

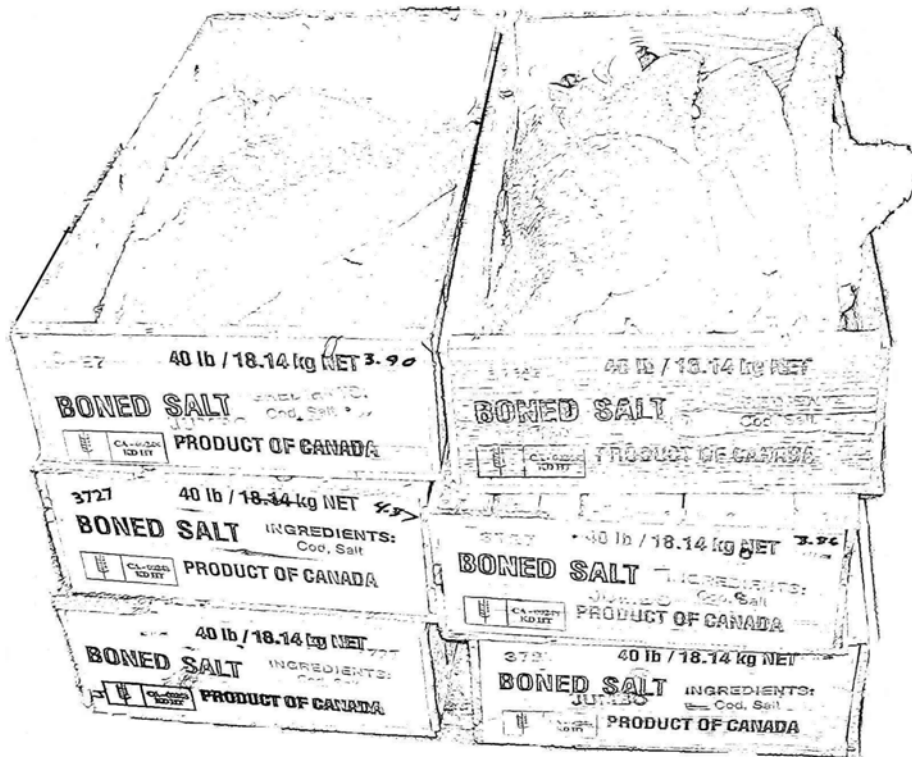
# REPORT

## Market and Product Development Study for the Salt Fish Industry In Nova Scotia

for the  
Nova Scotia Department of  
Fisheries and Aquaculture

Tender # 60130623

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**MRA**

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## **EXECUTIVE SUMMARY**

### **Project Overview**

The project focused on the markets for certain Nova Scotia salt fish products in the US and Brazil. The consultant travelled to these countries and interviewed supply chain members; including retailers, distributors, brokers and agents. Market trends and market share for comparable products were identified and charted. Key marketing factors were identified with a view to improving or enhancing Nova Scotia's marketing position for salt fish in these countries.

### **Nova Scotia Salt Fish Products**

Under international agreement, trade in salted and/or dried groundfish is covered under five main "product" categories (see below).

- 1) Fish fillets – dried, salted
- 2) Dried cod – salted or unsalted
- 3) Dried fish other than cod – salted or unsalted
- 4) Cod salted – not dried
- 5) Other fish salted – not dried

Some of the above product categories are also further broken down to provide more specific information, such as moisture content and the fish species involved (e.g., cod, hake, pollock, etc.).

In the above five categories, Nova Scotia exported 31,800 tonnes of salted/dried groundfish in 1990 and imported 61 tonnes. In the same categories in 2006, Nova Scotia exported approximately 9,600 tonnes and imported approximately 9,400 tonnes. The export dollar value in 1990 for the products was approximate \$151 million, dropping to about \$62 million in 2006. Imports in the sector totalled almost \$33 million in 2006, versus only \$150,000 in 1990. The "apparent" Nova Scotia trade surplus in salted/dried groundfish was \$29 million in 2006, versus nearly \$151 million in 1990.

The above product categories are just five of twelve that cover trade in the fish "product group" that also includes smoked fish, salted livers and roes, fishmeal (fit for human consumption) and salted and/or dried herring/anchovies/mackerel/alewife/salmon. When all 12 products in this group are included, Nova Scotia exports in 2006 increased by almost 1,500 tonnes. This relatively small increase includes about 1,000 tonnes of smoked fish (herring), 200 tonnes of salted mackerel and 100 tonnes of salted livers and roes. Nova Scotia exports in these additional products are also down from 1990 when almost 8,700 tonnes were shipped. In particular, almost 4,300 tonnes of salted herring and 1,100 tonnes of salted alewife were exported in 1990, but only a few tonnes were shipped in 2006 and Nova Scotia actually imported 1,000 tonnes of salted herring in 2006. In addition, exports of smoked herring, smoked mackerel and salted-dried herring fillets have decreased considerably since 1990.

Salted herring, in any form, has not been a major export product from Nova Scotia since the early 1990s and since salted herring, salted mackerel and salted livers and roes only accounted for a small percentage (about 3%) of salt fish exports in 2006, these products are not a major focus of the present study. Hence, the study focuses primarily on market opportunities for Nova Scotia salted and/or dried groundfish species in the five major product categories identified above.

## **The US Market for Salt Fish**

US imports for salted groundfish totalled \$US 113 million in 2006, up from \$77 million in 1990, showing an almost 50% increase in demand, while quantities increased by about 25% over the same period. This increased demand may come as a surprise to some market analysts (who suggest that “fresh and frozen” is the growing market) and even some US importers (who fear disenchantment of salt fish in the younger generations of their ethnically-based markets).

In terms of value, the US represented almost two-thirds of Nova Scotia’s salt fish exports in 2006, under the five designated product categories previously mentioned. Based on the available comparative data, Nova Scotia’s salted fish exports are estimated to account for about 30% of the US market share of these products in 2006.

The US market is segmented geographically, demographically and behaviourally. Geographically, more than 75% of the market is centred in the US northeast. Florida is also a fast growing market, reportedly based on retirees re-locating from the north. Demographically, the market is significantly populated by ethnic communities that originated from the Catholic counties of southern Europe and by immigrants from Caribbean countries that may, or may not be, Hispanic. Behaviourally, the Portuguese Americans have the largest demand for salted cod. Other European Americans are more likely to substitute salted pollock and other salted fishes. Caribbean Americans are more likely to prefer Alaska pollock and other less expensive substitutes.

Canada exports a full range of salted groundfish to the US, although some species are sourced elsewhere. Its main competitors are China, Norway, Iceland and Chile. In 2006, China overtook Canada as the major exporter in terms of value, as well as quantity. Norway has shown small, if any, increments in US exports over the last few years. Norway’s exports are 70% cod and the price per tonne is higher than Canada’s and considerably higher than China’s, a factor which likely constrains market development. Iceland is demonstrating a downtrend in US exports in recent years, in line with new global strategic approaches of major companies there. Iceland’s low prices reflect that it is mainly exporting salted products other than cod.

In terms of demand, the US market is primarily interested in salt fish fillets (other than cod), followed by dried fish (other than cod), which together comprise 57% of the market. Another 13% of demand is for pollock, cusk, haddock and/or hake in various forms. Salted or dried cod in various forms comprises the remaining 30% of demand, with cod fillets and dried cod at the top of the list.

Nova Scotia’s largest single export item is salt cod fillets, followed by other fish fillets, together accounting for almost 50% of export value. Salted cod fillets are also the most expensive salt fish product, averaging about \$US 10.00 per kg (import price). Prices for salt cod products are generally high, while haddock and hake are medium ranged (\$4.50 to \$5.00) and pollock is low (\$3.50 to \$4.00). While prices, on average, have increased by almost 50% since 1990; cod prices have more than doubled in some cases, while fish other than cod (e.g., Atlantic pollock and Alaska pollock fillets) have only experienced modest increases of 10% to 15% – i.e., not even keeping pace with inflation.

## Summary of US Market Options

In terms of traditional groundfish species, the US is in an under-supply situation. Nova Scotia processors must assess product and market development opportunities against the backdrop of a US salt fish market that is pretty well-served by inexpensive Alaska pollock from Asia, but is deficient in reasonably-priced traditional groundfish species, particularly cod. The lower price products primarily address US Caribbean immigrants, while the latter is the choice of most US European immigrants.

This study provides 10 product development and 6 market development options for the US market that the consultant believes can lead to increased quality, prices and prosperity. The options provided borrow heavily on examples from Iceland and Norway. There are no special recommendations for any of the options. The salt fish sector and/or individual processors will have to decide which options they can most efficiently implement under the circumstances they face. Moreover, some of the options point to the need for outside financial, research and marketing assistance. (Options are just listed below – please see the report for additional information.)

### Product Development Options

The premium product salt fish buyers want most is large, split-dried salt cod (traditional “bacalhau” or “bacalao”), usually heavily salted and well dried, with a brilliant white appearance. Nova Scotia must measure its resources to supply this product and/or acceptable substitutes. The market also usually demands that at least 80% of shipments be top quality, or in the “choice” category. The main product development options are intended to produce more product(s) at maximum quality and profit potential.

- 1) Produce More Groundfish for Salting (especially cod)
- 2) Salt New or Unused Species
- 3) Joint Venture with Alaskan Suppliers
- 4) The Whiter the Fish, the Higher the Quality (and Price)
- 5) Injection Salting
- 6) Filleting for Highest Returns
- 7) Sell Bone-in (if possible)
- 8) Quality Sorting
- 9) New Product Opportunities
- 10) Additional Research

### Market Development Options

Not every US distributor, wholesaler or broker complained about a lack of supply of traditional salted groundfish products, but most did. Under the conditions of shortage of supply, it is a seller’s market and aggressive market development may not always be necessary. However, some of the major market development options might include:

- 1) Pooling Efforts for More Market Strength
- 2) Branding Nova Scotia Salt Fish (generally, not recommended)

- 3) Improved Sales Presentation at Point-of-Purchase
- 4) Develop Nova Scotia Recipe Booklets for Salt Fish
- 5) Experiment with New Products and Markets
- 6) Additional Research

### **The Brazilian Market for Salt Fish**

Brazil's imports of fish and seafood products totaled \$427 million in 2006, of which \$183 million (43%) was salt fish. Cod made up almost 55% of the total salt fish imports by value, but only 27% by quantity, while other salted/dried fish made up the rest. The cod imported is mostly Pacific cod. Saithe was the largest import in terms of tonnage, accounting for about 60% of total salt fish imports. Norway was the largest supplier in 2006, accounting for almost 82% of salt fish imports by value, with Portugal accounting for most of the rest. Brazil's salt fish consumption makes it the third largest importer in the world, after Portugal and Spain. Boosted by a strengthening currency, Brazil's salt fish imports have also been growing rapidly in recent years.

In terms of present market conditions, traditional North Atlantic salt cod or "bacalhau" is very expensive in Brazil – as much as \$Cdn 25.00 per pound retail – although an "average cut" is about half that amount. Still, that is expensive, even by North America standards, and poorer Brazilians focus on less expensive fish. In Brazil, much of the salt fish market growth in recent years has been in saithe (i.e., Atlantic pollock). However, the Brazilian market has recently been opened to the Chinese and a flood of cheaper salted Alaska pollock (called "migas") is now expected.

Like Portuguese speakers everywhere, the difference between Atlantic cod ("*Morhua*") and Pacific cod ("*Macro*") is of great importance, with *Morhua* being the premium product and more expensive. "Porto" bacalhau is the traditional and commercial name for Atlantic cod when the fish is over 3.5kg; "portinho" refers to fish under this size. These terms are now applied to Pacific cod as well, although this fish has only recently been introduced to Brazil.

The word "bacalhau" has such a strong market presence that the name can now only legally be used for branding salted Atlantic and Pacific cods. Nevertheless, Brazilians take some license with the name "bacalhau," extending its meaning to describe other members of the cod family (e.g., "bacalhau – saithe," "bacalhau – zarbo," etc.). Even unsalted fresh or frozen cod fillets can sometimes be called "bacalhau," so that consumers could be confused as to whether it is a fish or a form of processing – and if a fish, what fish it is, or if a form, what form it is. An MRA focus group also confirmed that some Brazilians view "bacalhau" as the legitimate species name for cod, rather than a branding concept for a salted fish (i.e., the original meaning of the word).

Canadian exporters may be interested in the Brazilian market for the following reasons:

- 1) the market for salt fish is expanding and there is great long term growth potential,
- 2) prices are generally strong and Nova Scotia may have a price advantage in some products,
- 3) the market for salt fish is already developed; promotion costs may be minimal,
- 4) Brazil could be a better market than US for value-added products,
- 5) Brazilians seem to like Canadians; importers are interested in working with Canadian exporters.



Some of the problems that Canadian exporters might have to deal with in exporting to Brazil include:

- 1) Brazilian bureaucracy moves slowly; Canadian exporters will need an agent in-country,
- 2) Some Brazilian importers may seek external financing (not so true with larger importers),
- 3) Already existing competition (may be good or bad),
- 4) Brazil applied a 10.2% duty on imported fish products in 2006,
- 5) It would be helpful to have some facility in the Portuguese language.

### **Options: Special Considerations for the Brazilian Market**

All of the product and market development options for the US market are also true for Brazil, with the following qualifications:

- Nova Scotia Branding: The most appropriate brand name would probably be “Bacalhau da Terra Nova” (Newfoundland) as this is a known product, at least to a portion of the market; but this would conflict with a Nova Scotian identity. However, since about 95% of imported salt fish is split-dried, and not fillets, it is uncertain if a brand is necessary immediately. It may be a good idea not to have Canadian product differentiated from Norwegian to start with, although stores may differentiate Canadian products on their own.
- Norway has a bacalhau website in Portuguese (<http://www.bacalhaudanoruega.com.br>) In conjunction with branding considerations, a Nova Scotia bacalhau website may become desirable or necessary, especially if Nova Scotia has the production potential to fuel significant growth. At that point, the website would probably best be in English and Spanish as well.

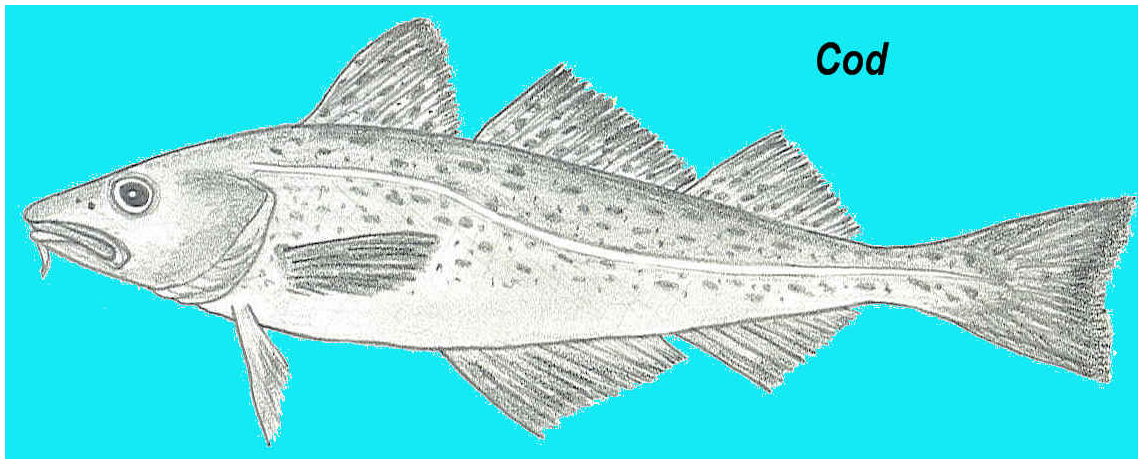
### **The Example of Iceland and Norway**

Iceland has high labour costs, yet competes effectively in world fisheries by having modern, high technology operations in all aspects of the industry. The world’s largest provider of salt fish, Norway, has a salt fish industry that is less profitable, but improving rapidly. The Norwegian research group, Fiskeriforskning, studied the differences between the Norwegian and Iceland industries and identified several factors that account for Iceland’s excellent performance.

- 1) The management of quotas to provide a year-round supply of raw material,
- 2) Processors have invested in the latest generation of processing systems that help to maximize yields, increase throughput and efficiency and optimize product quality,
- 3) Mitigation of damage caused by fishing gear and poor handling on board the boats,
- 4) Sorting fish by quality such that the customers know what they are buying.

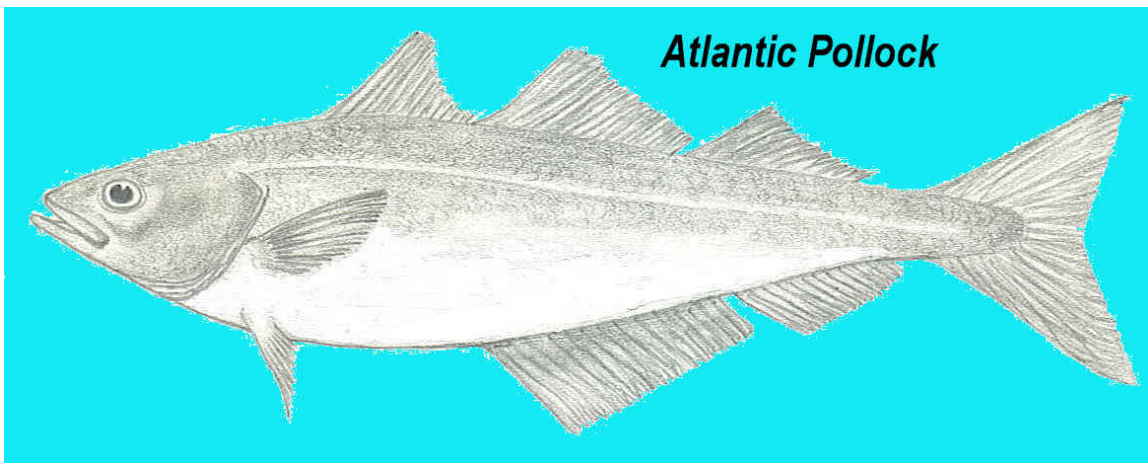
Norway now has an excellent research program to improve salt fish quality and maximize value from “the sea to the table.” Research goals are developed through an interactive consultative process starting with industry and industry organizations and funded primarily by an export tax, with other government departments or organizations often sponsoring some the costs.

## Common Salted Groundfish Species

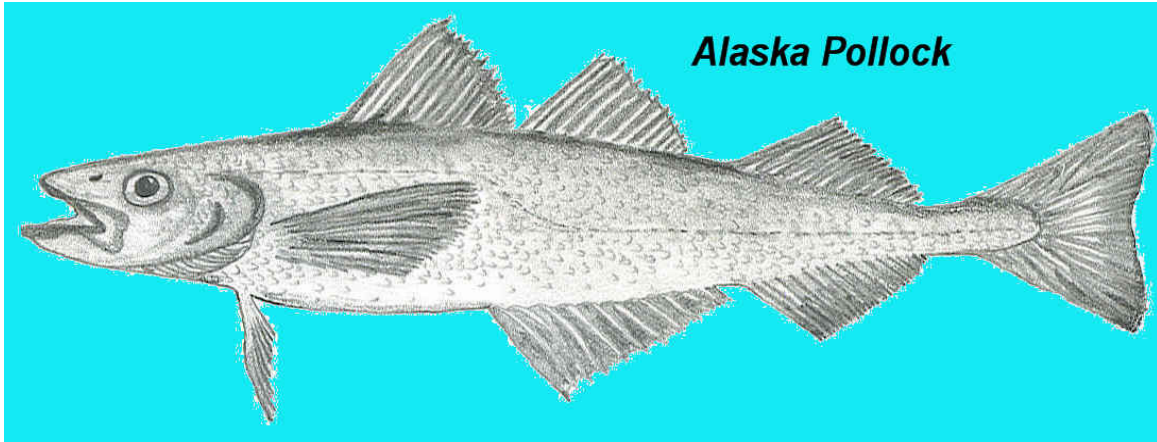


The **Atlantic cod** (*Gadus morhua*) has traditionally been the premium salted fish in the world. However, a closely related species, the **Pacific cod** (*Gadus macrocephalus*), is now the less-costly catch and is often substituted for Atlantic cod. This substitution is not always identified in the US marketplace; however, Atlantic cod is preferred by knowledgeable buyers and commands a higher price. To differentiate these species in Brazil, the fish are usually referred to by their abbreviated Latin names “morhua” (Atlantic cod) or “macro” (Pacific cod).

Other close relatives of the Atlantic cod, the polar cod (*Boreogadus said*) and the Greenland cod (*Gadus ogac*), are also salted, but are not major commercial species for this purpose.

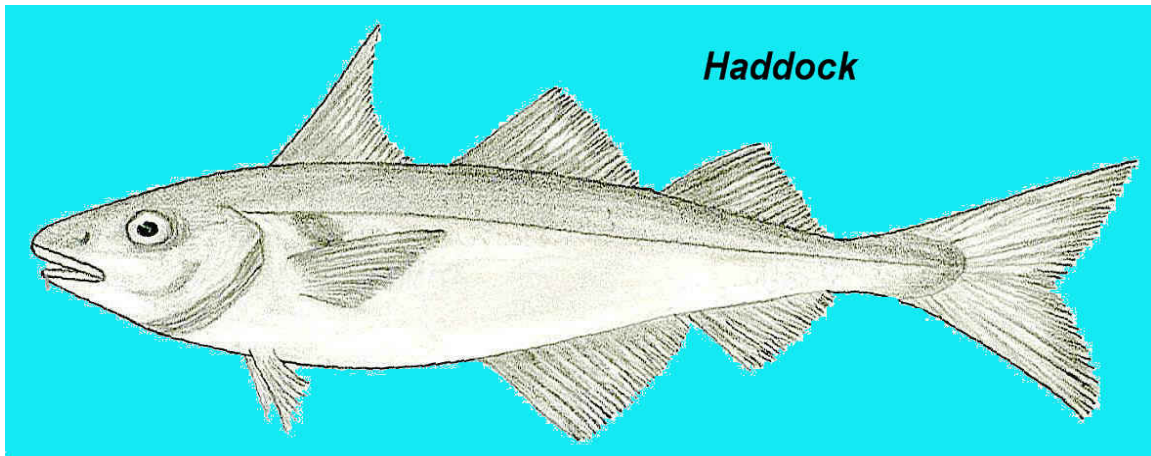


**Atlantic pollock** or saithe (*Pollachius virens*) is common to both sides of the North Atlantic Ocean, but saithe is the commercial name used throughout much of the world, including Europe and Brazil. Atlantic pollock is also a member of the cod family and is now perhaps more commonly salted than Atlantic cod. Salted pollock is a darker coloured fish than cod and has a more distinct flavour. The Atlantic pollock is a different species than the European “pollack,” (*Pollachius pollachius*) that is usually caught as a by-catch and is not a major salted species.



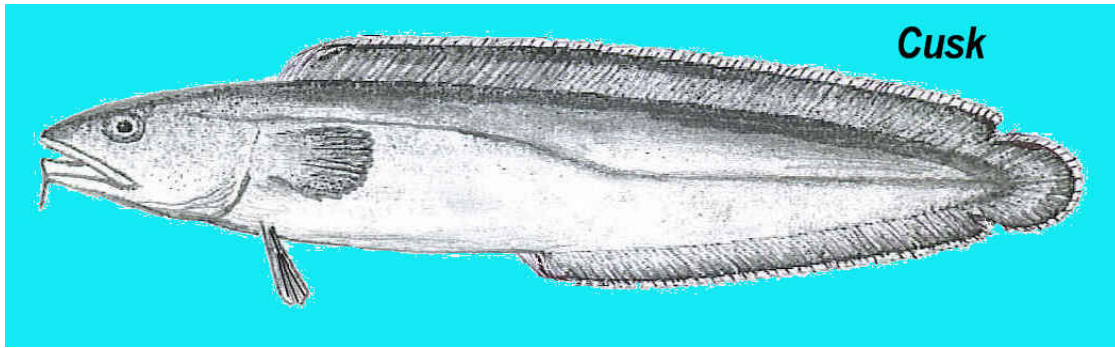
**Alaska Pollock**

**Alaska pollock** or walleye pollock (*Theragra chalcogramma*) is a member of the cod family, Gadidae. A species almost unheard of before the early 1980s, Alaska pollock is now one of the world's largest fisheries. As such, it is an inexpensive source of whitefish. It is a relative newcomer on the salt fish scene; however, because of its low price, it has made major inroads into traditional markets. This fish is small and generally sold as lightly salted fillets.



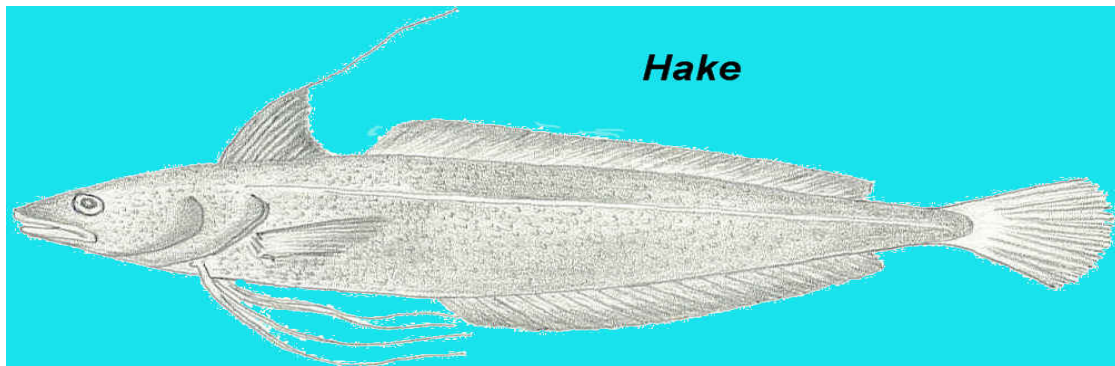
**Haddock**

**Haddock** (*Melanogrammus aeglefinus*) is in the same family as Atlantic cod and is generally acceptable as a salted fish. It tends to be a little softer and flakier than cod when salted and the colour may be less white. However, mostly because haddock is a valuable species and/or is not consistently available, it is not frequently salted at the present time.

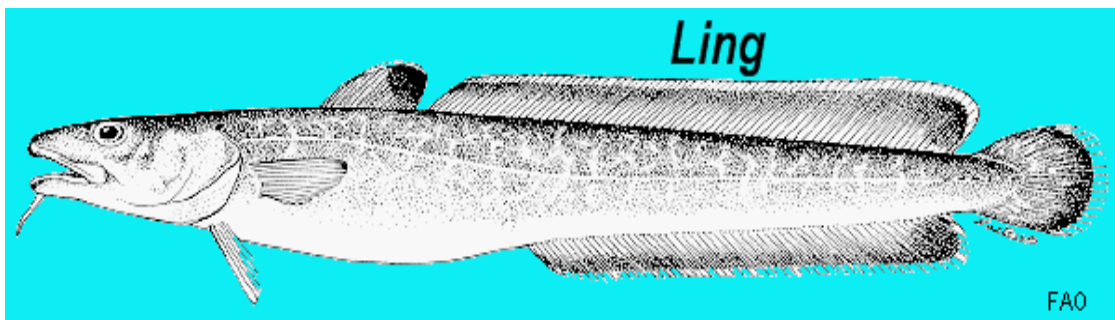


**Cusk** (*Brosme brosme*), also called tusk or zarbo, is another major salted species. Cusk is the recognized name in North America (AFS); however, tusk is the recognized name in Europe (Fishbase). Zarbo is the market name for this fish that is used in Portuguese-speaking countries such as Brazil.

Another species (not shown) called **forkbeard** (*Phycis blennoides*) is native to the Northeastern Atlantic Ocean, may also be salted. This fish looks something like a cusk (Norwegian name is “bustebrosme”), although it is actually a different species. It is not considered a major salted species on its own, but might sometimes be marketed as cusk or ling (see below).



**White hake** (*Urophycis tenuis*) and other groundfish species such as whiting can also be salted and/or dried. Often they are just not available in commercial quantities or their price is too high to justify this type of processing. However, some fishes just don't salt well. For example, some species of Merluccid hakes have a body fat structure that interferes with the salting process.



**Ling** (*Molva molva*) is a cusk-like fish caught primarily in the Northeast Atlantic between Greenland and Norway. A similar species, and similar looking fish, **blue ling** (*Molva dypterygi*) primarily occupies the same range, but is also found off Newfoundland. This latter species (not shown) is not considered a major salted species on its own, but might sometimes be marketed as ling.

## Glossary and Terms

Bacalao – Spanish for salt cod (also “baccalà” in Italy; “vakalaos,” “bakaliaros” or “bakalarakia” in Greece)

Bacalhau – legal Portuguese name for salted Atlantic cod or Pacific cod.

Boned – fish in which the bones have been removed; also called “boneless” in the US; (opposite “bone-in”)

Klippfish (Clipfish) – Norwegian term for fish that are salted and dried

Drying Factors:

- Dry (38%-40% moisture)
- 7/8's Dry (42-43% moisture)
- Semi-Dry (40%-44% moisture)
- Ordinary Cure (44%-50% moisture)

Dry salted – split fish are usually stacked between layers of salt such that the extracted fish liquid runs off

Green salted – fish that are salted, but not otherwise dried

Hard cure (heavy cure) – heavily salted, split fish, subsequently dried to a low moisture content

Light Cure (or Gaspé Cure) – dry salting of split fish in which the fish are immersed in the brine produced by extracted liquids for 2 to 3 days and then dried, producing a lightly-salted product of amber colour.

Product Grades for salt fish (North America):

- Choice
- Standard (10% off choice because of surface defects, blood, missing tail or nape)
- Commercial
- Bulk

Product Grades for salt fish (Norway):

- Imperial
- Universal
- Popular

Skrei – spawning cod stocks (Norwegian)

Split fish – fish that are gutted and in which about two-thirds of the backbone is removed so the fish can be butterflied; the most common form of salted fish

Stockfish – fishes that are dried, but unsalted (although dried fish are often considered to be in the salt fish category)

Wet salted – split fish are immersed in a brine solution (or “pickled”)

## **1.0 INTRODUCTION**

Nova Scotia's salt fish processing sector is under review. The sector that produces dried, salted and smoked fish (also referred to as Product Group HS 0305 in international trade) supported exports of more than \$160 million in 1990, but only \$71.5 million in 2006. Moreover, exports of the core salted and dried groundfish products in this group have declined from \$151 million in 1990 to \$62 million in 2006, and associated quantities have declined even further over the period – from 32,000 tonnes to less than 10,000 tonnes, amidst significant imports in this same sector.

Some of the current challenges that the Nova Scotia salt fish industry is facing include decline of resources, loss of market share, competition from low cost suppliers, tight margins and the drop in the US dollar, all of which have contributed to the present state of the industry. Building on a report completed in 2004, “The Nova Scotia Saltfish Industry: Situation and Prospects 2004” produced by Gardner Pinfold Consulting, the Nova Scotia Department of Agriculture and Fisheries requested proposals to identify the best options for moving forward and for developing plans for the successful marketing of salt fish.

The overall objective of this study was to re-capture market share in established markets while diversifying into new international markets and new product offerings. In addition, the study called for the identification and profiling of successful salt fish infrastructure and market development models used in other countries. For additional information on study parameters, see Appendix 1.

For readers who might not be familiar with the fish salting and drying process, an illustrated overview of the process is provided in Appendix 2.

## **2.0 STUDY OBJECTIVES**

### ***General***

Provide an in-depth market analysis of the USA and Brazil marketplaces identifying the best opportunities for significant increases in market share and sales. Focus on new opportunities in international markets where salt fish does not currently have a market share and/or an existing market where Nova Scotia has the ability to recapture substantial market share.

### **Competitive Challenges, Market Share & Development- specific to each market place**

- In-depth analysis of the selected marketplaces.
- Describe how do socio-economic and demographics factors affect purchasing in the marketplace.
- Profile the typical customer purchasing salt fish and how to target this customer.
- Identification of target market / niche markets.
- Seasonality of salt fish purchases throughout the year, seasonal (Easter, Christmas etc.)
- Describe which competitors are succeeding and why and market share.
- Describe what competitors are doing to maintain/increase market share.
- Determine Nova Scotia's competitive value proposition.
- Describe Nova Scotia's differential advantage in the international market place.
- Describe how Nova Scotia is stacking up against the competition.
- Describe the challenges and requirements to gain a significant share of the market.
- Describe barriers to entry such as regulatory issues, logistics (import transportation distribution), tariffs, packaging etc.
- Determine what is required in terms of marketing and promotional support to significantly increase market share/sales.

### **New and Existing Products**

Identify new and existing products (species, package size, product form) with the highest potential for success in the international market place that are more in line with today's consumption habits.

- Identify new products that provide the best opportunity for success; suited to today's consumption.
- Identify value added opportunities to meet the growing demand for consumer friendly products.

- Identify the key “other” products that salt fish will compete against.
- Describe the most popular product line/offering preferred by customers in each of the markets.
- Develop a strategy for building an internationally recognized brand name for salt fish.

### **Salt Fish Infrastructure and Market Development Models**

Profile countries such as Norway and Iceland that have developed successful models for industry-led market development and salt fish infrastructure in order to address new markets. Describe plans that have been developed for on-going marketing and sales. Identify the infrastructure has been put in place to meet these challenges. Comment on industry /government organizational models for market development.



### **3.0 METHODOLOGY**

The study examines the salt fish sector in Nova Scotia within the context of the larger international supply and demand situation. In particular, the international competition for markets in the US and Brazil was investigated. The consultant traveled to these markets to interview key supply chain personnel from brokers and wholesalers to distributors and retail buyers. Retail operations were also investigated and photographed, where possible, at store and/or market levels. The consultant also conducted consumer group interviews on salt fish in Brazil. Canadian Government consulate officials in the respective countries were also interviewed. A list of study contact personnel is provided in Appendix 3.

Secondary data were obtained from Statistics Canada, the US Census, UN Comtrade, FAO, SECEX, and various other trade associations. Canadian Government personnel in Norway and Iceland provided important information on those country's salt fish sectors. Agri-food Canada personnel provided important statistics on the Canadian and Nova Scotia salt fish trade. Other information was gleaned from internet sources.

The reported information is aligned with earlier work on the Nova Scotia industry by reporting data at the Harmonized System 4-digit Product Group level (HS-4) and by reporting key dates used in previous work (1990 and 2003). However, where possible and appropriate, trade data at the H-6 level (i.e., the standard reporting level) as well as HS-8 and HS-10 are used to provide more detail; especially for actual salted species information. See Appendix 4 for a full list of detailed HS Codes. The somewhat overwhelming amount of statistical tables used in the report was necessary due to the number of countries and products involved and the need to examine trade revenues and quantities.

It should be noted that some discrepancies occur in statistical reporting between exporting and importing countries. This is normally explained by differences in freight costs, tariffs and the time of year shipped/received. Usually these discrepancies were minor, but in a few cases totaled 10% or more of the trade figures. Except for Canadian data, trade values were usually reported in \$US.

## **4.0 HISTORICAL DEVELOPMENT OF THE SALT FISH TRADE**

History and tradition play a large role in the salt fish trade, even today. In order to understand present day consumption patterns, it is helpful to understand how this trade developed over time. Not only did salt fish become such an important food product that it attained the level of an icon in some cultures (cod especially), it was also a necessary provision for discovering and settling new continents and created many economic booms, including one in New England that many historians credit with helping precipitate the American Revolution.<sup>1</sup> This section provides a brief history of the salt fish trade and describes the present state of the key players in this commodity.

Nordic cultures originated a trade in codfish more than 1,000 years ago. The Oslo Museum in Norway holds manuscripts from the 9<sup>th</sup> century describing a system for drying cod in Iceland and Norway before the use of salt. Records indicate some of this dried, unsalted cod (or stockfish) was already being exported to England.<sup>2</sup>

It is now believed that Nordic explorers also introduced stockfish to the Iberian Peninsula about the same time. Before long, cod was being salted in this region, as well as dried. Records show that Basques were trading salt cod in Europe in 1000 AD. Basque traders used salt to preserve cod and dried the fish on rocks in the open air to maximize preservation.<sup>3</sup>

The idea of salting fish as well as drying it soon caught on and an especially large trade in salt cod developed between Northern Europe and Mediterranean countries over the next six hundred years, spurred on by many the fasts required for religious holidays in Southern Europe. Salt cod from Norway, Denmark and other countries was traded for various goods including wine, cloth, spices and salt. By 1120 AD, King Sigurdsson of Norway was taxing codfish exports.<sup>4</sup>

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1 The British Restraining Act of 1775 included prohibiting New England from fishing in the North Atlantic.

2 Queiroz, M 2006. *Cod Reigns over the Christmas Banquet*, IPS Dec 2006

3 Queiroz, M, *Ibid.*

4 Wyatt, T. 2000. *Long term trends in Norwegian cod fisheries – the pioneers*, UVAC Meeting, 6-7<sup>th</sup> March, 2000, Tromsø

While Norway and Iceland had a ready supply of cod off their coasts, the Portuguese, Basques and Spanish had to look further a field. Records suggest some fishermen from these countries were fishing cod off Newfoundland even before Columbus “discovered” America.<sup>5</sup> Throughout the 1500s, fishing boats from all over Europe sought cod and other fish on these new fishing grounds. The “Grand Banks” of Newfoundland was found to be the largest and most productive fishing grounds in the world. These fishing banks are part of the North American continental shelf, having a depth of about two hundred feet, extending from the southeast of Newfoundland almost to Cape Cod, USA. The cold Labrador Current and the warm Gulf Stream Current meet over the banks to create ideal conditions for the growth of cod and other fish.

The ever increasing cod catch not only ensured that salt fish became a staple product in Southern Europe, but also embedded this food in the popular culture, especially Portugal, where salt cod (“bacalhau”) is still the national dish today and is referred to as a “faithful friend.” Portugal and Spain also introduced salt fish to their colonies in the New World. Salted cod helped make the long voyages of discovery possible.

Despite various European wars, trade in salt cod continued to expand in Mediterranean countries including Spain, France, Italy and Greece throughout the early years of the second millennium. However, European wars in the late 1500s brought fishing from Spain and Portugal to a halt on the Grand Banks and created a virtual monopoly there for England. Portugal, the originator of the salt fish trade, was reduced to purchasing salt cod from England and its colonies.

The salt fish trade spurred the settlement and economic development of the New England colonies. Unlike Newfoundland, fishing was possible year around in New England, leaving the summers free for farming. Moreover, Britain’s mercantilism policies forced New England to seek markets outside of the mother country and soon a strong trade with Southern Europe developed, as well as with Caribbean countries.

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5 Jensen, Albert C. 1972. *The Cod* , Thomas Y. Crowell Company, New York

New England merchants exported fish to Spain and Portugal in exchange for wine, fruit, salt, iron, coal and other European products. Later this trade developed into a triangulated trade that included a Caribbean stop on the way back from Spain. The fish trade, especially cod, provided great wealth to the new colony and created a ‘codfish aristocracy’ in Boston. Mansions were built and decorated with symbols of codfish. Early US coins, tax stamps, state seals and company crests were issued with an emblem of the “mighty” codfish.<sup>6</sup>

As trade developed over the years, the Caribbean became a market for poorer quality salted fish that could not be sold in Europe. Fish that was small, poorly split, over-salted, under-salted or poorly dried was traded for salt, molasses, sugar, rum, coffee, spices, cotton, dyes and tobacco in the West Indies. Salt cod that was traded for molasses was used to make rum in New England that, in turn, was also exported to buy slaves shipped to the Caribbean.<sup>7</sup>

<b>Table 1 Nova Scotia Salt Fish Exports in 1990 (\$Cdn) (All Salted, Dried and Smoked Products)</b>	
<b>Major Importing Countries</b>	<b>\$Cdn</b>
<b>Portugal</b>	65,275,000
<b>US</b>	46,261,000
<b>Norway</b>	18,197,000
<b>Dominican Republic</b>	8,933,000
<b>Denmark</b>	6,874,000
<b>Jamaica</b>	2,956,000
<b>U.S.S.R. (former)</b>	2,064,000
<b>Japan</b>	1,463,000
<b>Greece</b>	1,420,000

Statistics Canada (numbers rounded to nearest 000)

After the American Revolution, some of the US salt fish trade with British colonies in the Caribbean shifted to Nova Scotia and Newfoundland. Eventually, this led to Nova Scotia becoming a major supplier of salt fish to the world.

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<sup>6</sup> For a more complete discussion of the impact of fisheries in the development of North America, see Mark Kurlansky’s book *Cod: A Biography of the Fish That Changed the World*.

<sup>7</sup> Rodger, R. W. A. 2006. *The Fisheries of North America*, Canadian Marine Publication, Halifax, NS. .

North American demand for salt fish generally increased throughout the 1800s and salt cod was a staple of the Union Army in the American Civil War. In North America, salt fish demand was gradually replaced by the demand for fresh fish after cold storage became widely available, starting in the late 1800s. Salt fish also appears to have declined in demand in many European countries; however, it is still held in high esteem in some places, especially Portugal, Spain and Brazil.

By 1990, Portugal had become Nova Scotia's major salt fish market, purchasing \$65 million of salt cod. Even Norway, the traditional supplier to Portugal and other Mediterranean countries, was a major importer of Nova Scotia salt fish less than 20 years ago (see Table 1).<sup>8</sup>

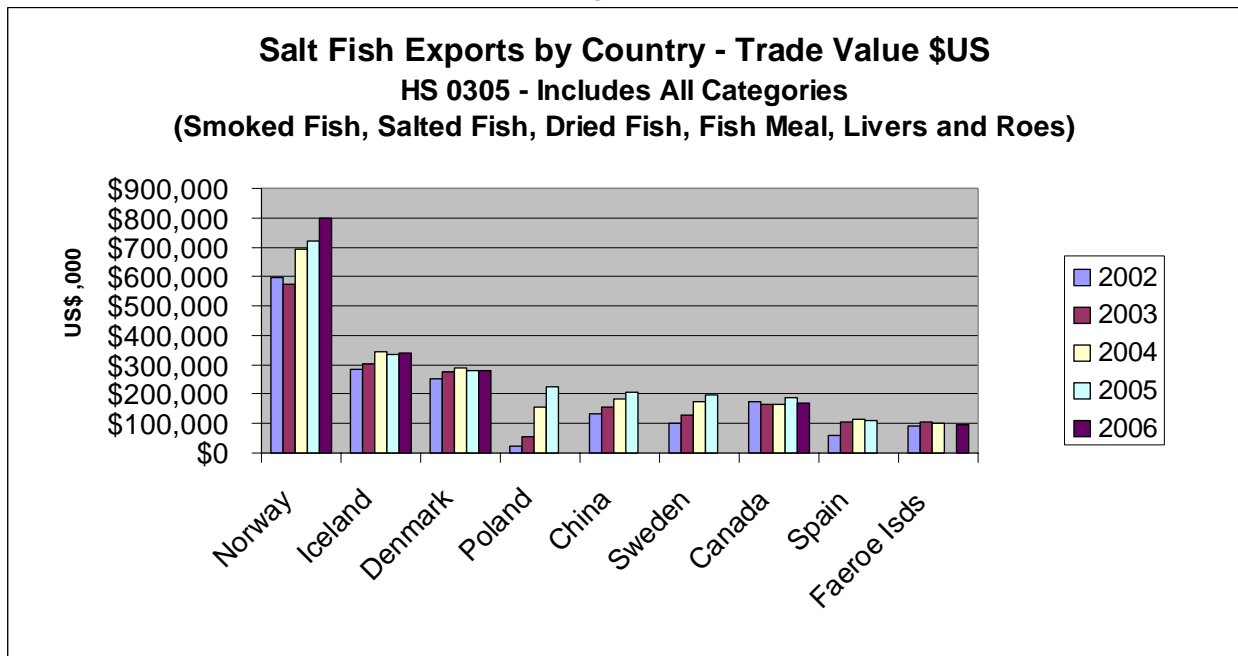
<b>Table 2</b>				
<b>Nova Scotia Salt Fish Exports – Selected Years (\$Cdn)</b>				
<b>(All Salted, Dried and Smoked Products)</b>				
<b>Importing Countries</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2006</b>
<b>US</b>	46,260,705	78,902,910	83,862,931	45,719,548
<b>Portugal</b>	65,275,266	1,191,813	7,251,172	4,995,151
<b>Jamaica</b>	2,956,115	3,152,531	12,387,766	4,182,267
<b>Trinidad / Tobago</b>	156,944	463,688	1,801,121	3,218,669
<b>Mexico</b>	--	--	175,743	3,069,264
<b>Dominican Rep</b>	8,933,266	9,351,434	813,146	2,073,788
<b>Greece</b>	1,420,170	909,100	275,400	1,442,099
<b>Spain</b>	1,025,806	23,624	928,336	917,650
<b>Congo (Zaire)</b>	273,219	--	--	696,012
<b>Barbados</b>	516,554	224,953	360,332	687,303
<b>Subtotal</b>	126,818,045	94,220,053	107,855,947	67,001,751
<b>Others</b>	35,543,583	5,190,419	2,031,900	4,488,704
<b>Total</b>	162,361,628	99,410,472	109,887,847	71,490,455

Statistics Canada

The United States is now the major market for Nova Scotia salt fish (see Table 2). Exports to the US more than doubled throughout the 1990s, reaching \$88 million in 1999 (not shown); however, exports to the US have declined in recent years and are now about the same level as they were in 1990.

<sup>8</sup> Cod landings in Norway were at a low in 1990; they have since rebounded.

**Figure 1**



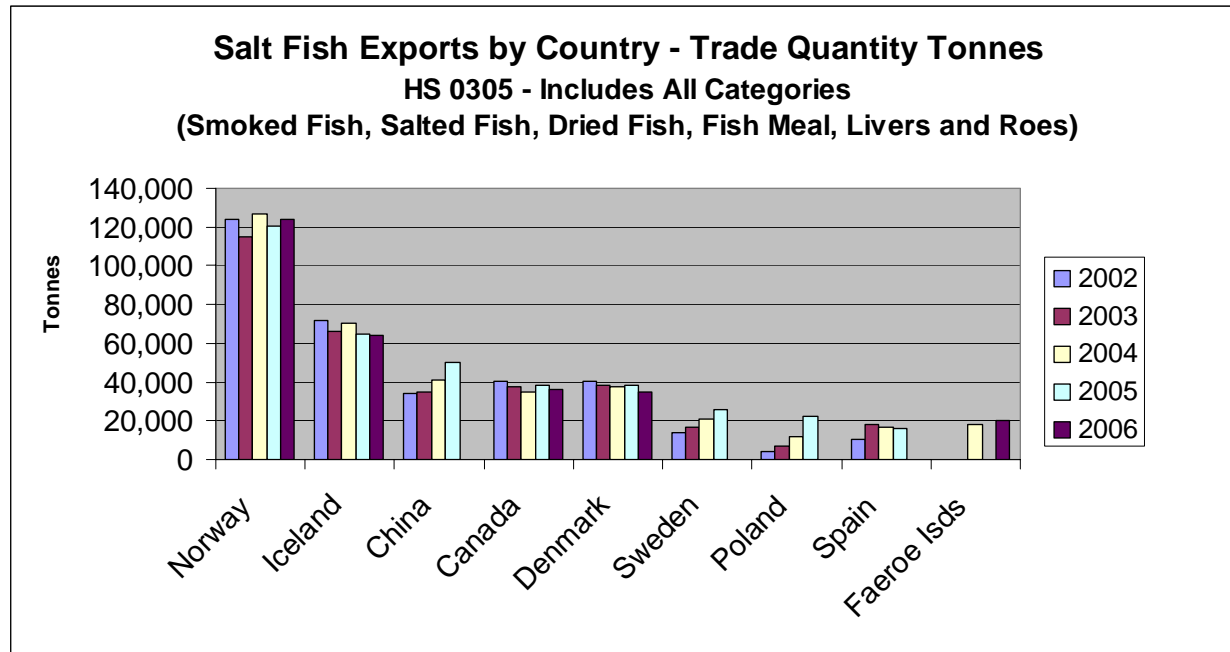
2006 data from Poland, China, Sweden and Spain not presently available  
 Data represents all data reported under HS 0305, including fish meal, dried fish, smoked fish and salted livers and roes.  
 Source: MRA adapted from ComTrade and Statistics Canada data

In the larger picture, Canada’s position as a major player in the world salt fish trade has declined since 1990, overshadowed by countries such as Norway, Iceland and Denmark — countries with a long tradition in this market, but perhaps more importantly, larger resources at present.

Figure 1 above reflects exports under the 4-digit “product group” trade code HS 0305 that includes twelve “product categories” at the 6-digit level. These product categories not only include salt fish (both pelagic and groundfish), but also smoked fish, dried fish, salted livers and roes and fish meal fit for human consumption. Poland’s exports under this product group are almost wholly smoked fish (and Denmark is also a large producer of smoked fish), while the USA leads in fish meal exports fit for human consumption and Canada leads in salted roes.

World exports under the “product group” HS 0305 were reported as \$3.36 billion in 2005, led by Norway at \$US 720 million (\$US 800 million in 2006). However, at a more detailed level (6-digit codes) that primarily relates to salted and dried fish, the 2005 export total was approximately \$2 billion (not shown).

Figure 2



2006 data from Poland, China, Sweden and Spain not presently available.

2002, 2003 and 2006 data from Faeroe Islands not reported.

Data represents all data reported under HS 0305, including fish meal, dried fish, smoked fish and salted livers and roes.

Source: MRA adapted from ComTrade and Statistics Canada

The total export volume of salt fish in the world can be somewhat distorted through “re-processing.”<sup>9</sup> Countries such as Norway and Iceland generate the initial production, which is further processed (perhaps further dried or just re-packaged) and exported again by such countries as Sweden, Spain, Portugal, Canada. It appears that worldwide initial production of fish in the salted and dried category (i.e., five of the twelve 6-digit codes under the HS 0305 product group) is in the 300,000 tonne range. Including re-processing and exports of other products under HS 0305, world exports volumes appear to be in the 400,000 tonne range (see Figure 2).

In terms of most of the world’s principal salt fish exporters, fish meal, smoked fish and salted livers and roes are not a major export item; however, they do form a significant percentage of the exports of some countries such as Canada; exaggerating Canada’s present contribution in the core salted and dried fish products category. This situation will be examined later in the report.

<sup>9</sup> Re-exports are another trade category not included here that signifies minimal or no re-processing.

## **5.0 OVERVIEW OF THE NOVA SCOTIAN SALT FISH SECTOR**

### ***General***

The international Harmonized Commodity Description and Coding System (HS) is administered by the World Customs Organization (WCO) based in Brussels. Almost 200 countries, representing about 98% of world trade, use the HS as a basis for trade negotiations, collecting international trade statistics, quota controls, rules of origin and statistical and economic research and analysis. In 1988, Canada adopted this system to replace the Customs Tariff Schedule.

Trade data under the HS is collected using a six-digit numeric system that assigns an internationally agreed upon 6-digit code to all traded goods. In addition, countries may assign more finely defined 8- and 10-digit export and import codes for some products. These are generally for internal use and the codes may be different in different countries.

Salt fish “products” (6-digits) are reported under the 4-digit Harmonized System “product group” 0305 (Fish: dried, salted, in brine, smoked and fish meal for human consumption). Within NAFTA, export statistics between Canada and the US are collected by the host country and both countries are in basic agreement on export-import trade volumes and values. Canada also reports data at an 8-digit export level and 10-digit import level, while the US reports data at 10-digits for both imports and exports.

At the 6-digit level of detail, twelve salt fish products are defined under HS 0305 (see Table 3 over). These include fish meal, fish livers and roes, pelagic fishes, smoked fishes, dried fishes and salted fish or fish in brine; as well as various combinations of the above. In 1990, we can see that total exports from Canada under this category were approximately \$435 million. By 2006, these same categories reveal exports had dropped to approximately \$191 million. Canadian exports of salted cod (HS 030562), in particular, have dropped precipitously from almost \$145 million in 1990 to about \$18 million in 2006 (see Table 4 over).



<b>Table 3</b>	
<b>HS 0305 Product Group 6-Digit Product Codes</b>	
<b>Fish dried, salted, in brine, smoked and fish meal for human consumption</b>	
<b>HS 6</b>	<b>Description</b>
HS 030510	FISH MEAL - FIT FOR HUMAN CONSUMPTION
HS 030520	LIVERS AND ROES - DRIED, SMOKED, SALTED OR IN BRINE
HS 030530	FISH FILLETS - DRIED, SALTED OR IN BRINE BUT NOT SMOKED
HS 030541	SMOKED SALMON (ATLANTIC, PACIFIC) - INCLUDING FILLETS
HS 030542	SMOKED HERRING - INCLUDING FILLETS
HS 030549	OTHER SMOKED FISH NES - INCLUDING FILLETS
HS 030551	DRIED COD – WHETHER OR NOT SALTED – NOT SMOKED
HS 030559	DRIED FISH (OTHER THAN COD) – WHETHER OR NOT SALTED - NOT SMOKED
HS 030561	HERRING, SALTED OR IN BRINE - NOT DRIED OR SMOKED
HS 030562	COD, SALTED OR IN BRINE - NOT DRIED OR SMOKED
HS 030563	ANCHOVIES, SALTED OR IN BRINE - NOT DRIED OR SMOKED
HS 030569	OTHER FISH - SALTED OR IN BRINE - NOT DRIED OR SMOKED

Source: WCO

<b>Table 4</b>					
<b>All Canadian Exports of Salted, Dried and Smoked Fish and Fish Meal Fit for Human Consumption - Selected Years (\$Cdn)</b>					
<b>HS 6</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2003</b>	<b>2006</b>
030510	41,229	24,913	12,407	442,890	48,844
030520	172,121,955	169,291,410	132,845,620	90,406,640	50,022,671
030530	38,346,146	53,986,243	51,439,606	39,837,647	33,808,881
030541	7,680,320	12,170,650	8,675,378	7,305,961	4,160,105
030542	14,753,386	17,284,650	17,548,622	18,492,825	25,379,353
030549	1,238,074	1,332,089	1,572,714	1,479,934	1,546,983
030551	12,868,109	29,527,331	26,016,858	15,473,849	16,541,846
030559	4,470,435	16,005,489	6,914,358	9,368,883	8,405,296
030561	9,010,784	4,458,111	5,269,344	2,426,390	2,344,462
030562	145,271,345	9,697,907	30,058,585	24,818,247	18,285,700
030563	20,829	--	4,777	436	2,904
030569	28,773,084	32,719,605	25,699,528	21,817,496	30,618,962
<b>TOTAL</b>	<b>434,595,696</b>	<b>346,498,398</b>	<b>306,057,797</b>	<b>231,871,198</b>	<b>191,166,007</b>

Source: Statistics Canada

At the same time, within Canada, Nova Scotia's total exports under the HS 0305 category were approximately \$162 million in 1990. By 2006, these same data reveal exports had dropped to approximately \$71.5 million. Nova Scotia exports of salted cod (HS 030562), in particular, have dropped from almost \$100 million in 1990 to about \$12 million in 2006 (see Table 5 over). In general terms, Nova Scotia accounted for approximately \$71.5 million (37%) of Canadian exports of approximately \$192 million under all the product categories found in product group HS 0305 in 2006.

Table 5 All Nova Scotia Exports of Salted, Dried and Smoked Fish and Fish Meal Fit for Human Consumption (HS 0305) - Selected Years (\$Cdn)						
HS 6		1990	1995	2000	2003	2006
030510	FISH MEAL - FIT FOR HUMAN CONSUMPTION	-	6,236	-	5,611	3,532
030520	LIVERS/ROES - DRIED, SMOKED, SALTED/BRINE	1,741,449	2,812,076	677,659	807,138	1,109,466
030530	FISH FILL - DRIED, SALTED/BRINE, NOT SMOKE	25,988,851	39,335,624	44,792,036	34,583,672	28,761,260
030541	SMOKED SALMON - INCL FILLETS	134,299	21,211	205,448	22,194	5,149
030542	SMOKED HERRING - INCLUDING FILLETS	3,882,681	3,122,638	2,409,091	3,089,157	3,074,497
030549	OTHER SMOKED FISH - INCLUDING FILLETS	487,732	250,239	361,016	180,404	469,577
030551	DRIED COD – SALTED OR NOT – NOT SMOKED	6,295,609	20,877,481	17,447,207	12,050,342	8,403,079
030559	DRIED FISH – SALTED OR NOT – NOT SMOKED	4,163,636	12,785,203	6,200,156	7,741,751	6,174,285
030561	HERRING, SALTED/BRINE - NOT DRIED/SMOKED	3,093,483	83,468	84,770	83,035	9,477
030562	COD, SALTED/BRINE - NOT DRIED OR SMOKED	99,349,310	5,741,995	18,969,347	15,048,624	12,142,102
030563	ANCHOVY, SALTED/BRINE, NOT DRIED/SMOKED	19,839	-	-	-	-
030569	OT FISH – SALTED/BRINE, NOT DRIED/ SMOKED	17,204,739	14,374,301	18,741,117	10,255,196	11,360,659
TOTAL		162,361,628	99,410,472	109,887,847	83,867,124	71,513,083

Source: Statistics Canada

**Not shown in Table 5 above:** In the major 6-digit product categories in 2006, British Columbia led Canada in exports of salted roes (HS 030520) while New Brunswick was far ahead in smoked fish, especially herring (HS 030542). However, Nova Scotia now accounts for more than 85% of salted, dried fillets (HS 030530), 65% of the whole salted cod (HS 030562) and 50% of whole dried cod (HS 030551) - with the balance of the latter shared equally by Newfoundland and Quebec. Nova Scotia has also typically led in the “other” salted fish category (HS 030569), although Quebec is now sharing that category as an equal.

Table 6 Nova Scotia Exports of Salted and Dried Fish Selected Products and Years (\$Cdn)						
HS 6		1990	1995	2000	2003	2006
030530	FISH FILLETS – DRIED, SALTED, NOT SMOKED	25,988,851	39,335,624	44,792,036	34,583,672	28,761,260
030551	DRIED COD – SALTED OR NOT, NOT SMOKED	6,295,609	20,877,481	17,447,207	12,050,342	8,403,079
030559	DRIED FISH – SALTED OR NOT, NOT SMOKED	4,163,636	12,785,203	6,200,156	7,741,751	6,174,285
030562	COD SALTED/BRINE – NOT DRIED/SMOKED	99,349,310	5,741,995	18,969,347	15,048,624	12,142,102
030569	OT FISH SALTED/BRINE – NOT DRIED/SMOKED	17,204,739	14,374,301	18,741,117	10,255,196	11,360,659
TOTAL		153,002,145	93,114,604	106,149,863	79,679,585	66,841,385

Source: Statistics Canada

Table 6 reflects the main product categories that define salted and dried groundfish fish exports from Nova Scotia. However, in order to separate a small amount of salted and/or dried pelagic fishes still included in categories HS 030530 and HS 030569, it is necessary to go to the 8-digit export code (see Table 7 and Table 8, over).

**Table 7  
Nova Scotia Exports of Salted or Dried Groundfish - Value (\$Cdn)  
Selected Products and Years**

HS 8		1990	1995	2000	2003	2006
03053030	Cod fillets, dried, salted/brine, but not smoked	10,275,813	15,145,579	21,986,626	15,407,607	13,481,218
03053090	Fish fillets, nes, dried, salted/brine - not smoked	14,994,134	22,280,793	22,644,107	17,429,798	12,598,517
03055100	Cod dried, whether or not salted but not smoked	6,295,609	20,005,603	17,395,563	10,900,683	7,746,464
03055900	Fish nes, dried, salted or not - not smoked	4,163,636	12,573,437	6,173,134	7,185,557	6,171,453
03056210	Cod, green salted, wet salted	79,468,825	1,500,352	7,577,967	5,927,042	4,296,006
03056221	Cod, light salted, over 43% moisture content	3,371,334	84,548	77,057	0	0
03056222	Cod, light salted, 43% or less moisture content	1,052,024	44,747	543,487	2,184,151	2,208,383
03056231	Cod, heavy salted, >45% but <51% moisture	9,439,160	3,538,699	9,333,844	6,766,391	4,015,531
03056232	Cod, heavy salted, >43% but <46% moisture	2,541,954	39,843	783,184	73,014	1,610,918
03056233	Cod, heavy salted, 43% or less moisture content	3,426,010	413,880	124,466	N/A	N/A
03056290	Cod, salted/brine, nes, but not dried / smoked	50,003	100,595	529,342	55,255	0
03056921	Hake, salted or in brine, but not dried or smoked	3,648,111	2,980,919	1,995,108	2,100,782	2,753,780
03056922	Pollock, salted or in brine, not dried or smoked	11,496,076	9,620,476	14,290,376	5,999,769	5,819,856
03056923	Haddock, cusk, salted/brine - not dried/smoked	703,616	998,552	1,864,752	1,422,122	1,011,982
03056999	Fish nes, salted/brine, but not dried or smoked	47,816	111,840	35,706	40,924	12,243
	Total:	150,974,121	89,439,863	105,354,719	75,493,095	61,726,351

Source: Statistics Canada

**Table 8  
Nova Scotia Exports of Salted or Dried Groundfish - Quantity (Tonnes)  
Selected Products and Years**

HS 8	Description	1990	1995	2000	2003	2006
03053030	Cod fillets, dried, salted / brine, but not smoked	1,504	1,668	1,892	1,428	1,263
03053090	Fish fillets, nes, dried, salted / brine - not smoked	2,920	2,904	3,622	2,874	2,213
03055100	Cod dried, whether or not salted but not smoked	1,288	2,826	1,951	1,276	922
03055900	Fish nes, dried, salted or not - not smoked	1,197	2,007	1,271	1,654	1,405
03056210	Cod, green salted, wet salted	16,620	289	1,057	750	749
03056221	Cod, light salted, over 43% moisture content	481	14	13	0	0
03056222	Cod, light salted, 43% or less moisture content	200	6	54	206	224
03056231	Cod, heavy salted, >45% but <51% moisture	1,693	536	1,001	782	546
03056232	Cod, heavy salted, >43% but <46% moisture	474	6	79	7	188
03056233	Cod, heavy salted, 43% or less moisture content	690	95	20	52	52
03056290	Cod, salted/brine, nes, but not dried / smoked	13	14	137	11	0
03056921	Hake, salted or in brine, but not dried or smoked	1,127	572	394	501	581
03056922	Pollock, salted/brine, but not dried or smoked	3,359	1,935	3,425	1,539	1,339
03056923	Haddock, cusk, salted/brine - not dried/smoked	222	190	238	184	146
03056999	Fish nes, salted/brine, but not dried or smoked	16	31	8	7	4
	Total:	31,804	13,091	15,160	11,270	9,632

Source: Statistics Canada

Canada's 8-digit export codes under the HS 0305 product group includes more than 30 product listings (not all shown above) and also breaks out exports of specific fishes such as hake, pollock and haddock/cusk.

Table 7 reveals that Nova Scotian exports of salted and dried groundfish declined from approximately \$151 million in 1990 to approximately \$62 million in 2006. Table 8 reveals that quantities exported declined from approximately 31,000 tonnes to less than 10,000 tonnes over the same period. Salted whole cod (HS 03056210), in particular, took a beating, dropping from almost \$80 million to \$4 million in exports over the period. Salted cod fillets (HS 03053030) other fish fillets (HS 03053090), dried cod (HS 03055100) and other dried fish (HS 03055900) that have high unit value experienced the lowest declines in total value over the period, despite some slippage in volumes. Given the lack of resources at the present time, more emphasis on these latter products, fillets in particular, may be something to look at. Haddock and cusk (HS 03056923) also show a high revenue return per unit quantity.

An overview of the Nova Scotia salt fish sector would not be complete without an analyses of how the sector has been operating under the constraint of depleted resources.

<b>Table 9</b>					
<b>Nova Scotia Imports of Salted, Dried or Smoked Fish (\$Cdn)- Selected Years</b>					
<b>HS 6</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2003</b>	<b>2006</b>
HS 030520	-	3,410	-	34,307	-
HS 030530	-	3,810,248	8,488,797	7,121,628	10,040,326
HS 030541	-	-	235	-	-
HS 030549	108	564,340	-	33,072	456,873
HS 030551	224	55,094	1,892,225	1,600,990	2,603,286
HS 030559	19,811	251,831	390,719	376,217	768,585
HS 030561	-	-	152	460,528	1,498,027
HS 030562	68,592	4,713,523	7,992,110	5,256,556	3,710,768
HS 030569	61,936	20,785,751	27,378,980	13,088,382	15,595,387
<b>TOTAL</b>	<b>150,671</b>	<b>30,184,197</b>	<b>46,143,218</b>	<b>27,971,680</b>	<b>34,673,252</b>

Source: Statistics Canada

Table 9 above indicates that Nova Scotia only imported approximately \$150,000 of salt fish products in 1990; however, this amount increased to \$34.7 million by 2006. The major categories of imports are salt fish fillets (HS 030530) and salt fish other than cod (HS 030569). Significant amounts of whole salt cod (HS 030562) and dried cod (HS 030551) were also imported. Imports and exports by country are examined more closely in the next section.

Overview of Supply Sources and Export Destinations

Table 10 Nova Scotia Exports and Imports by HS Code, Country and Year (\$Cdn) HS 030530 - FISH FILLETS - DRIED, SALTED OR IN BRINE, BUT NOT SMOKED					
Nova Scotia Exports			Nova Scotia Imports		
Country	1990	2006	Country	1990	2006
United States	23,737,456	*23,598,611	China	0	8,213,732
Trinidad / Tobago	89,444	1,653,777	Iceland	0	1,077,284
Mexico	0	1,424,963	Faeroe Islands	0	698,910
Congo (Zaire)	0	565,512	Denmark	0	50,400
Jamaica	0	419,095			
Portugal	156,600	300,000			
Dominican Rep	0	129,265			
Barbados	22,217	3,395			
Other	**1,983,134	***666,642			
Total	25,988,851	28,761,260	Total	0	10,040,326

\* Includes re-exports of \$2,526,080

\*\* Includes Bermuda, Norway, Sweden, Haiti

\* \* \*Includes Congo (Brazzaville), Saint Lucia, Antigua-Barbuda, St. Kitts-Nevis, Grenada, Brazil, St. Vincent

Source: MRA adapted from Statistics Canada data

Salted fish fillets (HS 030530) accounted for approximately 43% of the total value of Nova Scotia salt fish exports in 2006; as compared to 17% in 1990. Analysis of HS 8-digit exports reveals that total exports in 2006 included \$13.5 million of salted cod fillets (HS 03053030) and \$12.6 million of other fish fillets (HS 03053090). Cod fillet exports were up 25% over 1990, while other fillet exports declined by 16%.

Herring and mackerel exports represent a small percentage of the total. Herring fillet (HS 03053010) exports were \$719,000 in 1990, declining to \$50,000 in 2006. There were \$105,000 exports of mackerel fillets (HS 03053020) in 2006, up from \$0 in 1990.

Unlike 1990, exports in this category were buttressed by significant imports from China, as well as other countries, totaling approximately \$10 million in 2006. The US remained the primary market in 2006, but exports in this category were widely dispersed in 2006 – seeming to indicate significant marketing efforts (see Table 10).

Table 11 Nova Scotia Exports and Imports by HS Code, Country and Year (\$Cdn) HS 030551 - DRIED COD – WHETHER OR NOT SALTED, BUT NOT SMOKED					
Nova Scotia Exports			Nova Scotia Imports		
Country	1990	2006	Country	1990	2006
United States	6,295,609	*5,533,773	Norway	0	1,820,578
Mexico	0	1,633,807	China	0	782,708
Portugal	0	1,235,499	United States	224	0
Total	6,295,609	8,403,079	Total	224	2,603,286

\* Includes re-exports of \$656,615

Source: MRA adapted from Statistics Canada data

Dried cod (HS 030551) accounted for almost 12.5% of the total value of Nova Scotia salt fish exports in 2006; as compared to 4% in 1990. Unlike 1990, exports in this category were buttressed by significant imports from Norway, as well as other countries, totaling approximately \$2.6 million in 2006. The US remained the primary market in 2006, but significant exports were also made to Mexico and Portugal in 2006 – seeming to indicate significant marketing efforts (see Table 11).

Table 12 Nova Scotia Exports and Imports by HS Code, Country and Year (\$Cdn) HS 030559 - DRIED FISH (OTHER THAN COD) WHETHER OR NOT SALTED, BUT - NOT SMOKED					
Nova Scotia Exports			Nova Scotia Imports		
Country	1990	2006	Country	1990	2006
United States	4,143,919	*2,014,251	China	0	739,498
Trinidad / Tobago	0	1,128,856	Faeroe Islands	0	15,714
Dominican Rep	0	509,408	Norway	0	13,373
Jamaica	0	338,446	Iceland	0	0
Barbados	0	271,581	Denmark	0	0
Congo (Zaire)	0	130,500	United States	0	0
Other	19,717	**1,781,243	Hong Kong	19,811	0
Total	4,163,636	6,174,285	Total	19,811	768,585

\* Includes re-exports of \$2,832

\*\* Includes St. Vincent-Grenadines , St. Kitts-Nevis , British Virgin Islands, Antigua and Barbuda , Brazil, Congo (Brazzaville), Montserrat, Anguilla, Saint Lucia, Haiti , Netherlands Antilles, Grenada, China

Source: MRA adapted from Statistics Canada data

Other dried fish (HS 030559) accounted for almost 10% of the total value of Nova Scotia salt fish exports in 2006; as compared to less than 3% in 1990. Unlike 1990, exports in this category were buttressed by significant imports from China, as well as other countries, totaling approximately \$768,585 in 2006. The US remained the primary market in 2006, but significant exports were also made to the Caribbean in 2006 – seeming to indicate significant marketing efforts (see Table 12).

Table 13 Nova Scotia Exports and Imports by HS Code, Country and Year (\$Cdn) HS 030562 - COD, SALTED OR IN BRINE - NOT DRIED OR SMOKED					
Nova Scotia Exports			Nova Scotia Imports		
Country	1990	2006	Country	1990	2006
United States	6,042,225	*7,629,686	United States	227	1,300,776
Portugal	64,703,395	3,459,652	China	0	1,276,077
Spain	1,025,806	912,351	Norway	0	791,405
Norway	17,071,740	0	Iceland	0	302,286
Denmark	6,873,975	0	Denmark	0	40,224
Jamaica	530,409	0	St.Pierre-Miqu.	68,365	0
Barbados	179,532	0			
Dominican Rep	48,119	0			
Congo (Zaire)	72,765	0			
Trinidad / Tobago	67,500	0			
Other	**2,733,844	***140,413			
Total	99,349,310	12,142,102	Total	68,592	3,710,768

\* Includes re-exports of \$11,264

\*\* Includes France, Italy, Switzerland, Sweden, Germany, Bermuda, Brazil

\*\*\* Includes, France, Iceland, Mexico

Source: MRA adapted from Statistics Canada data

HS 8	Detailed Product Exports Under HS 030562	1990	2006
03056210	Cod, green salted, wet salted	\$79,468,825	\$4,296,006
03056221	Cod, light salted, over 43% moisture content	3,371,334	N/A
03056222	Cod, light salted, 43% or less moisture content	1,052,024	2,208,383
03056231	Cod, heavy salted, > 45% but not > 50% moisture	9,439,160	4,015,531
03056232	Cod, heavy salted, > 43% but not > 45% moisture	2,541,954	1,610,918
03056233	Cod, heavy salted, 43% or less moisture content	3,426,010	0
03056290	Cod, salted or in brine, nes, but not dried or smoked	50,003	N/A
	Total	\$99,349,310	\$12,130,838

Source: Statistics Canada data

Salted cod (HS 030562) accounted for approximately 18% of the total value of Nova Scotia salt fish exports in 2006; as compared to 65% in 1990. Actual export value in the category dropped from \$99.3 million in 1990 to \$12.1 million in 2006. Analysis of HS 8-digit export data (see inset Table above) reveals that while the sector recorded moisture content in about 20% of exports in 1990, this had increased to 64% in 2006 – suggesting an increased emphasis on quality while quantities decreased.

Unlike 1990, exports in this category were buttressed by significant imports from the US and China, as well as other countries, totaling approximately \$3.7 million in 2006. The US remained the primary market in 2006, but it is evident that many other markets have been lost in this category since 1990 (see Table 13).

Table 14 Nova Scotia Exports and Imports by HS Code, Country and Year (\$Cdn) HS 030569 - OTHER FISH NES - SALTED OR IN BRINE - NOT DRIED OR SMOKED					
Nova Scotia Exports			Nova Scotia Imports		
Country	1990	2006	Country	1990	2006
United States	4,229,591	*5,318,504	Faeroe Islands	0	5,076,377
Jamaica	2,224,953	3,167,989	Norway	0	4,785,754
Dominican Repub	7,795,454	1,344,405	Denmark	0	2,084,200
Barbados	314,805	410,923	Iceland	0	1,832,303
Trinidad / Tobago	0	393,896	China	0	1,816,753
Spain	0	5,299	United States	2,301	0
Brazil	38,262	347,310	Hong Kong	59,635	0
Congo (Zaire)	200,454	0			
Haiti	976,827	0			
Norway	599,228	0			
Portugal	415,271	0			
Other	**409,894	***372,333			
Total	17,204,739	11,360,659	Total	61,936	15,595,387

\* Includes re-exports of \$970,101

\*\* Includes France, Netherlands, Monserrat

\*\*\* Includes Panama, St. Kitts-Nevis, Antigua and Barbuda

Source: MRA adapted from Statistics Canada data

HS 8	Detailed Product Exports Under HS 030569	1990	2006
03056921	Hake, salted or in brine, but not dried or smoked	\$ 3,648,111	\$ 2,753,780
03056922	Pollock, salted or in brine, but not dried or smoked	11,496,076	5,819,856
03056923	Haddock and cusk, salted / brine, but not dried or smoked	703,616	1,011,982
03056991	Mackerel, salted or in brine, but not dried or smoked	542,176	763,317
03056992	Salmon, salted or in brine, but not dried or smoked	21,628	22,706
03056993	Alewife, salted or in brine, but not dried or smoked	745,316	6,674
03056999	Fish nes, salted or in brine, but not dried or smoked	47,816	12,243
	Total ( approximate: use Table 14 for 2006 data)	\$17,204,739	\$10,390,558

Source: Statistics Canada

Other salted fish (HS 030569) accounted for approximately 15% of the total value of Nova Scotia salt fish exports in 2006; as compared to 11% in 1990. Actual export value in the category dropped from \$17.2 million to \$10.4 million from 1990 to 2006. Analysis of HS 8-digit export data (see inset Table above) reveals that salted salmon, alewife and mackerel directly represent only a small portion of these exports (about 7.5% in 1990 and 2006); although mackerel exports have increased over that time while alewife has decreased. Salt haddock/cusk have also shown a 43% increase, while pollock exports decreased by almost 50% and hake by 25%, since 1990.



Unlike 1990, exports in this category were buttressed by significant imports from the Faeroe Islands, Norway, Denmark and other countries, totaling approximately \$15.6 million in 2006. The US, Jamaica and the Dominican Republic remained primary markets in 2006, but it is evident that many other markets have been lost in this category since 1990 (see Table 14).

**Table 15**  
**Nova Scotia Imports of Frozen Cod (HS 030360) by Selected Years and Countries (\$Cdn)**

Countries	1990	1995	2000	2003	2006
<b>US</b>	--	10,837,113	7,969,553	6,813,624	3,778,853
<b>China</b>	--	--	14,802	1,085,018	1,924,912
<b>Russia</b>	--	28,836,906	5,961,072	3,785,686	395,914
<b>Korea, South</b>	--	119,614	1,463,758	474,205	80,291
<b>Norway</b>	--	997,252	4,177,664	335,521	47,764
<b>Sweden</b>	--	1,865,196	252,476	85,210	--
<b>Japan</b>	--	--	132,902	--	--
<b>St.Pierre-Miq</b>	--	--	11,108	--	--
<b>Denmark</b>	--	653,707	--	--	--
<b>Portugal</b>	--	228,464	--	--	--
<b>Iceland</b>	--	19,287	--	--	--
<b>Netherlands</b>	--	17,092	--	--	--
<b>U.S.S.R. (former)</b>	977,763	--	--	--	--
<b>TOTAL (All countries)</b>	977,763	43,574,631	19,983,335	12,579,264	6,227,734

Source: Statistics Canada

Another factor that has the potential to influence Nova Scotia's salt fish export capacity is the import of frozen fish, particularly cod, for re-processing. Table 15 outlines the import history of whole, headless and gutted cod from 1990 to 2006. While much of this cod was processed for other value-added products besides salt fish, the import trend is noticeably peculiar in paralleling the experience of the Nova Scotia salt fish sector over the period. As imports of frozen cod declined in the last six years, so have Nova Scotia salt cod exports. Further, as Atlantic cod became more expensive, it was usually substituted by cheaper Pacific cod, but this cod is not favoured by the market.

## **6.0 UNITED STATES SALT FISH MARKETS**

### *Overview of US Economic, Demographic and Cultural Factors*

The United States is Canada's largest trading partner and its largest importer of seafoods, including salt fish. In Section 3 of this report we identified the importance of salt fish to the development of New England, from its earliest settlement well into the early 20<sup>th</sup> century. This section focuses on the present market in New England and the United States, in general, for salt fish. For an overview of information on US cultural factors, and comparisons to Canada, see Table 16 (over).

Throughout the last century, salt fish demand was gradually overtaken in many North American markets by fresh and frozen fish products. By 1990, the US was only exporting \$30 million of salt fish products, while importing almost \$80 million. By 2006, US salt fish exports had dropped to \$12 million and some of this trade was with partners like Canada, which were net exporters to the US, suggesting that some of the trade may have been inter-company or re-processing work. The MRA survey of New England salt fish buyers in early 2007 was not able to identify any US salt fish producers of any size still operating in the region. Indeed, it appears that some US companies were sending fresh or frozen fillets to Canada for salting to supply their customers at home and abroad.

Many large importers and distributors in the US reported they are wary about the long term viability of the salt fish market. However, salt fish markets in the US are far from depleted. In fact, market demand for salt fish has increased by 50% in value, and 33% in quantity, in the US since 1990 – mostly in New England and along the Eastern Seaboard (see Table 17). Continued immigration is one factor that has helped to maintain the old traditions that support a salt fish culture. Portuguese immigration, in particular, is very strong in southern New England.<sup>10</sup>

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<sup>10</sup> "More Portuguese have settled in southern New England than any other region of the United States. New England has become a hub for other Portuguese-speaking cultures, including Brazilians and Cape Verdeans. Brazilians are the region's third fastest growing immigrant group." Mamie Marcuss and Ricardo Borgos, "Who Are New England's Immigrants?" *Communities and Banking*, Fall (2004).

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<b>Table 16 Comparison of Selected United States and Canadian Demographic and Economic Factors (2006 – except where noted )</b>		
<b>Item</b>	<b>United States</b>	<b>Canada</b>
Government Type	Democracy - constitution-based federal republic	Democracy - constitutional monarchy, federal parliament
Area	9,826,630 sq km	9,984,670 sq km
Population	301,139,947 (July 2007 est.)	33,098,932
Medium Age	36.6 years	38.9 years
Life Expectancy	78 years	80.22 years
Ethnic Groups	white 81.7%, black 12.9%, Asian 4.2%, Amerindian and Alaska native 1%, native Hawaiian and other Pacific islander 0.2% (2003 est.) (Hispanic est. 13% - 2006)	British Isles origin 28%, French origin 23%, other European 15%, Amerindian 2%, other, mostly Asian, African, Arab 6%, mixed background 26%
Literacy	99%	99%
GDP (Purchasing PP)	\$US 12.98 trillion	\$US 1.165 trillion
GDP (Exchange Rate)	\$US 13.22 trillion	\$US 1.089 trillion
GDP (Per Capita)	\$US 43,500	\$US 35,200
GDP – Real Growth	3.4%	2.8%
GDP by Sector	agriculture: 0.9%; industry: 20.4% services: 78.6%	agriculture: 2.3% ; industry: 29.2%; services: 68.5%
Unemployment	4.8%	6.4%
Total Exports \$	\$1.024 trillion	\$US 405 billion
Main Exports	agricultural products (soybeans, fruit, corn) 9.2%, industrial supplies (organic chemicals) 26.8%, capital goods (transistors, aircraft, motor vehicle parts, computers, telecommunications equipment) 49.0%, consumer goods (automobiles, medicines) 15.0% (2003)	motor vehicles/parts, industrial machinery, telecommunications equipment; chemicals, plastics, fertilizers; wood pulp, timber, crude petroleum, natural gas, electricity, aluminum, aircraft,
Total Imports \$	\$US 1.869 trillion	\$US 353.2 billion
Main Imports	agricultural products 4.9%, industrial supplies 32.9% (crude oil 8.2%), capital goods 30.4% (computers, telecom equip., motor vehicle parts, office machines, electric power machinery), consumer goods 31.8% (autos, clothes, medicines, furniture, toys) (2003)	machinery and equipment, motor vehicles and parts, crude oil, chemicals, electricity, durable consumer goods
US / Canada Bi-lateral Exports	US exports \$Cdn 218 billion to Canada	Canada exports \$Cdn 359 billion to US
US / Canada Bi-Lateral Export Items	US exports automobiles and parts; oil and gas; aircraft and parts; process units and integrated circuits; medications	Canada exports oil and gas; automobiles and parts; lumber and newsprint; medications; aluminum
Fish Production	4.32 million tonnes (2003)	1.32 million tonnes (2003)
Per Capita Supply	26.8 kg (2003)	23.9 kg (2003)
Fish Exports	\$US 4.1 billion (edible - 2005)	\$Cdn 3.6 billion; \$Cdn 2.2 billion to US
Fish Imports	\$US 12.1 billion (edible -2005)	\$Cdn 1.5 billion; \$Cdn 616 mil from US
Exchange Rate	\$US 1.00 = \$Cdn 1.16 (April 2007)	\$Cdn 1.00 = \$US \$0.87 (April 2007)

Source: MRA adapted from *CIA World Fact Book, FAO Fishery Country Profiles*

**US Salt Fish Import Statistics and Trade Flows**

<b>Table 17</b>								
<b>World Exports of Salted and Dried Groundfish to the US – Value (\$US 000)</b>								
<b>HS 10</b>	<b>Product</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
0305306080	OTH FSH FL,D/S/B	18,264	24,483	<b>28,898</b>	<b>41,407</b>	<b>40,560</b>	<b>39,844</b>	<b>45,950</b>
0305594000	FISH,DRIED,NT/SMK	11,823	22,894	13,615	13,689	13,318	17,187	18,710
0305306030	COD FL,D/S/B	8,931	15,556	16,548	15,297	16,191	17,488	15,267
0305510000	COD,DRIED,NT/SMK	14,569	23,245	20,148	11,611	11,609	9,978	10,484
0305691042	OT PLK,SL/NT DR	1,551	2,653	2,773	2,100	1,173	5,143	9,335
0305620025	COD,WH,MS 45-50%	4,772	2,096	5,533	4,352	3,618	2,996	2,837
0305620045	COD,WH,MS <44%	1,955	135	997	1,471	1,791	2,314	2,283
0305592000	SHARK FINS DRIED	4,077	2,348	2,356	110	344	752	1,382
0305691021	HAKE,SLTD,NT/DRD	1,403	552	849	678	881	985	1,254
0305691022	POLLOCK,ST/NT/DR	2,031	2,236	4,665	3,242	3,804	2,640	1,073
0305620070	COD,OT,MS 43-45%	565	4	1,543	1,075	896	775	950
0305696000	FISH,NESOI,SALT	962	1,372	1,129	1,237	870	1,262	918
0305695000	FSH NES,CNT<6.8K	405	158	725	1,226	1,182	728	902
0305691049	OT HADD,SL/DT DR	8	31	170	891	1,238	516	535
0305620030	COD,WH,MS 43-45%	636	24	31	80	184	230	530
0305620010	COD,WH,MS OV 50%	2,923	239	225	443	916	277	369
0305691029	HADDOCK,ST/NT/DR	347	372	971	85	230	459	368
0305620060	COD,OT,MS OV 45%	586	1,131	453	812	890	1,405	186
0305691041	OT HAKE,SL/NT DR	86	303	180	207	117	107	55
0305620080	COD,OT,MS <44%	799	33	99	0	34	279	53
0305620050	COD,OT,MS OV 50%	561	97	618	654	646	50	32
<b>TOTAL - All Countries</b>		<b>77,252</b>	<b>99,964</b>	<b>102,525</b>	<b>100,667</b>	<b>100,493</b>	<b>105,415</b>	<b>113,474</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes reported above are derived from the five main HS 6 codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559) Source: MRA adapted from US Census and Statistics Canada

The US imported almost \$114 million of salted groundfish in 2006, up from 77 million in 1990. Without a doubt, it is the ethnic markets in the US, from both Latino and Caribbean countries, that support a large salt fish demand throughout the United States. Besides transplanted Portuguese, there are Spanish, Italian, Greek and other audiences from southern Europe that are also strong consumers. However, these latter communities are now more assimilated within the larger US culture and place less emphasis on salt fish, particularly cod, than do Portuguese immigrants.

Caribbean-origin communities are also strong consumers of salt fish; especially those from Jamaica, Trinidad and Tobago and Puerto Rico, as well as many of the smaller islands that have large immigrant populations in the US. These communities are usually more price conscious and more likely to consume a variety of salt fish species, other than cod.

**Table 18**  
**Major Exporters of Salted and Dried Groundfish to the US by Year and Country (HS 10)**  
**Nova Scotia (HS 6)**

Country	2003		2004		2005		2006	
	\$US (000)	Tonnes	\$US (000)	Tonnes	\$US (000)	Tonnes	\$US (000)	Tonnes
Canada	46,707	8,681	41,472	7,282	38,655	6,286	36,872	5,615
*NS	44,244	N/A	38,657	N/A	39,654	N/A	38,883	N/A
China	22,520	6,665	28,149	8,078	35,406	9,636	40,796	10,707
Norway	7,617	798	8,949	941	9,447	893	8,956	806
Chile	7,372	1,545	6,076	1,262	5,741	1,230	10,312	1,683
Iceland	6,116	1,570	5,165	1,185	3,696	868	3,937	808
Other	10,335	1,983	10,682	1,820	12,470	1,975	12,601	1,821
World	100,667	21,242	100,493	20,568	105,415	20,888	113,474	21,440

Source: MRA adapted from US Census and Statistics Canada; \*NS Nova Scotia data includes some pelagic fishes.

Canada, China, Norway and Chile are the primary suppliers of salt fish to the US (see Table 18). In 2006, China, already the leading exporter in quantity terms, overtook Canada as the major exporter in terms of value. Canada's market share of the US by value was approximately 33% in 2006. The data isn't wholly comparative, but suggests Nova Scotia's market share was about 30% in 2006.

Norway is showing small, if any, increments in US exports over the last few years. Norway's price per tonne is higher than Canada's and considerably higher than China's, a factor which likely constrains its market development in the US for the present. Chile has a growing market in salted fish fillets, although it is not clear what species are involved; possibly, hake, tilapia, mackerel and/or jack mackerel. (A small amount of salt "mackerel" is indicated in some of the data.)

Iceland is demonstrating a downtrend in recent years, in line with new global strategic approaches. Iceland's low prices (or values) in the table are indicative of export species other than cod. Data in Table 18 is delineated in greater detail in the tables that follow.

Table 19										
Canadian Exports of Salted and Dried Groundfish to US (\$US 000)										
HS 10	Product	1990	1995	2000	2001	2002	2003	2004	2005	2006
0305306030	COD FL, D/S/B	8,777	14,152	14,633	12,071	11,727	11,146	10,062	11,016	10,497
0305306080	OTH FSH FL,D/S/B, NES	14,901	18,119	15,001	15,765	13,600	11,840	8,637	7,720	8,403
0305510000	COD,DRIED,NT/SMK	10,934	18,949	16,236	12,109	10,577	8,812	8,681	6,613	5,475
0305620025	COD,WH,MS 45-50%	4,716	2,093	5,500	5,707	4,670	4,331	3,618	2,996	2,837
0305620045	COD,WH,MS <44%	1,913	133	997	956	2,785	1,471	1,674	2,306	2,270
0305594000	FISH,D(S), NT/SMK, NES	3,686	9,542	3,111	3,191	3,365	2,856	2,334	1,879	2,038
3056910210	HAKE, S/B, NT/DR	1,403	544	849	691	705	678	881	985	1,254
0305620070	COD, OT,MS 43-45%	561	4	1,540	1,257	1,142	1,075	896	775	950
0305691022	POLK, WH, S/B, NT/DR	1,888	1,959	3,477	1,531	2,154	1,887	1,121	998	691
0305691049	HAD/CUSK,OT, S/B,NT/DR	8	31	170	419	619	891	1,232	510	501
0305691042	POLK, OT, S/B, NT/DR	1,093	2,610	282	315	611	225	236	535	497
0305620030	COD,WH,MS 43-45%	636	24	31	0	15	0	20	17	452
0305620010	COD,WH,MS OV 50%	2,923	239	225	98	379	434	910	273	363
0305691029	HAD/CUSK,WH,S/B,NT/DR	347	365	971	469	187	82	227	427	357
0305620060	COD,OT,MS OV 45%	575	1,121	453	688	314	734	789	1,405	186
0305691041	HAKE,OT, S/B, NT/DR,NES	86	303	180	123	215	207	117	64	53
0305620050	COD,OT,MS OV 50%	559	97	64	35	15	9	28	41	22
0305620080	COD,OT,MS <44%	594	32	85	20	97	0	2	77	12
0305696000	FISH,S/B, NES	60	332	22	8	21	29	4	19	11
0305592000	SHARK FINS DRIED	0	197	349	54	40	0	0	0	5
0305695000	FSH, S/B, CNT, NES	0	20	10	4	0	0	2	0	0
<b>TOTAL</b>		<b>55,660</b>	<b>70,866</b>	<b>64,186</b>	<b>55,513</b>	<b>53,238</b>	<b>46,707</b>	<b>41,472</b>	<b>38,655</b>	<b>36,872</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers

Note: The HS 10 codes reported above are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559)

Source: MRA adapted from US Census and Statistics Canada

Table 19 indicates that Canadian salt cod fillets and other salt fish fillets were the major imported salt fish products in the US in recent years. Dried cod and other different forms of salted and/or dried cod followed these leaders. In other fish, hake is maintaining traditional export levels; however, pollock and haddock/cusk are down in recent years. Overall, Canadian exports in the whole table category are down almost 50% in value over 1995. Table 20 (over) indicates that groundfish quantities are down even further – almost 60% from 1995 to 2006. Cod fillets, in particular, and whole salted cod, dry or semi-dry, seem to be the only products that are holding their own in recent years.

Table 20 Canadian Exports of Salted and Dried Groundfish to US (MT)										
HS 10	Product	1990	1995	2000	2001	2002	2003	2004	2005	2006
0305306080	OTH FSH FL,D/S/B, NES	3,509	3,335	3,380	3,620	3,003	2,668	1,882	1,534	1,517
0305306030	COD FL, D/S/B	1,560	2,199	1,886	1,531	1,533	1,430	1,170	1,237	1,088
0305510000	COD,DRIED,NT/SMK	2,467	3,546	2,558	1,906	1,710	1,391	1,289	975	778
0305594000	FISH,DRIED,N/SMK	1,242	2,321	1,010	1,028	1,068	883	735	521	526
0305620025	COD,WH,MS 45-50%	1,062	430	855	896	744	691	576	473	439
0305691021	HAKE,SLTD,NT/DRD	516	141	224	212	188	194	282	259	293
0305620045	COD,WH,MS <44%	468	33	147	126	364	189	216	316	269
0305691022	POLLOCK,ST/NT/DR	573	514	1,040	486	640	551	399	303	189
0305620070	COD,OT,MS 43-45%	177	1	268	239	204	183	137	119	126
0305691042	OT PLK,SL/NT DR	348	621	78	84	166	61	62	118	95
0305691029	HADDOCK,ST/NT/DR	134	90	158	95	41	22	51	87	71
0305691049	OT HADD,SL/DT DR	4	9	28	83	113	155	218	82	69
0305620010	COD,WH,MS OV 50%	826	47	45	20	75	83	125	55	60
0305620030	COD,WH,MS 43-45%	183	5	4	0	3	0	2	2	60
0305620060	COD,OT,MS OV 45%	164	236	81	121	60	114	105	161	19
0305691041	OT HAKE,SL/NT DR	36	73	41	32	57	57	27	15	8
0305696000	FISH,NES,SALT	55	301	7	5	7	10	4	13	4
0305620050	COD,OT,MS OV 50%	108	20	11	4	2	1	4	6	2
0305620080	COD,OT,MS <44%	128	6	10	2	13	0	0	11	2
0305592000	SHARK FINS DRIED	0	17	7	7	1	0	0	0	0
0305695000	FSH NES,CNT	0	9	0	1	0	0	0	0	0
<b>TOTAL</b>		<b>13,558</b>	<b>13,953</b>	<b>11,838</b>	<b>10,495</b>	<b>9,988</b>	<b>8,681</b>	<b>7,282</b>	<b>6,286</b>	<b>5,615</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers

Note: The HS 10 codes reported above are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559)

Source: MRA adapted from US Census and Statistics Canada

Table 21 (see over) identifies US states that receive shipments of Nova Scotia salt fish products. In 1990, Canadian salt fish exports accounted for about 72% of total US market demand and approximately 83% of Nova Scotia salt fish exports went to New York and Massachusetts. At that time (1990), the US state distribution shown here was probably fairly representative of the US regional market demand. (However, there would also have been inland shipments by importers that would not show up in Table 21.) Canada now has only about 33% of the total US market share and distribution in the table may be much less representative than shown for 2006. Hence, the reader must be cautious in interpreting this data directly. However, one explanation for the recent growth in demand in many southern states was put forward by a major New England distributor who said his older client base was reaching retirement age and moving south, especially to Florida.

<b>Table 21</b>				
<b>Distribution of Nova Scotia Salt Fish Exports (HS 6) in US States</b>				
<b>Selected Years (\$US)</b>				
<b>State</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2006</b>
NEW YORK	16,890,888	12,981,962	16,577,696	12,407,758
MASSACHUSETTS	14,615,481	24,185,958	15,769,992	11,678,303
FLORIDA	154,934	2,542,252	5,035,298	5,674,109
NEW JERSEY	948,013	4,069,423	6,240,070	2,469,311
PUERTO RICO	979,344	7,459,941	5,048,061	1,015,384
RHODE ISLAND	1,245,255	2,291,417	2,547,823	981,763
CALIFORNIA	246,622	416,898	620,101	951,173
DC	--	33,916	329,446	742,486
CONNECTICUT	42,170	299,081	626,416	660,514
TEXAS	--	569,507	505,025	437,235
PENNSYLVANIA	99,699	184,296	498,849	431,458
WASHINGTON	67,083	8,200	--	344,024
ILLINOIS	35,329	31,430	106,239	277,215
MARYLAND	--	152,654	150,975	259,874
GEORGIA	--	--	264,301	199,512
MINNESOTA	179,388	3,077	95,984	129,862
OHIO	10,283	9,067	--	123,005
MAINE	6,613	667,219	269,514	36,924
Subtotal	35,521,102	55,906,298	54,685,790	38,819,910
Others	2,571,518	293,138	478,614	62,908
Total US	38,092,620	56,199,436	55,164,404	38,882,818

Note: The above data are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559). The data are not necessarily representative of salt fish sales in any part of the US and serve only to indicate the presence of distribution. Source: MRA adapted from Statistics Canada

<b>Table 22</b>										
<b>Norway Exports of Salted and Dried Groundfish to US (\$US 000)</b>										
<b>HS 10</b>	<b>Product</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
0305510000	COD,DRIED,NT/SMK	2,173	1,098	2,966	2,318	2,783	2,724	2,815	2,739	4,089
0305306080	OTH FSH FL,D/S/B	523	582	2,332	1,842	1,671	1,419	1,434	1,943	2,743
0305306030	COD,D/S/B	92	678	1,263	2,261	3,240	3,130	4,503	4,370	2,055
0305594000	FISH,DRIED,N/SMK	310	206	145	148	299	341	191	318	50
0305620045	COD,WH,MS <44%	0	0	0	0	44	0	0	0	13
0305691049	OT HADD,SL/DT DR	0	0	0	0	0	0	6	6	6
0305620010	COD,WH,MS OV 50%	0	0	0	0	0	3	0	0	0
0305691022	POLLOCK,ST/NT/DR	0	0	342	0	0	0	0	0	0
0305691029	HADDOCK,ST/NT/DR	0	0	0	0	0	0	0	16	0
0305696000	FISH,NESOI,SALT	13	4	0	0	0	0	0	55	0
TOTAL		3,111	2,569	7,048	6,569	8,038	7,617	8,949	9,447	8,956

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes reported above are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559)  
Source: MRA adapted from US Census



Table 23 Iceland Exports of Salted and Dried Groundfish to US (\$US 000)										
HS 10	Product	1990	1995	2000	2001	2002	2003	2004	2005	2006
0305691042	OT PLK,S/NT DR	139	0	0	0	0	0	32	935	2,386
0305594000	FISH,DRIED,N/SMK	16	257	700	839	1,055	1,032	890	1,154	1,070
0305306080	OTH FSH FL,D/S/B	4	2,448	4,998	3,930	3,775	4,415	3,296	1,519	415
0305691022	POLLOCK,ST/NT/DR	0	177	251	59	81	22	101	45	32
0305691049	OT HADD,SL/DT DR	0	0	0	0	0	0	0	0	26
0305620010	COD,WH,MS OV 50%	0	0	0	0	0	0	0	4	6
0305306030	COD,D/S/B	44	431	0	3	130	0	0	6	3
0305510000	COD,DRIED,NT/SMK	240	276	128	135	5	3	0	10	0
0305620025	COD,WH,MS 45-50%	0	0	0	0	47	0	0	0	0
0305620045	COD,WH,MS <44%	0	0	0	0	0	0	117	0	0
0305620050	COD,OT,MS OV 50%	0	0	551	733	440	644	618	9	0
0305620060	COD,OT,MS OV 45%	0	0	0	0	0	0	101	0	0
0305620080	COD,OT,MS <44%	0	0	0	0	0	0	11	0	0
0305691029	HADDOCK,ST/NT/DR	0	0	0	0	0	0	0	15	0
0305696000	FISH,NESOI,SALT	0	0	0	24	0	0	0	0	0
<b>TOTAL</b>		<b>443</b>	<b>3,596</b>	<b>6,629</b>	<b>5,722</b>	<b>5,531</b>	<b>6,116</b>	<b>5,165</b>	<b>3,696</b>	<b>3,937</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes reported above are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559). Source: MRA adapted from US Census

Table 22 and Table 23 reflect salt fish exports by Norway and Iceland to the United States from 1990 to 2006. As illustrated, neither country's exports were particularly large in 1990, and even in 2006, Norway and Iceland only accounted for about 8% and 4% of the US salt fish market, respectively. Norway's exports are mostly tied up in three main products; dried cod, salted cod and salted fish fillets other than cod. Norwegian exports remained in the \$3 million to \$4 million range between 1990 and 1996 (not shown); before starting a steady climb into the \$9 million range. Norwegian cod prices are often more than \$US 10,000 per MT, translating into retail prices at the upper limits of market acceptability and acting to constrain sales. Iceland exports climbed to \$US 2 million by 1994 (not shown in Table 23) and then continued upwards in the late 1990s until leveling off and decreasing in recent years. Iceland's exports to the US have mostly been lower cost pollock and other fishes.

Chinese salt fish exports to the US, which only began seriously in 1997, reached \$40.8 million in 2006. Exports are primarily in the "other fish fillet" category and not a lot of cod is being shipped (only \$2.2 million in 2006). According to market sources, China exports a large amount of low priced Alaska pollock fillets to the US, particularly to Puerto Rico (see Table 24, over). Other countries' exports are listed in Table 25 (over).

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<b>Table 24</b>									
<b>China Exports of Salted and Dried Groundfish to US (\$US 000)</b>									
<b>HS 10</b>	<b>Product</b>	<b>1997</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
0305306080	OTH FSH FL,D/S/B	175	2,034	5,592	11,519	15,672	20,325	22,082	23,451
0305594000	FISH,DRIED,N/SMK	794	2,543	2,745	3,600	2,568	2,709	5,193	7,229
0305691042	OT PLK,SL/NT DR	0	2,360	2,557	1,597	1,654	538	3,152	6,137
0305306030	COD,D/S/B	53	408	1,083	1,579	877	1,344	2,016	2,217
0305696000	FISH,NESOI,SALT	504	384	294	123	276	397	734	597
0305695000	FSH NES,CNT<6.8K	0	2	45	0	0	33	293	533
0305691022	POLLOCK,ST/NT/DR	0	358	83	699	1,283	2,563	1,597	339
0305592000	SHARK FINS DRIED	46	88	32	578	0	19	8	132
0305620030	COD,WH,MS 43-45%	0	0	41	71	80	164	214	78
0305510000	COD,DRIED,NT/SMK	0	73	196	26	0	50	110	49
0305691029	HADDOCK,ST/NT/DR	0	0	0	0	4	0	0	11
0305620050	COD,OT,MS OV 50%	0	0	0	35	0	0	0	10
0305620080	COD,OT,MS <44%	0	14	0	0	0	0	0	9
0305691049	OT HADD,SL/DT DR	0	0	0	20	0	0	0	3
0305620010	COD,WH,MS OV 50%	36	0	180	196	86	6	0	0
0305620025	COD,WH,MS 45-50%	0	33	0	9	21	0	0	0
0305620045	COD,WH,MS <44%	0	0	0	0	0	0	7	0
<b>TOTAL</b>		<b>1,609</b>	<b>8,298</b>	<b>12,849</b>	<b>20,051</b>	<b>22,520</b>	<b>28,149</b>	<b>35,406</b>	<b>40,796</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes above are derived from the five main HS codes applicable to salted / dried fish (i.e., 030530, 030551, 030559, 030562, 030559). Source: MRA adapted from US Census

<b>Table 25</b>									
<b>Other Major Countries Exports of Salted and Dried Groundfish to US (\$US 000)</b>									
<b>Country</b>	<b>HS 10</b>	<b>Products</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
CHILE	0305306080	OTH FSH FL,D/S/B	2,711	2,081	5,475	7,368	6,076	5,726	10,312
HONG KONG	0305592000	SHARK FINS DRIED	530	404	145	41	107	524	1,053
HONG KONG	0305594000	FISH,DRIED,N/SMK	1,092	811	140	83	382	639	259
HONG KONG	0305696000	FISH,NESOI,SALT	105	69	5	41	54	99	115
JAPAN	0305594000	FISH,DRIED,N/SMK	3,070	3,110	3,671	3,704	2,837	3,319	3,078
KOREA	0305594000	FISH,DRIED,N/SMK	1,284	1,195	1,196	1,402	1,339	1,165	1,561
MALAYSIA	0305594000	FISH,DRIED,N/SMK	117	624	585	139	493	537	456
PORTUGAL	0305510000	COD,DRIED,NT/SMK	381	0	0	0	0	418	692
PORTUGAL	0305306030	COD,D/S/B	74	0	132	12	0	0	394
PHILIPPINES	0305594000	FISH,DRIED,N/SMK	120	119	147	154	220	302	315
PHILIPPINES	0305696000	FISH,NESOI,SALT	268	318	391	649	231	263	155
PHILIPPINES	0305306080	OTH FSH FL,D/S/B	7	14	4	30	11	254	111
PHILIPPINES	0305695000	FSH NES,CNT<6.8K	201	726	592	285	89	30	77
THAILAND	0305594000	FISH,DRIED,N/SMK	139	244	413	124	120	472	267
VIETNAM	0305594000	FISH,DRIED,N/SMK	283	434	376	272	535	957	1,086
<b>TOTAL</b>			<b>10,382</b>	<b>10,149</b>	<b>13,272</b>	<b>14,304</b>	<b>12,494</b>	<b>14,705</b>	<b>19,931</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes above are derived from the five main codes applicable to salted / dried fish (i.e., 030530, 030551, 030559, 030562, 030559). Source: MRA adapted from US Census

## ***Results of US Market Investigation***

### **General US Salt Fish Market Conditions**

Statistically, overall US demand for salt fish products in general has increased (up from less than \$77 million in 1990 to \$113 million in 2006, see Table 17). However, you wouldn't know this by talking to US importers, many who seem very apprehensive about present marketing conditions. In particular, they are concerned about the younger generation not following in the salt fish tradition of their older generations, as well as a lack of supply from traditional exporters, especially in Nova Scotia. True as well, the US market is expanding, but in less-traditional salt fish products. In fact, much of the growth in recent years has been in fillets, especially Alaska Pollock. Pacific cod is also a new product, not always appreciated by traditional markets. The scarcity of Atlantic cod, in general, has driven prices for this salted species very high and opened the market for secondary products. Even these are not cheap and more salt fish could obviously be sold if it was available at a "reasonable" price. In the MRA investigation, 2 of 3 major distributors complained of lack of supply, as did a major brokerage.

### **Market Segmentation Considerations**

#### Geographic Segmentation

The market for salt fish is centered in the Northeast US, particularly in Southern New England (Southern Massachusetts and Rhode Island) and in the New York-New Jersey area. Some suppliers in this region also ship to the continental US and/or take orders for the Caribbean.

One distributor noted that retirees to Florida were draining some demand from local markets while enhancing demand in Florida.

#### Ethnic Segmentation

The market is segmented into several distinct ethnic groups:

- 1) Ethnic Portuguese Americans – hold to traditional values and prefer salted cod, which is consumed on a regular basis (especially new immigrants from the continent, not Azores). New immigrants especially are year around consumers of salt cod.
  
- 2) Other European Americans (e.g., Spanish, Greek, Italian, Polish) – many are second or third generation; southern Europeans prefer salted cod, but will substitute pollock and other salted fish. Salt fish is now important mostly around Christmas and, to a lesser extent, Easter or when there are family gatherings with older generations in attendance. Polish-Americans are a market for dried fish (stockfish).
  
- 3) Immigrants from the Caribbean (e.g., Puerto Rico, Dominican Republic, Jamaica) are most price conscious and more likely to consume other types of salt fish such as Alaska pollock. These are often only lightly salted/ordinary cure and can be served quickly; e.g., with ackee and other fruit or with callalou (greens/soup), at breakfast. Big market - salt fish is often consumed year 'round in this group.

### Demographic Segmentation

Demographically, the younger generation is not consuming salt fish like the older generation. One distributor likened the demographic change as follows:

“If the US-born child marries into the same ethnic-Portuguese community, demand is reduced to 20% of the parents’; if the marriage is outside the ethnic community; demand is reduced to 2% of the parents’.”

In another case, a Portuguese-born fish processor said that neither his American-born wife (of Portuguese parents) nor his sons, would eat salt cod. For his own part, he said “It’s become so expensive I salt it myself.” (He showed the researcher one large split Atlantic cod he had salted and dried himself in his plant.)

The reduced demand of the younger generation appears to be moderated by continued immigration in the New York-New Jersey region (at least until recent years); whereas, in some New England areas, such as New Bedford, new immigration has not kept pace.

One major distributor said that demographic changes were not affecting demand in his markets (the US Northeast).

### **Competitive Considerations**

- There appear to be no major salt fish processors in the US. Some US fish processors have been known to ship cod to Nova Scotia for salting.
- US buyers interviewed are all buying from Nova Scotia; some have exclusive suppliers or own plants here. At least one major buyer has lost an exclusive Nova Scotia supplier (operation has closed).
- Norwegian salt cod is often the preferred product over Canadian in the US ethnic Portuguese market, but price is higher. However, Canadian salted cod is preferred in other US markets.
- Norwegian and Icelandic prices for premium groundfish appear higher than much of the US market is prepared to pay; European markets are willing to pay more. Neither Iceland nor Norway are making big inroads in US salted groundfish markets.
- Canadian Gaspé cure (very dry) is considered a premium product, but too expensive now (one buyer indicates supply is down by more than 90%).
- The Chinese have supplied Atlantic cod and Pacific cod to Canadian salt fish processors in the past; however, they are now focused on supplying mostly Alaska pollock (2/3 of production).
- A fear was expressed that Nova Scotia companies may be facilitating a move by competitors into US markets. “The Chinese are already exhibiting at the Boston Seafood Show; it’s just one more step for them to set up distribution here themselves.” One major distributor said that he was “already competing with his suppliers.”
- Buyers are becoming desperate for premium salted Atlantic cod and somewhat desperate for any salt fish. One buyer said he could sell 2-3 times his present supply. Another buyer asked the researcher if he could put her in touch with Icelandic exporters.<sup>11</sup>

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<sup>11</sup> Icelandic salted cod and other salted fishes were not highly visible in MRA’s US survey of retailers. One large US importer said he had tried Icelandic salted cod, “but had a poor experience.”

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**Product Observations:**

The salt fish consumer usually has certain product preferences. Colour is different, and texture and flavour are perceived to be different, between various types of salt fish products, product forms and salting methods. Starting with the basics, the flavour and texture of cooked salt fish is considered to be both different, and preferable to, that of cooked fresh or frozen fillets in the same fish (i.e., cooked salt cod is better than freshly cooked cod).

The flavour of bone-in salted cod is considered preferable, although Italian community likes boned (boneless) cod. The flesh around the bone is considered the most tender and flavourful. Generally speaking, a large, plump, brilliant-white, heavily salted, well-cured, split dried fish is the choice groundfish product. Pollock is a darker and oilier fish than cod and less preferred.

Cod:

- a) cod is the preferred fish for Portuguese and many other relocated southern Europeans.
- b) hard cure (well dried) is the preferred product form for many Portuguese.
- c) bone-in is preferred and a premium product over boneless in much of the Portuguese market.
- d) some Portuguese and many Italians prefer boneless cod.
- e) market wants big fish: jumbos 4-6 fish per case (25 kg.) extra-large (7-9) or medium (8-10)
- f) Polish prefer stockfish (dried, not salted) but very smelly
- g) Canadian product is often not dry enough (ordinary cure)
- h) hard cured cod is usually quite white in appearance
- i) Pacific cod is not as favoured as Atlantic; believed to have different texture (more fibrous), less oil and is a thicker fillet.

Atlantic Pollock:

- a) unlike cod, has a darker colour
- b) less expensive than cod and quite popular

Alaska Pollock:

- a) has a grayish colour, somewhere between cod and Atlantic Pollock
- b) fish is small; generally sold in packages as small boned fillets
- c) typically light salted; may not need much rinsing (or any) to prepare

Haddock:

- a) haddock colour may be white or light-yellow (especially after de-salting)
- b) one large buyer said yellow haddock was a little softer and flakier (“more finicky”) than cod, but perfectly acceptable
- c) another large buyer said light-yellow haddock mimics the Gaspé cure look and could be attractive to that market
- d) one small buyer was a little concerned as to the acceptability of salt haddock in its markets

Cusk, White Hake and Ling:

- a) all very acceptable; hake is especially acceptable

Other

- a) Canadian Fish Exporters, located in Boston, reports trying to salt all types of other fish from sharks to South American hake, with no luck.



Above – display of salt fish in New Bedford, MA, corner market.



Canadian cello-wrapped fillets – large boneless cod \$US 6.99/lb. Canadian and Norwegian split dried cod prices.

## Packaging Observations

- Large split salt cod is usually cello-wrapped at the supermarket for shelf presentation.
- In smaller markets, large salt cod is unwrapped and sold from boxes or stalls. Norwegian large wooden boxes (50 kg) are preferred by consumers.
- Some product like Alaska pollock fillets and cod bits are sold pre-packaged.
- Canadian salt cod/pollock is also sold in small 1 lb. wooden boxes.
- The Spanish term “bacalao” is used on some packaging.

## Price Considerations

Table 26 US Import Price of Canadian Salted and Dried Groundfish to US (\$US/MT)								
HS 10	Product	1990	2000	2002	2003	2004	2005	2006
0305306030	COD FL,D/S/B	5,608.70	7,759.30	7,652.30	7,793.20	8,603.20	8,904.60	9,650.50
0305306080	OTH FSH FL,D/S/B	3,987.50	4,438.70	4,529.10	4,438.60	4,590.20	5,031.20	5,540.30
0305510000	COD,DRIED,NT/SMK	4,792.70	6,347.50	6,185.40	6,333.10	6,734.30	6,779.50	7,040.40
0305620025	COD,WH,MS 45-50%	4,402.70	6,430.30	6,276.10	6,270.60	6,284.80	6,334.70	6,466.70
0305620045	COD,WH,MS <44%	4,121.80	6,776.80	7,657.80	7,793.10	7,744.60	7,290.20	8,430.30
0305594000	FISH,DRIED,N/SMK	4,805.10	3,080.20	3,151.80	3,235.30	3,176.40	3,607.30	3,874.60
0305691021	HAKE,S,NT/DRD	2,717.30	3,785.80	3,741.60	3,492.70	3,129.30	3,801.00	4,276.90
0305620070	COD,OT,MS 43-45%	3,155.90	5,746.60	5,603.70	5,879.70	6,557.60	6,510.40	7,534.90
0305691022	POLLOCK,ST/NT/DR	3,344.20	3,344.30	3,364.80	3,426.70	2,810.40	3,290.60	3,647.50
0305691049	OT HADD,SL/DT DR	2,244.70	6,175.50	5,486.90	5,740.60	5,653.40	6,242.60	7,302.80
0305691042	OT PLK,SL/NT DR	3,293.50	3,593.60	3,690.00	3,719.60	3,813.80	4,549.00	5,206.00
0305620030	COD,WH,MS 43-45%	3,484.70	8,142.30	6,084.60	0	8,947.30	11,309.30	7,586.70
0305620010	COD,WH,MS OV 50%	3,537.00	4,962.70	5,084.40	5,216.20	7,288.70	4,927.00	6,011.10
0305691029	HADDOCK,ST/NT/DR	2,602.30	6,143.40	4,609.20	3,681.70	4,416.80	4,934.50	5,054.80
0305620060	COD,OT,MS OV 45%	3,493.60	5,608.50	5,245.20	6,459.10	7,538.10	8,726.30	9,628.00
0305691041	OT HAKE,SL/NT DR	2,430.20	4,422.70	3,789.10	3,653.60	4,347.80	4,387.80	6,777.60
0305620050	COD,OT,MS OV 50%	5,167.50	5,870.40	7,165.60	6,624.60	6,832.70	7,553.20	8,958.00
0305620080	COD,OT,MS <44%	4,905.20	8,451.10	7,575.80	0	6,361.80	6,904.50	7,776.20
0305696000	FISH,NESOI,SALT	2,487.30	3,331.00	3,108.50	3,104.20	1,170.30	1,482.10	2,683.60
<b>AVERAGE</b>		<b>4,451.40</b>	<b>5,318.70</b>	<b>5,422.30</b>	<b>5,380.30</b>	<b>5,694.80</b>	<b>6,149.10</b>	<b>6,567.40</b>

Key: FL= fillets; D= dried; S= salted; (S)= may be salted; B = brine; NES - not otherwise specified; NT/SMK= not smoked; WH, MS= whole salted or in brine, not dried or smoked; OT, MS= other salted or in brine, not dried or smoked; OV = over (moisture content); NT/DR= not dried or smoked; CNT= containers. Note: The HS 10 codes reported above are derived from the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559) Source: MRA adapted from US Census.

Table 26 illustrates the delivered US import price of various salted fish products. Dried, salted cod fillets (HS 0305306030) from all export sources averaged \$US 9,650.50 per tonne (or \$US 9.65 per kg / \$4.38 per lb.) in 2006. The price of whole salted cod, ordinary cure (HS 0305620025) was about one-third less, at \$US 6,466.70 per tonne (\$US 6.47 per kg / \$2.94 per lb.). The price of salted cod fillets is 72% higher in 2006 than it was in 1990 and is also Nova Scotia’s largest export product. The price of salted pollock has only increased by 10% since 1990.



Table 27 Retail Price of Salted and Dried Groundfish in Sample US Locations				
Origin	US Location	Product/brand	Price US/lb	Price Cdn/lb
Norway	MA Market	Split salted dried (unwrapped)	\$7.59	\$8.80
Canada	MA Market	Large Bone-in cod (unwrapped)	\$6.59	\$7.64
Canada	MA Market	Medium bone-in cod fillets (cello)	\$5.99	\$6.95
Canada	MA Market	Small salted cod (unwrapped)	\$5.49	\$6.37
Canada	MA Market	Salted split cod faces (unwrapped)	\$1.99	\$2.31
Canada	MA Market	Large Boneless fillets (cello)	\$6.99	\$8.11
Canada	MA Market	Salt cod bits (cello wrapped)	\$5.99	\$6.95
Canada	MA Shaws	Canadian Pollock - Cristobal brand	\$3.99	\$4.63
China	MA Shaws	Alaska Pollock - Ventura brand	\$3.19	\$3.70
China	MA Shaws	Salted Cod wood box - Cristobal brand	\$7.99	\$9.27
Iceland	MA Shaws	Split salt cod (cello wrapped)	\$4.99	\$5.79
Canada	RI Stop & Shop	Canadian cod chunks	\$4.99	\$5.79
Canada	RI Stop & Shop	Cod small - Gonsalves brand	\$7.99	\$9.27
N/A	RI Stop & Shop	Split salted dried (cello wrapped)	\$5.99	\$6.95
N/A	RI Stop & Shop	Salted cod wood box - Cristobal brand	\$7.99	\$9.27
Canada	NJ Market	Bacalhau large	\$8.49	\$9.85
Canada	NJ Market	Bacalhau large	\$7.49	\$8.69
Norway	NJ Market	Bacalhau large 8/12	\$8.99	\$10.43
Canada	NJ Market	Goya Brand boned salted Alaska P	\$5.29	\$6.14
Norway	NJ Market	Bacalhau 13/15	\$6.99	\$8.11
Norway	NJ Market	Bacalhau 11-15	\$7.99	\$9.27
N/A	NJ Market	Bacalhau Demodhado	\$5.49	\$6.37
N/A	NJ Market	Bacalhau SP, SE	\$8.99	\$10.43
N/A	NJ Market	Bacalhau Destiado	\$4.99	\$5.79
N/A	NJ Market	Cares de Bacalhau	\$1.89	\$2.19

\$US 1.00 = \$Cdn 1.16 (April 2007)

Source: MRA Survey

Table 28 Typical Margins on Salted and Dried Groundfish in New England				
Price Level	% of Retail	Sample Price 1	% of Retail	Sample Price 2
Consumer	100	\$ 8.00	100	\$ 10.00
Retailer	35	\$ 2.80	35	\$ 3.50
Wholesaler	0	\$ 0.00	15	\$ 1.50
Distributor/Importer	10	\$ 0.80	10	\$ 1.00
Processor Price	55	\$ 4.40	40	\$ 4.00

Source: MRA Survey

Table 27 (see previous page) illustrates some sample prices of salt fish in various Northeast US locations. As the landed import price of salt cod increases, the price increases through the supply chain to the consumer. Retail prices for salt cod generally vary from \$6.00 to \$8.00 per pound in the US Northeast. If the supply chain includes a wholesaler, prices may even be higher (see Table 28). The price could easily reach \$10 per pound. However, at that price, sales begin to fall substantially and some consumers will begin to substitute lower priced products such as pollock or Alaska pollock. Alternatively, as the price gets higher, retailers are forced to cut their margins and/or shorten the supply chain.

All of the above is happening; however, to protect their margins, supply channels are seeking lower cost fish. This includes Pacific cod and Alaska pollock, as well as less traditional Atlantic Ocean groundfish. What the market would like to have most is relatively inexpensive Atlantic cod. However, under present conditions any inexpensive groundfish is welcome.<sup>12</sup>

The present high price for fresh/frozen groundfish fillets in Europe was mentioned as a factor in limiting additional penetration in the US market. The less favourable \$Cdn exchange rate has had a big effect in squeezing US margins even tighter in recent years.

One US importer stated that a Canadian salt cod product he was purchasing had doubled in price in recent years. Another importer/distributor reported that a recent price quote for Canadian salt cod (extra-large, semi-dry) of \$US 5.75/lb. was higher than a quote from Norway.

One distributor noted that Chinese export strategy is simply to sell at low prices. He has visited fish processing plants in China and sees how this is done with cheap labour. He also sees that the result of this strategy is working in the US market.

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12 The landed value of Atlantic cod was about \$US 1.50 per pound in 2006, up from about \$1.00 per pound in recent years. The landed value of Pacific cod was about \$US 0.15 in 1999, but has since doubled. Alaska Pollock is even cheaper than Pacific cod, but final prices for both must include shipping costs to intermediary processors as well.

### **Distribution Observations**

- US distributors bring container loads in from Norway (1,000 cases per container), but shipping takes several weeks, slower arrangement now than in previous years. Nova Scotia is closer and has a short delivery time advantage.
- Nova Scotia salt fish products are less expensive than similar products from Europe (until recently at least), but may be more expensive than Chinese products.
- New York-New Jersey not served by large supermarket chains; brokers are key.

### **Promotion Considerations**

- Nova Scotia Branding: Not necessary - distributors already brand products (up to 80%). A Nova Scotia brand would have to ensure same quality across all producers (unlikely).
- Salt cod is labeled Bacalhau (especially in Portuguese neighbourhoods) and sometimes Bacalao (Spanish).
- Nova Scotia products lacks POP sales materials (e.g., price and product description placards for stalls; Norway is also supplying printed cardboard display cases to retailers)
- Canadian selling practices are questioned:
  - a) asking the buyer for his price
  - b) selling volume at higher prices per pound than single units

### ***Nova Scotia's Salt Fish Export Position in the US Northeast***

US importers generally position Nova Scotia salt fish products as high quality at reasonable price; although one wholesaler said he found quality inconsistent over the years, but he is now happy with his present Nova Scotia supplier. The following analysis outlines a more detailed perspective.

### **Strengths**

- ✓ Nova Scotia's proximity to the main US market in US Northeast
- ✓ Canadian product is known by consumers and generally has a good reputation.
- ✓ Price alternative to expensive European products (lost recently on large fish). Iceland and Norway are pricing out of the market on premium products.

## **Weaknesses**

- ❖ Canadians producers are not market conscious – seldom visit market or importer or check product on store shelves like other foreign producers.
- ❖ Canadian product quality has been poor or inconsistent from some suppliers.
- ❖ Complaints on skin-on, bone-in product.
- ❖ Product not dry enough.
- ❖ Too many regulations/standards on retail packaging.
- ❖ Nova Scotia companies are too competitive with each other; processors not cooperative and not sharing knowledge on markets like Norway and Iceland.

## **Threats**

- ❖ Anyone who has salt fish to sell – commodity products, price dominates.
- ❖ Exchange on \$Cdn.
- ❖ Suppliers are selling direct to US market, may circumvent Nova Scotia export efforts.

## **Opportunities**

- Salt fish markets are strong and growing, but also seeking less expensive products.
- Canada should sell more bone-in salted groundfish; it is cheaper to produce and the US Portuguese community prefers it. Norwegian product is all bone-in. (However, this option requires large fish, presently somewhat scarce in Nova Scotia.)
- Nova Scotia producers should pool efforts for more market strength.
- Marketing efforts need to carry through to consumers.
- Trim from Pacific cod (sometimes imported by New England processors) is available for salting – 1 company is seeking a buyer for 25,000 lbs.
- Sales promotion materials included in shipments would highlight quality.
- Small haddock, if it could be efficiently filleted, would be well-received.
- Sales of boneless fillets optimize present lack of resources and small sizes of fish.

## ***Summary of US Market Options***

Nova Scotia processors must assess market and product development opportunities against the backdrop of a US salt fish market that is pretty well-served by inexpensive Alaska pollock from Asia, but is deficient in reasonably-priced traditional groundfish species, particularly cod. The former product primarily addresses US Caribbean immigrants, while the latter is the choice of most European immigrants.

### **Product Development Options**

The premium product salt fish buyers want most is large, split-dried salt cod (traditional “bacalhau,” or “bacalao”) usually heavily salted and well dried, with a brilliant white appearance or “blush”. Nova Scotia must measure its resources to supply this product and/or acceptable substitutes. The market also usually demands that at least 80% of shipments be top quality or in the “choice” category. The main product development options are to produce more of the product at maximum quality.

#### 1) Producing More Fish

The prospect of creating more local supply is daunting, but should be considered. Cod farming is expected to be the next big marine aqua-cultured species; even over-taking salmon production.

“the available data points toward a significant trend—substantial growth in farmed cod and a likelihood that cod farming will surpass wild harvest of cod (Pacific and Atlantic) as the most significant source of cod within the next two decades” *Alaska Seafood Marketing Institute*, June 2006 at [http://www.alaskaseafood.org/fishingprocessing/seafoodweb\\_june06/junestories/cod.html](http://www.alaskaseafood.org/fishingprocessing/seafoodweb_june06/junestories/cod.html)

One way to initiate this venture in Nova Scotia may be to entice, or joint venture with, an already successful producer. Marine Harvest, one of the world’s largest aquaculture companies, has plans to produce as much as 700,000 tonnes of cod annually within 12 years. As a result, Norway’s farmed cod production is estimated to reach 30,000 tonnes by 2008, climbing to 100,000 tonnes by 2010.

In Eastern Canada, Cooke Aquaculture has taken up the challenge of cod farming and is expected to produce 1,000 tonnes by 2009, all in New Brunswick, with some outreach in Nova Scotia for breeding. The company is still evaluating cod-farming economics, but a company spokesperson sees no major reason why future expansion plans could not include Nova Scotia.

Capture-based aquaculture may be another option, especially if cod, in particular, are starving off our coasts and/or otherwise being preyed on, as some observers report. One benefit would be a

dependable, year-around supply of fish.

2) Salt New or Unused Species

Canadian Fish Exporters Inc. (CFE) in Boston reports it has tried salting several different species from shark to South American hake, but has not found any acceptable substitutes for the present groundfish species. The possibility of using small haddock was raised. This product would be acceptable, but it was feared the processing of small fillets may not be cost efficient, at least by hand. If haddock, large or small, ever become available in larger quantities, this option may be worth considering.

Another small source of supply might be Pacific cod trimmings. It is believed that 100 to 200 tonnes of Pacific cod are processed across North America each year; mostly in Alaska and Washington States, but some closer to home. The trim from this processing can be saved for salting and might be the source of several thousands tonnes. It would not be a high value product, but could help keep plants going in downtimes.

3) Joint Venturing with Alaskan Suppliers or Co-op Purchasing of Alaskan Pacific Cod

Alaska is one of the few places left that has substantial resources of a “traditional” groundfish species available at a reasonable price. Nova Scotia is one of the few places left in North America that knows how to salt them. Perhaps closer ties would benefit both parties. Volume purchases may reduce prices and facilitate Nova Scotia’s competitive efforts.

4) The whiter the salt fish, the higher the quality.

Norwegian scientists are examining ways to make saithe “whiter.” Starting from when the fish is first landed, oil in the flesh becomes rancid, turning it a “yellowish-brown” colour. Scientists are using phosphates and anti-oxidants to reverse rancidity and create a whiter salted fish. High heat during processing has also been found to lighten fish colour. A whiter fish means more money. Norwegian scientists also report that to achieve the whitest possible fillet in any fish, the fish must be salted before rigor mortis sets in. Norwegian research to achieve the whitest possible fillet also found that heavier salting contributes to a whiter fillet and that adding calcium to the salt will increase weight.

#### 5) Injection Salting

In Iceland and the Faeroe Islands the industry uses machines with needles that inject brine into the fish flesh. This process also speeds up production. The fish flesh becomes plumper, has a lighter colour and looks more delicate. The market likes the product and more water means greater profits because the product weighs more. (For additional information – see Appendix 8.)

#### 6) Filleting for Highest Returns

Cod in fillet form is showing the highest value on US markets. Nova Scotia processors demonstrate they are already taking advantage of this demand. However, a review of salt fish processing costs and revenues may identify additional value-added products that could return higher profits (see Table 26).

#### 7) Sell Bone-in

Bone-in salted groundfish could be another profitable option when available; it is cheaper to produce and the US Portuguese community prefers it. Norwegian product is all bone-in. (However, Nova Scotia generally lacks the larger sizes required to supply this market; boneless filleting of small fish is almost a necessity.)

#### 8) Quality Sorting

Producers in Iceland and the Faeroes have focused on sorting the fish by quality such that the customers know what they are buying. In North America, it is common to mix good quality and low quality fish, making it difficult to assert a quality image.

#### 9) New Products

The consultant noted several value-added products on store shelves, or in the frozen food section, in the supermarkets in Brazil, which are apparently not available in US supermarkets.

- Already de-salted fillets sold frozen (“Pronto Bacalhau”)
- Bolinhos de bacalhau (i.e., “fish balls” made from salt fish – similar to fish cakes)
- Bacalhau croquettes (i.e., fish cake in sausage form)
- Frozen prepared meals made from salted fish

Although fish cakes can be found in the New England market, other products from salted fish;

particularly bolinhos (which are very popular in Brazil) and already de-salted (previously salted, ready-to-cook) fish are not available, as confirmed by one major distributor. These products are considered to have a market in the US and may merit further research. Development of such products as bolinhos and croquettes could stretch the value of Nova Scotia's already scarce salt fish resources. Ready-to-cook products have just recently been introduced to Brazil from Portugal and are reported to have been well-accepted. JA Oliveira Import Agents in Brazil expressed interest in importing both de-salinated bacalhau, and also bolinhos, from Nova Scotia. (For addition information and photos, see Brazil Market Section in report, page 59.)

#### 10) Additional Research

Norwegians conduct studies on all aspects of the salting and drying process. These studies include how temperature, humidity and air circulation affect storage of clipfish and stockfish quality. Norwegian industry is encouraged to bring projects forward to a host of potential funding agencies. Although general study conclusions are often reported, it is also known that production specifics (for example, salting formulas) are kept as trade secrets. Nova Scotia may have to conduct additional research at the processing level to remain competitive in international markets.

#### **Market Development Options**

It is worth noting that market development actually starts with good harvesting practices. Norway has been conducting a series of studies in this regard ("Market-based Harvesting Strategies") to improve the quality of fish landed at sea. The purpose is to bring both more, and better, quality fish to market, in lieu of catches that are not increasing. Examples of such studies are:

- Cod feeding on capelin are softer and less valuable.
- Larger saithe are worth more to the salting industry.
- Understanding fishermen's behaviour to improve product quality at sea.

Not every distributor, wholesaler or broker complained about a lack of supply of traditional salted groundfish products, but most did. Under the conditions of shortage of supply, it is a seller's market and aggressive market development may not always be necessary. However, some of the major market development options include:



### 1) Pooling Efforts for More Market Strength

The Nova Scotia salt fish industry might benefit from more cooperative efforts to trade information, set agendas, provide marketing services and purchase raw materials. In Norway, the salt fish industry has two forums, the Bacalao Forum and the Stockfish Forum, operating under the National Seafood Federation, an exporters group. The Norwegian Seafood Export Council (NSEC) safeguards the reputation of Norwegian seafood by means of active influence and through setting agendas. In addition, NSEC acts as a contact link between education, research and industry in the marketing of seafood. Norwegian seafood and fish exporters are levied a tax of 0.3% on all exports to assist in industry R&D.

### 2) Branding Nova Scotia Salt Fish

According to some distributors in the US marketplace, there would be little or no advantage in branding Nova Scotia salt fish products at this time. One major distributor already has several of its own brands and would feel uncomfortable about mixing these brands up with other companies that might be producing at different quality. Another factor is that much salt fish is often shipped and sold as a commodity – without packaging – and a brand would not be visible to consumers, in any case. Finally, the traditional name for cod from Eastern Canada is “Bacalao/Bacalhau Terra Nova,” which would mix Nova Scotia up with Newfoundland. From the view of this study, a branding concept needs to be further researched and developed before adoption; point-of purchase sales materials may offer a short term solution in the meantime.

### 3) Improved Sales Presentation at Point-of-Purchase

It can be seen from photographs in the report that split-dried salt fish is often sold straight from the box with prices hand-written on any convenient piece of paper. This presentation is almost the only source of quality information to consumers. Sales promotion materials included in shipments could help highlight quality at this point-of-purchase. Promotional leaflets and blank printed price labels that can be stuck on boxes would help generate a quality and uniform image of Nova Scotia salt fish. The MRA survey indicated that consumers also prefer to buy from wooden, rather than cardboard, boxes.

#### 4) Develop Recipe Booklets for Salt Fish

Norwegian researchers report that the recipe book “Bacalhau da Noreuga” was very helpful in promoting salt fish in Portugal, Spain and Brazil.

#### 5) Experiment with New Products and Markets

Producing 1) already de-salted fish and 2) fish cakes made from salted fish may present new market opportunities for Nova Scotia producers. De-salted ready-to-cook fish was the highest-priced product found in Brazilian supermarkets (\$Cdn 27.50 per pound). Some US buyers report that their markets prefer large, bone-in salted fish and wonder if Nova Scotia could produce this product, which requires larger fish. Another buyer reported a strong market for stockfish in the Polish community in the New York/New Jersey region (however, it is apparently difficult to maintain dried fish at low moisture content in Nova Scotia’s somewhat humid climate).

#### 6) Additional Research

The Norwegians practice product development throughout the processing stage and conduct constant market monitoring in their major markets to adjust market strategy and tactics. For example; “Market-Based Product Development of Clipfish” – conducted by Fiskeriforskning and funded by the Research Council of Norway undertakes such studies as follows:

- Brazil - Objective was to assess the quality of Norwegian clipfish (saithe) at store level. Customers and salespersons in shops were interviewed on their opinions about the quality and user-friendliness of clipfish.
- Lisbon, Portugal - Objectives: 1) bacalhau product evaluation tests at store level to answer “what fish would you buy and why?” (Indicated that consumers who rated fish that looked good to them in the store, actually scored poorly on taste). 2) Study also identified different purchase motivations for older and younger audiences (e.g., older audiences prefer stronger flavour) 3) initial research to develop a common vocabulary for describing bacalhau (e.g., “fibrous,” “firm,” “soft,” “chewy,” etc.).
- Studies on food traceability (back to harvester or fish farm).

## **7.0 BRAZILIAN SALT FISH MARKETS**

### **Country Overview and Some Personal Observations**

Brazil is a large country in area, almost the size of the continental USA. With almost 200 million people, it is also a populous country. However, there is an unequal distribution of income with wealth concentrated in a relatively small percentage of the population and in the southern region of the country. Statistically, about 1/3 of the wealth is concentrated the top 10% of households and about thirty percent of people live below the poverty level (Source: CIA World Fact Book). One state alone, São Paulo, is estimated by the Canadian Consulate office in São Paulo to account for about 45% of the country's GDP. In the late 1990s Brazil suffered a currency crises, from which it is still recovering. For additional facts on the country itself, see Table 29 (over).

The people in Brazil were found by the researcher to be friendly and fond of Canadians. Despite a grinding poverty that is evident in some parts of the two major cities visited (São Paulo and Rio de Janeiro) ubiquitous security personnel, gated stores and apartment buildings and warnings to be careful, the researcher only encountered friendly people who were prepared to be helpful.

The researcher found the Portuguese language to be a little difficult to comprehend. Although it is a hybrid of Spanish, it doesn't seem to follow all the conventions that overlap between the Spanish and French languages that would make it easier to understand; as well as having some difficult "twists of tongue" in pronunciation. Brazilians say "(they) can understand Spanish, but the Spanish don't understand Portuguese." The culture seems to be oriented toward North America more so than other Spanish-speaking countries and there was a fair amount of English-only television programming. Many educated Brazilians speak English as well, but visitors shouldn't expect much help on the street.

Cuisine, in general, seemed to be a little high in starchy foods.<sup>13</sup> Outside of tourist areas, prices are about ½ or less than you would expect in Canada. Supermarkets are beginning to penetrate and one Carrefour Store the researcher visited in Rio de Janeiro was probably the largest and most deluxe supermarket he had ever seen. Wal-Mart is also moving into the country. Brazil is a bureaucratic country with a somewhat regulated economic system; however, its future potential, and the obvious high regard Brazilians have for Canadians, should provide an incentive to exporters.

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<sup>13</sup> Beer appears to be the national drink in Brazil, probably because it is cheap, but also because it is a cool drink in a hot climate. The wine industry in Brazil is growing, but appears to be at the same level as Canada's industry. Much wine is imported from Chile, but the price is the same in Brazil as it is in Canada, for well known brands.

Table 29 Comparison of Selected Brazilian and Canadian Demographic and Economic Factors (2006 – except where noted )		
Item	Brazil	Canada
Government Type	Democracy - federative republic	Democracy - constitutional monarchy, federal parliamentary
Area	8,511,965 sq km	9,984,670 sq km
Population	188,078,227	33,098,932
Medium Age	28.2 years	38.9 years
Life Expectancy	71.97 years	80.22 years
Ethnic Groups	white 53.7%, mulatto (mixed white and black) 38.5%, black 6.2%, other (includes Japanese, Arab, Amerindian) 0.9%, unspecified 0.7% (2000 census)	British Isles origin 28%, French origin 23%, other European 15%, Amerindian 2%, other, mostly Asian, African, Arab 6%, mixed background 26%
Literacy	86.4%	99%
GDP (Purchasing PP)	\$US 1.616 trillion	\$US 1.165 trillion
GDP (Exchange Rate)	\$US 943.6 billion	\$US 1.089 trillion
GDP (Per Capita)	\$US 8,600	\$US 35,200
GDP – Real Growth	2.8%	2.8%
GDP by Sector	agriculture: 8% ; industry: 38% services: 54%	agriculture: 2.3% ; industry: 29.2%; services: 68.5%
Unemployment	9.6%	6.4%
Total Exports \$	\$US 137.5 billion; \$2.5 bill to Canada	\$US 405 billion; \$800 mill to Brazil
Main Exports	transport equipment, iron ore, soybeans, footwear, coffee, autos	motor vehicles/parts, industrial machinery, telecommunications equipment; chemicals, plastics, fertilizers; wood pulp, timber, crude petroleum, natural gas, electricity, aluminum, aircraft,
Total Imports \$	\$US 91.4 billion	\$US 353.2 billion
Main Imports	machinery, electrical and transport equipment, chemical products, oil, automotive parts, electronics	machinery and equipment, motor vehicles and parts, crude oil, chemicals, electricity, durable consumer goods
Brazil / Canada Bi-lateral exports	Brazil exports \$Cdn 3.4 billion to Canada	Canada exports \$Cdn 1.4 billion to Brazil
Brazil / Canada Bi-Lateral Export Items	aircraft, aluminum oxide, sugarcane, iron/steel, diesel engines, citrus	chemicals, coal, newsprint, trains, telephone equipment
Fish Production	802,000 tonnes (2000)	1.32 million tonnes (2003)
Fish Per Capita Supply (nominal)	7 kg (2006)	23.9 kg (2003)
Fish Exports	\$US 235 mil (2000)	\$Cdn 3.6 billion; \$Cdn 600,000 to Bra
Fish Imports	\$US 427 mil; \$151 mil from Norway	\$Cdn 1.5 billion; \$Cdn 5.5 mil from Bra
Currency	Real; reais	Dollar; dollars
Exchange Rate	\$R 1.00 = \$Cdn 0.56 (April 2007)	\$Cdn 1.00 = \$R 1.78 (April 2007)

Source: MRA adapted from *CIA World Fact Book*, *FAO Fishery Country Profiles*

**Brazilian Salt Fish Statistics and Trade Flows**

<b>Table 30</b>						
<b>Brazil Imports of Selected Salt Fish Products (HS 0305) By Year and Product (\$US)</b>						
<b>HS 6</b>	<b>Description</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
030551	dried cod, salted or not, not smoked	\$37,227,384	\$36,284,936	\$47,609,658	\$63,964,195	\$98,947,695
030559	dried fish, salted or not, not dried/smoked	\$57,673,520	\$42,391,119	\$57,421,261	\$78,074,786	\$82,215,680
030562	cod, salted/brine - not dried/smoked	\$408,193	\$400,033	\$507,662	\$787,839	\$820,732
030569	other fish, salted/brine, not dried/smoked	\$715,834	\$490,190	\$603,628	\$283,991	\$1,289,751
030530	Fish fillets, salted/dried, but not smoked	\$49,235	\$30,606	\$32,266	41,908	\$179,965
	<b>Total</b>	<b>\$96,074,166</b>	<b>\$79,596,884</b>	<b>\$106,174,475</b>	<b>\$143,151,719</b>	<b>\$183,453,823</b>

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish under HS 0305  
 Source: MRA adapted from Comtrade (Reported by Brazil)

<b>Table 31</b>						
<b>Major Exports of Salted and Dried Groundfish (HS 6) to Brazil by Selected Years and Country (Value and Quantity)</b>						
	<b>2002</b>		<b>2004</b>		<b>2006</b>	
<b>Country</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>
Norway	83,356,301	18,529	93,378,486	NA	149,502,159	26,711
Portugal	7,657,462	1,546	10,993,129	NA	31,016,627	4,475
Iceland	1,598,419	370	767,538	NA	1,137,762	234
Canada	316,814	48	176,719	NA	499,517	110
Spain	171,320	25	213,062	NA	296,566	52
Other	2,973,850	877	645,541	NA	1,001,192	520
<b>World Total</b>	<b>96,074,166</b>	<b>21,395</b>	<b>106,174,475</b>	<b>NA</b>	<b>183,453,823</b>	<b>32,102</b>

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559).

Source: MRA adapted from Comtrade (Reported by Brazil)

Brazil's total imports of fish and seafood products totaled \$427 million in 2006, of which \$183 million (43%) was salt fish (see Table 30).<sup>14</sup> In terms of value, cod made up almost 55% of the total salt fish imports, while other salted/dried fish made up the rest. Norway accounted for almost 82% of salt fish imports by value in 2006 (see Table 31). Tables and charts on the following pages will delineate Brazil's imports of salt fish in more detail.

14 Other major fish and seafood imports besides salt fish included salmon from Chile and hake from Argentina (not shown).

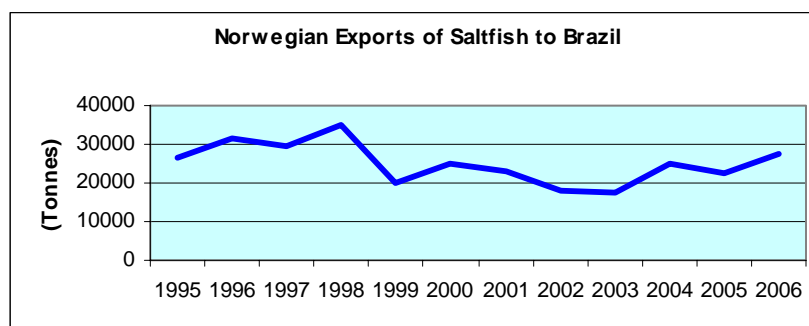
**Table 32**  
**Norway Exports of Salted and Dried Groundfish to Brazil By Year and Product**  
**(Value and Quantity)**

HS 6	2003		2004		2005		2006	
	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes
030530	84,207	10	126,937	17	267,165	34	1,006,875	209
030551	27,270,012	4,063	43,819,407	5,818	47,310,060	5,714	67,188,999	7,490
030559	40,754,710	13,778	61,537,057	19,755	67,673,484	17,513	91,888,595	20,085
030562	57,278	8	98,095	33	11,836	3	214,974	20
030569	-	-	-	-	-	-	99,958	18
<b>Total</b>	<b>68,166,207</b>	<b>17,859</b>	<b>105,581,496</b>	<b>25,623</b>	<b>115,262,545</b>	<b>23,263</b>	<b>160,399,401</b>	<b>27,821</b>

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish – See Table 30 or Appendix 4 for definitions.

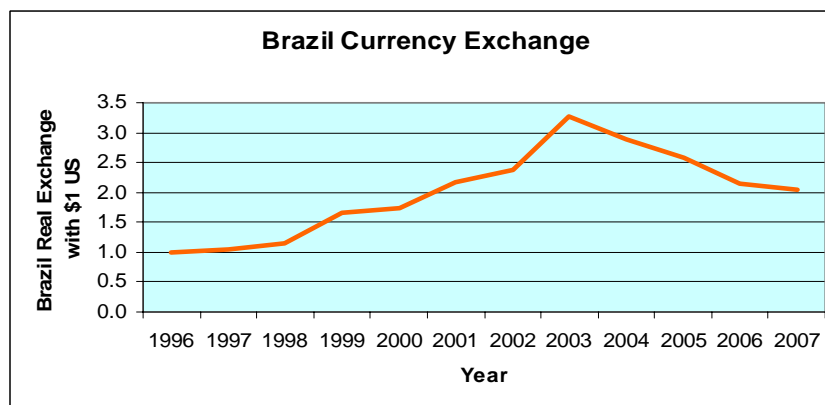
Source: MRA adapted from Comtrade (Reported by Norway)

**Figure 3**



Source: MRA based on data supplied by JA Oliveira Co., Brazil

**Figure 4**



Source: MRA based on data supplied by Classic Currency Converter (on-line)

Norway’s salt fish exports to Brazil more than doubled between 2003 and 2006; from approximately \$68 million to \$160 million and from almost 18,000 tonnes to 28,000 tonnes (see Table 32). The significant increase in value is due to the increase in cod exports over other salt/dried fish during the period.

Norway was the major salt fish supplier to Brazil throughout the 1990s. Exports, in terms of quantity, actually reached a peak of 35,142 tonnes in 1998 before falling back to 17,494 tonnes in 2003 (see Figure 3).<sup>15</sup> This decline coincided with a currency crisis and subsequent devaluation in early 1999 in Brazil that eventually saw the Brazilian real drop to less than 1/3 of its 1996 value (in \$US) by 2003 (see Figure 4). At the present time, the real has only regained a little more than 1/2 its lost value.

<b>Table 33 Norway Exports of Salted and Dried Groundfish to Brazil by Year and Species (Tonnes)</b>									
<b>Species</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>	<b>Percent</b>
<b>Cod*</b>	5,702	5,069	4,232	4,033	5,733	5,666	7,606	38,041	24
<b>Saithe</b>	11,928	12,207	10,399	11,086	16,590	14,405	17,154	93,769	59
<b>Zarbo</b>	4,535	4,137	2,005	1,588	1,419	1,560	1,317	16,561	10
<b>Ling</b>	3,099	1,754	1,088	787	1,249	1,094	1,458	10,529	7
<b>Total</b>	25,264	23,167	17,724	17,494	24,991	22,725	27,535	158,900	100

Atlantic cod and Pacific cod.

Source: MRA based on data supplied by JA Oliveira Co., Brazil

Table 33 shows the make up of salt fish products exported from Norway to Brazil. A full 76% of exports are in the “other fish” category (i.e., pollock – 59%, cusk – 10% and ling – 7%).<sup>16</sup> Only 24% of shipments are cod. Of the cod shipments, a knowledgeable Brazilian importer estimates that only 1% – 2% is Atlantic cod and the balance is Pacific cod.

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<sup>15</sup> Norway also reported a salt fish quality problem in 2002, stagnating sales in 2002 and 2003.

<sup>16</sup> “Saithe” is pollock and “zarbo” is tusk.

**Table 34**  
**Norway Exports of Salted and Dried Groundfish to Brazil by Month and Species (Tonnes)**

2005 Months													
Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>Cod</b>	1,544	620	20	97	211	257	91	373	502	1,093	277	581	5,666
<b>Saithe</b>	2,817	1,326	420	1,176	792	600	325	715	1,924	2,030	877	1,403	14,405
<b>Zarbo</b>	448	121	0	55	29	45	26	35	223	338	115	125	1,560
<b>Ling</b>	345	63	0	42	14	23	4	53	175	130	48	197	1,094
<b>Total</b>	5,154	2,130	440	1,370	1,046	925	446	1,176	2,824	3,591	1,317	2,306	22,725
2006 Months													
Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>Cod</b>	1,270	1,438	415	213	358	329	187	467	790	864	579	696	7,606
<b>Saithe</b>	1,750	3,575	1,081	370	375	342	448	844	2,264	3,007	1,180	1,918	17,154
<b>Zarbo</b>	249	387	7	20	5	32	28	56	202	104	21	206	1,317
<b>Ling</b>	140	260	12	3	23	57	47	123	194	163	123	313	1,458
<b>Total</b>	3,409	5,660	1,515	606	761	760	710	1,490	3,450	4,138	1,903	3,133	27,535

Table 34 shows the expected seasonality of salt fish export shipments to Brazil. A buildup for the Christmas season starts in August. Significant exports continue throughout the winter months to meet the Lent and Easter demand, falling off in the spring and early summer.

**Table 35**  
**Portugal Exports of Salted and Dried Groundfish to Brazil By Year and Product (Value and Quantity)**

HS 6	2002		2003		2004		2005	
	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes
030551	4,384,425	613	7,793,030	1,417	9,808,680	1,347	14,353,452	1,852
030559	1,865,375	633	1,668,366	595	1,941,331	733	3,615,946	949
030562	334,961	48	-	-	-	-	5,850	1
030569	200,112	69	-	-	-	-	-	-
<b>Total</b>	6,784,873	1,362	9,461,396	2,012	11,750,011	2,080	17,975,248	2,802

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish – See Table 30 or Appendix 4 for definitions.

Source: MRA adapted from Comtrade (Reported by Portugal)

Portugal is the second largest supplier of salt fish to Brazil shipping \$14.4 million of cod (mostly Pacific cod) and \$3.6 million of other salted fish (mostly saithe) in 2005 (see Table 35). Portuguese exports have increased significantly in recent years.



<b>Table 36</b>								
<b>Iceland Exports of Salted and Dried Groundfish to Brazil By Year and Product (Value and Quantity)</b>								
<b>HS 6</b>	<b>2003</b>		<b>2004</b>		<b>2005</b>		<b>2006</b>	
	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>
030530	-	-	-	-	-	-	107,622	25
030559	81,549	25	217,557	75	131,984	18	852,204	172
030569	-	-	173,301	51	177,841	49	-	-
<b>Total</b>	<b>81,549</b>	<b>25</b>	<b>390,858</b>	<b>126</b>	<b>309,825</b>	<b>67</b>	<b>959,826</b>	<b>197</b>

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish – See Table 30 or Appendix 4 for definitions.

Source: MRA adapted from Comtrade (Reported by Iceland)

Iceland is a small supplier of salt fish to Brazil, exporting mostly in the other fish category. In 2006 Iceland shipped 197 tonnes, valued at \$960,000 (see Table 36).

<b>Table 37</b>								
<b>Canada Exports of Salted and Dried Groundfish to Brazil By Year and Product (Value and Quantity)</b>								
<b>HS 6</b>	<b>2002</b>		<b>2003</b>		<b>2004</b>		<b>2005</b>	
	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>
030530	-	-	-	-	117,297	11	52,544	6
030559	-	-	777	-	-	-	216,473	43
030562	-	-	7,785	1	26,255	5	381,077	95
030569	-	-	33,316	5	226,968	73	-	-
<b>Total</b>	<b>-</b>	<b>-</b>	<b>41,878</b>	<b>6</b>	<b>370,520</b>	<b>88</b>	<b>650,094</b>	<b>143</b>

Note: Data are derived from the five main HS 6 codes applicable to salted and dried fish – See Table 30 or Appendix 4 for definitions.

Source: MRA adapted from Comtrade (Reported by Canada)

Canada has been another very small supplier of salt fish to Brazil in recent years. In 2005 (most recent data available from Comtrade) Canada shipped 143 tonnes of various salt fish, valued at \$US 650,000 (see Table 37).

## ***Results of Brazil Market Investigation***

### **Brazil as a Fisheries Culture**

Although it has a long coastline (8,400 km) Brazil has traditionally been viewed as a country that lacked extensive fishing resources. The fishery off the northeast coast, in particular, has been described as “barren.” Historically, Brazilian fishermen (or “Jangadeiros”) sailed far out to sea on small rafts for a pitifully small catch, with little to ensure a safe return beside their seamanship. At the beginning of the twentieth century Brazil still did not have a significant fishing industry.<sup>17</sup> Even today the country has a relatively under-developed marine fishery of only 450,000 tonnes in 2000.

However, new fisheries are in development. A potential marine fishery of 1.4 million to 1.7 million tonnes per year is now thought to exist (Ref: FAO Fishery Country Profile 2001). Fish species are varied, but include sardines, corvinas, croakers, snappers, tuna, sardines, lobster and shrimp. In addition, Brazil has large and growing artisanal and aquaculture fisheries. Total production from all sources in 2000 was approximately 800,000 tonnes and, including imports and exports, resulted in a supply of approximately 6 kg per capita in 2000 (apparent nominal domestic consumption), versus 70 kg in Portugal, 23.9 kg in Canada (1998) and 26.8 kg in the US (2003).

### **General Brazil Salt Fish Market Conditions**

Brazil is a complicated country, ethnically mixed and very poor in some regions. The country has never really had a strong fishing industry and a tradition of seafood consumption is still lacking in many respects, particularly in lower income groups. Most of the Brazil’s own fisheries’ production is used to supply local fresh and refrigerated markets. Brazil is also the largest fish importer in Latin America with imports of \$US 423 million in 2006, up from \$US 297 million in 2000. However, even with this level of imports, a great unfulfilled demand for fish products is deemed to exist.

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<sup>17</sup> Antonio Carlos Diegues, "Pescadores, camponesas e trabalhadores do mar" (São Paulo: Ática, 1983),107-9

Portugal is, by far, the largest importer of traditional salt fish products in the world and Brazil has strong ties with Portuguese culture. Already Brazil is the third largest importer of salt fish, after Spain. The Portuguese presently consume 10 times more fish than Brazilians, on a per capita basis, in a country that is almost 20 times smaller in population than Brazil. In other words, if Brazilians ever catch “bacalhau fever” like their Portuguese fore bearers, the potential market expansion is 200-fold.

Statistically, Brazilian demand for salt fish products has increased dramatically in recent years; more than doubling between 2003 and 2006 (see Table 30). Part of this increase is due to upward currency valuation. In the longer term Brazil’s GDP is expected to increase as well, creating a larger middle class with more disposable income and more able to afford expensive fish products.

However, a huge growth in market demand for salt fish is not likely to happen soon, although a continued and steady upward expansion in salt fish demand, especially in the “other fish” categories, should be expected as the country develops. Two potential constraints are noteworthy:

- 1) the “bottleneck effect of the present food distribution system, which is currently undergoing rapid development, but is some years away from full market saturation, and
- 2) like their North American counter-parts, there is some apprehension in the trade that the younger generation will not follow long-held traditions that promote salt fish consumption.

In terms of present market conditions, traditional North Atlantic salt cod or “bacalhau” is very expensive in Brazil – as much as \$Cdn 25.00 per pound – although an “average cut” is about half that amount. Still, that price is expensive, even by North America standards, and lower income people focus on less expensive fish. In Brazil, much of the salt fish growth in recent years has been in saithe (or Atlantic pollock). However, the Brazilian market has recently been opened to the Chinese and a flood of cheaper salted Alaska pollock (called “migas”) is now expected.

Like Portuguese speakers everywhere, the difference between Atlantic cod (“*Morhua*”) and Pacific cod (“*Macro*”) is of great importance, with *Morhua* being the premium product and more expensive. “Porto” bacalhau is the traditional and commercial name for Atlantic cod when the fish is over

3.5kg; “portinho” refers to fish under this size. These terms are now applied to Pacific cod as well, although this fish has only recently been introduced to Brazil. The word “bacalhau” itself has such a strong market presence that the name can now only legally be used for branding salted Atlantic and Pacific cods. Nevertheless, Brazilians take some license with the name “bacalhau,” extending its meaning to describe other members of the cod family (e.g., “bacalhau – saithe,” “bacalhau – zarbo,” etc.). Even unsalted fresh or frozen cod fillets can sometimes be called “bacalhau,” so that consumers could be confused as to whether it is a fish or a form of processing – and if a fish, what fish it is, or if a form, what form it is. The MRA focus group also confirmed that some Brazilians view “bacalhau” as the legitimate species name for cod, rather than a branding concept for a salted fish.



Above – display of salt fish in Pao de Açúcar (Sendas) Supermarket, Rio de Janeiro, March 4, 2007

## **Market Segmentation Considerations**

### Geographic and Demographic Segmentation

There is a market for salt fish throughout Brazil; however, the northeast region of the country is very poor and the market there is more thinly spread. The southeast portion of the country comprises only 30% of the population, but 70% of the GDP. Reportedly, 80% of the food distribution system is conducted from the southern part of the country.

The market is also segmented by income and age. Only a small percentage of the population can presently afford the premium prices requested for traditional “bacalhau.” However, in a country with a population of 188 million, this is still a sizeable group. Lower income groups must substitute less expensive pollock, cusk, ling or other groundfish. About 500 tonnes per year of Alaska pollock, or “migas,” has also been shipped from China via Portugal and Spain in recent years. These will soon become direct shipments; however, China is not expected to compete in the larger salted groundfish segments.

Importers suggest the younger generation is not as focused on salt fish as their parents. Like North American dealers, no one is very sure what this means, or where it will take the market in the future. MRA conducted a focus group with mature students learning English in Brazil and found that, for this group at least, “bacalhau” was far from being “top of mind.” The younger generation expressed such sentiments as “bacalhau was not something they thought about (daily/weekly/monthly)” and “they were too busy to prepare it themselves.” It was something they expected to see at family gatherings and/or on religious holidays, but it was also something their parents provided. They didn’t seem to think they would have the time in their futures to put the same value on it. Of course, this somewhat ambitious group (“English learners”) may not be representative of the population as a whole. (For additional information on focus group results, see Appendix 5)

Bacalhau is part of the popular culture, however. One noticeable sign of this is the popularity of “bolinhos de bacalhau.” These are essentially fish cakes and are found everywhere in Brazil, from the highest cuisine restaurants to beach and street side vendors – and the quality varies accordingly. “Bolinhos” means “balls” and bacalhau served in this form is usually (but not always) in the form of a ball, about the size of a golf ball or slightly larger. The fish, sometimes spiced, is usually minced and mixed with flour/batter or potatoes and can be baked or deep fried. It is often served with beer or wine as an appetizer. Brazilians from all income levels and ethnic backgrounds will know of “bacalhau” through this exposure, as well as seeing the raw salted product sold prominently in stores and markets.

In summary, bacalhau products of all types are universally-accepted in Brazil, but primary demand is in the income groups that can afford them, except for bacalhau de bolinhos, which everyone eats.

## **Competitive Considerations**

Portugal presently has a significant presence in the Brazilian market, and is exporting salt cod (“*Macro*”) and pollock. However, since this is usually in the form of unbranded split-dried fish, the Portuguese presence is not well known outside of the trade. Another product that Portugal is shipping is de-salinated salt fish. This is a somewhat new product that allows the consumer to prepare bacalhau faster, since the product has already been pre-rinsed. However, Portugal is a net importer of salt fish and should generally not be cost competitive, except in niche products. China will soon be exporting Alaska Pollock “migas” to Brazil and the presumption is that they will be tough to beat in this market. However, Norway is the major competitor in Brazil and has undertaken the following actions to promote the product.

- Sponsors promotions and parade floats on religious holidays throughout Brazil; not only at Christmas and Easter, but year around.
- Some promotions highlight Norwegian-Brazilian common history.
- Conducts consumer research at points of purchase of salt fish in Brazil to determine buyers’ purchase motivations.
- Hosts Brazilian buyers twice per year in Brazil and invites these to visit Norway twice per year. Norwegian export representatives speak Portuguese.

## **Product Observations:**

Observations on products are similar in both North and South America, but perhaps even more strongly felt in Brazil. Connoisseurs demand Atlantic cod and typically want large fish (e.g., 8/10 to 25 kg box) that are heavily salted and 7/8 dry. The flesh should be a bright white colour. Pacific cod is considered more “fibrous” and less desirable than Atlantic cod. About 95% of imports are for split-dried fish, rather than fillets.

The flavour of bone-in salt fish is considered preferable by many over boned (boneless). The flesh around the bone is considered the most tender and flavourful. Generally speaking, a large, plump, brilliant-white, heavily salted, well-cured, split-dried fish is the choice groundfish product. Pollock is a darker and oilier fish than other groundfish and is generally the least preferred and the lowest price. While not as dark as Atlantic pollock, Alaska pollock has a grayish, off-white colour and, because it is a small fish, is always exported as fillets.

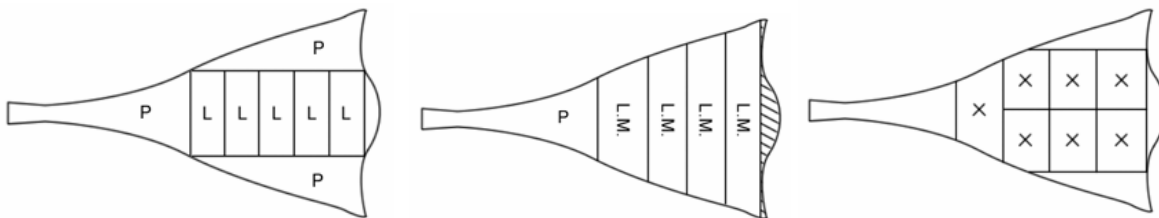
In Brazil, fish can be filleted in a number of different ways so that different fillets will vary by quality and price. The backbone fillet is the most prized and can be priced at upwards of \$100 Reais/kg.



Above: loin (“lombos”), special cut \$R 99.99/kg (\$Cdn \$25/lb.)



Above: bacalhau LING \$R 31.99/kg (\$Cdn \$8/lb.)



(Above: samples of the different fillets types obtainable from bacalhau.)

Right: “Fresh” bacalhau (\$R 73/kg)



Additional Products Forms:



De-salted ready-to-cook (“pronto”) bacalhau \$R 110/kg



Bolinhos de Bacalhau Frozen



Frozen Prepared Meals



Bacalhau Croquette

Additional Product and Packaging Observations:

- Haddock is a known fish in Brazil, but it is not generally known as a salted species.
- Canadian hake would not be a known salted species and might be confused with Argentinean hake, a species that is generally not salted.
- The terms “saithe” and “zarbo” for pollock and cusk, respectively, are necessary.
- 95% of shipments are split-dried, 5% fillets; 7/8 dry is the standard cure.
- Generally heavily salted for white appearance, but salting formulas are a secret.
- Imperial (Choice) quality is usually 80% of shipment; 20% Universal (Standard) shipped in separate boxes.
- Products are usually shipped in 25 kg or 50 kg wooden boxes, depends on size/species.
- Split-dried cod was usually unwrapped at the supermarket for shelf presentation.
- Fillets were wrapped in cello packages; with pre-printed store labels.



Price Considerations

Table 38 Brazilian Import Prices of Norwegian Salted/Dried Groundfish Typical Prices, April 2007 (\$US and \$R)				
Importer prices include freight		Price Importer Pays	Price Store Pays	
PRODUCT	Desc.	\$US/KG	\$US/KG	\$R/KG
PORTO MORHUA	8/10	\$14.17	\$21.15	\$43.50
PORTO MORHUA	11/15	\$11.73	\$17.50	\$36.00
PORTO MACRO	8/10	\$11.56	\$17.26	\$35.50
PORTO MACRO	11/15	\$10.69	\$15.95	\$32.80
LING	8/10	\$7.82	\$11.67	\$24.00
LING	11/15	\$7.33	\$10.94	\$22.50
LING	16/20	\$6.12	\$9.14	\$18.80
LINGUINHO (SMALL LING)	7/9	\$6.51	\$9.72	\$20.00
LINGUINHO (SMALL LING)	10/12	\$6.19	\$9.24	\$19.00
LINGUINHO (SMALL LING)	13/15	\$5.86	\$8.75	\$18.00
COD MORHUA	4/7	\$11.56	\$17.26	\$35.50
COD MORHUA	7/9	\$10.26	\$15.31	\$31.50
COD MACRO	7/9	\$9.45	\$14.10	\$29.00
COD MACRO	10/12	\$9.12	\$13.61	\$28.00
COD MACRO	13/15	\$8.80	\$13.13	\$27.00
COD MACRO	in straps	\$7.49	\$11.18	\$23.00
COD MACRO	unweaving	\$7.17	\$10.70	\$22.00
ZARBO / CUSK	7/9	\$6.84	\$10.21	\$21.00
ZARBO / CUSK	10/12	\$6.51	\$9.72	\$20.00
ZARBO / CUSK	13/15	\$6.19	\$9.24	\$19.00
ZARBO / CUSK	16/20	\$5.86	\$8.75	\$18.00
ZARBO / CUSK	21/30	\$5.05	\$7.54	\$15.50
SAITHE / POLLOCK	4/6	\$5.15	\$7.68	\$15.80
SAITHE / POLLOCK	7/9	\$4.88	\$7.29	\$15.00
SAITHE / POLLOCK	10/12	\$4.56	\$6.81	\$14.00
SAITHE / POLLOCK	13/15	\$4.40	\$6.56	\$13.50
SAITHE / POLLOCK	16/2	\$3.91	\$5.83	\$12.00
SAITHE / POLLOCK	21/3	\$3.75	\$5.59	\$11.50

1 USD = 2.057 BRL 03/30/2007

Sources: Santa Luzia Import and JA Oliveira, Sao Paulo, Brazil

Table 38 identifies the price per kg. an importer will pay to ship a container load of salt fish, including freight charges, from Norway to Santos, Brazil. Importer and distributor mark-ups result in a average 33% price increase at delivery to the São Paulo store/warehouse location.

Table 39 Brazilian Retail Prices of Salted and Dried Groundfish ( Brazilian Real and \$Cdn)				
Origin	Brazil Location/Store	Product/brand	Price \$R Brazil/kg	Price \$Cdn/kg
	<b>Sao Paulo</b>			
Norway	Pao de Açúcar	Imperial bacalhau fillet	\$55.99	\$31.35
Norway	Pao de Açúcar	Lombo (loin, back) de bacalhau special cut	\$99.99	\$55.99
Norway	Pao de Açúcar	Bacalhau Imperial	\$49.90	\$27.94
Norway	Pao de Açúcar	Bacalhau ling fillet	\$36.90	\$20.66
Norway	Pao de Açúcar	Bacalhau lascas (pieces)	\$29.80	\$16.69
Norway	Santa Luzia	Bacalhau Porto <i>Morhua</i>	\$88.00	\$49.28
Norway	Santa Luzia	Bacalhau Desfiado	\$62.00	\$34.72
Norway	Santa Luzia	Bacalhau Fillet	\$78.00	\$43.68
Norway	Santa Luzia	Bacalhau Isca ventresca	\$90.50	\$50.68
Norway	Santa Luzia	Bacalhau Posta (chop)	\$90.50	\$50.68
Norway	Santa Luzia	Bacalhau dessalgado (de-salted)	N/A	N/A
Norway	Santa Luzia	Bacalhau arriz	\$31.00	\$17.36
Norway	Santa Luzia	Bacalhau gratinado	\$31.00	\$17.36
Norway	Santa Luzia	Bacalhau de nazau	\$49.00	\$27.44
Portugal	Santa Luzia	Bacalhau croquette	N/A	N/A
Norway	Santa Luzia	Bacalhau lombo dessalgado (loin de-salted)	\$99.00	\$55.44
Norway	Santa Luzia	Bacalhau desfiado ventresca	\$62.00	\$34.72
Norway	Santa Luzia	Bacalhau ventresca	\$50.00	\$28.00
	<b>Rio de Janeiro</b>			
Norway	Pao de Açúcar	Bacalhau - saithe (split)	\$18.90	\$10.58
Norway	(Sendas)	Bacalhau - cusk (split)	\$22.90	\$12.82
Norway	Pao de Açúcar	Bacalhau (cod) de Porto (split)	\$42.49	\$23.79
Norway	(Sendas)	Bacalhau - ling (fillet)	\$31.99	\$17.91
Norway	Pao de Açúcar	Bacalhau (cod) porto (fillet)	\$40.49	\$22.67
Norway	(Sendas)	Bacalhau - saithe (fillet)	\$18.90	\$10.58
Norway	"	Dias brand Bacalhau Lombo dessalgado	\$110.10	\$61.66
Norway	Carrefour	Bacalhau - Ling (split)	\$34.49	\$19.31
Norway	Carrefour	Bacalhau (cod) Porto Macro (split)	\$47.90	\$26.82
Norway	Carrefour	Bacalhau - saithe (split)	\$18.90	\$10.58
Norway	Carrefour	Bacalhau (cod) Porto Morhua (split)	\$50.49	\$28.27
Norway	Carrefour	Bacalhau - cusk "Brosmius" (cello)	\$21.90	\$12.26
Norway	Carrefour	Bacalhau - saithe (cello wrapped)	\$20.03	\$11.22
Norway	Carrefour	Bacalhau - lombo (cello wrapped)	\$83.90	\$46.98
Norway	Carrefour	Bacalhau Morhua desfiado	\$48.95	\$27.41

\$R 1.00 = \$Cdn 0.56 (April 2007)

Source: MRA Survey

Table 39 illustrates the retail prices of various salt fish products in various stores and supermarkets. Mark-ups, depending on the store, seem to vary between 50% (i.e., 33% margin) to 100% (i.e., 50% margin). For example, Santa Luzia, a very upscale store in São Paulo, purchases Porto *Morhua* at \$R36.50 - \$R44, depending on size (Table 38) and sells it at \$R88.00 (for some cuts).

### **Distribution Observations**

- Brazilian distributors bring container loads from Norway at a cost of \$US 3,500 to \$4,000, per container. Nova Scotia is closer and has a shorter delivery cost and time advantage. Costa Container Lines has regular shipping between Halifax and Santos, Brazil every 10 days. Hamburg Sud and Maersk Lines may also be interested in this business, according to one Brazilian importer.
- Nova Scotia salt fish products are less expensive than similar products from Europe (until recently at least).
- Brazilian supermarkets still small sales channel ~1,050 stores for the whole country, versus about 2,000 in Canada.

#### Brazil Supermarket Chains

Pao de Acucar - 550 Stores

Carrefour - 180 Stores

Wal-Mart - 280 Stores

Zona Sul - 23 Stores

### **Promotion Considerations**

- Nova Scotia Branding: Some sort of branding may be useful. The Canadian salt cod has traditionally been known as “Bacalhau da Terra Nova” (Newfoundland)
- Salt cod is labeled Bacalhau and sometimes Bacalao (Spanish).
- Nova Scotia products lacks POP sales materials (e.g., price/product placards for stalls)
- Norway has Bacalhau website in Portuguese.

### ***Nova Scotia’s Salt Fish Export Potential with Brazil***

#### **Strengths**

- ✓ Canada should be able to compete on resource costs - most of the codfish that Norway and Portugal send to Brazil is Pacific cod; it would seem that Canada should have similar access to this resource on world markets.
- ✓ Transport cheaper/faster
- ✓ Brazilian importers want to work with Canadians
- ✓ Brazilian currency is strengthening; prices for some products strong

## **Weaknesses**

- ❖ Norway is well established in this market. Norwegian competitors have promotion and market development funds available (see Carnival 2007 promotion below.)
- ❖ Potential language difficulties.
- ❖ Salt products not dry enough.
- ❖ Nova Scotia companies are too competitive; processors not cooperative and not sharing knowledge on markets like Norway and Iceland.

## **Problems**

- ❖ Need to Register with Brazilian agencies (e.g., MARA)
- ❖ Some Brazilian importers may seek external financing
- ❖ Existing competition (may be good or bad)
- ❖ Brazil applied a 10.2% duty on imported fish products in 2006.
- ❖ Need to work in Portuguese

## **Opportunities**

- Market for salt fish is already developed, promotion costs may be minimal
- Profits could be higher than US
- Market for de-salted fish (JA Oliveira Importers)
- Market for Bolinhos de Bacalhau (JA Oliveira Importers)
- Could be market for salted Atlantic pollock and small haddock (if that is all that is available)



Above: The Poster reads “Do you want bacalhau?” (A theme developed for the 2007 Winter Carnival in Brazil to celebrate Norwegian codfish. Vikings in costume were part of the Parade. The theme was borrowed from a popular TV show.)

### ***Options: Special Considerations for the Brazilian Market***

All of the product and market development options for the US market are also true for Brazil, with the following qualifications:

#### Nova Scotia Branding

The most appropriate brand name for Brazil (as with Portugal) would probably be “Bacalhau da Terra Nova” (Newfoundland) as this is a known product, at least to a portion of the market; but this would conflict with a Nova Scotian identity. However, since about 95% of imported salt fish is split-dried, and not fillets, it is uncertain if a brand is necessary immediately. It may be a good idea not to have Canadian product differentiated from Norwegian to start with, although stores may differentiate Canadian products on their own.

#### Website Development

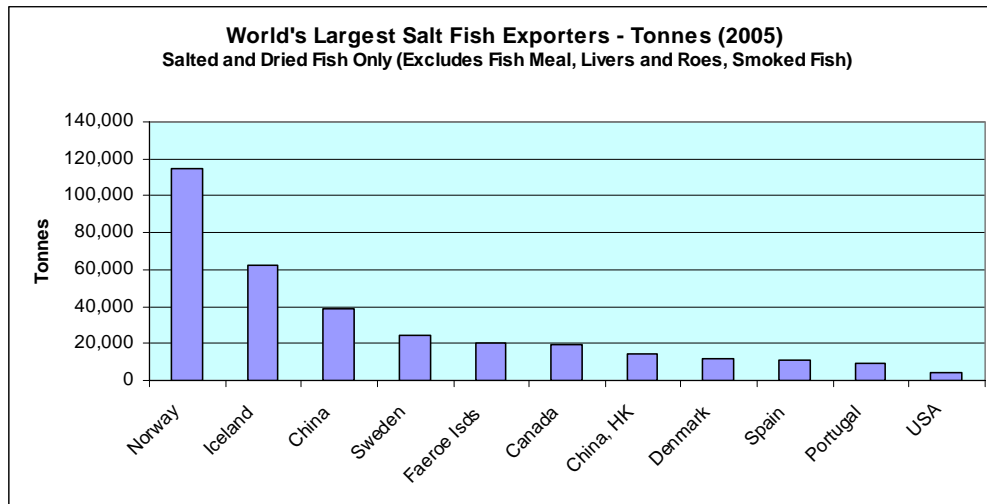
Norway has a bacalhau website in Portuguese (<http://www.bacalhaudanoruega.com.br>)

In conjunction with branding considerations, a Nova Scotia bacalhau website may become desirable or necessary, especially if Nova Scotia has the production potential to fuel significant growth. At that point, the website would probably best be in English and Spanish as well.

## 8.0 GLOBAL COMPETITORS IN SALT FISH MARKETS

### Overview of Competition and Markets

Figure 5

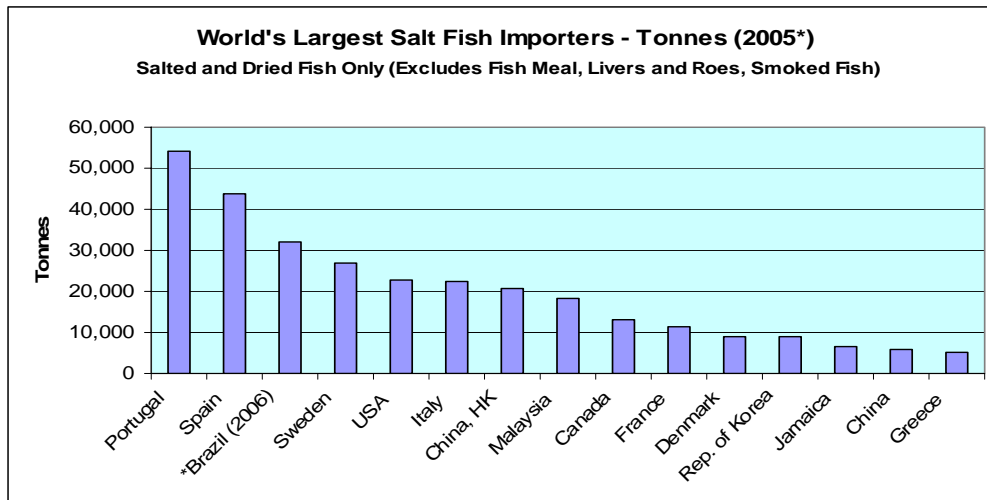


Source: MRA adapted from ComTrade

Figure 5 illustrates Canada's export position, and Nova Scotia's main competitors, in the salted and dried fish category – exclusive of smoked fish, salted livers and roes and fish meal. Total exports of the above countries in 2005 were 331,000 tonnes and approximately \$US 2 billion. Canada's exports in this group totaled 19,200 tonnes (\$US 86 million) in 2005, of which Nova Scotia accounted for about 11,800 tonnes (\$US 64 million). Using comparative data, Nova Scotia's world market share in 2005 was approximately 3.6% by quantity and 3.2% by value.

Norway, Iceland and China are major competitors. Norway exports products in this category to well over 100 countries worldwide, but Portugal, Brazil, Italy, Dominican Republic and Spain are the major markets. Iceland ships to about 30 countries worldwide and is a principal supplier to Spain, Portugal and Nigeria. China exports primarily to Japan and Korea, but also to the USA, Canada, Russia and Spain, among other countries. Sweden is both a major exporter and importer (see Figure 6), exporting mostly to Portugal, but also Italy, Spain and Greece. The Faeroe Islands is a principal supplier to Spain, as well as Italy and a number of other European countries.

Figure 6



Source: MRA adapted from ComTrade

Figure 6 illustrates the main markets (tonnage) for salted and dried fish worldwide. Portugal is by far the largest market, followed by Spain and Brazil (2006 data). All three of these markets are supplied by Norway, but on the Iberian Peninsula, Norway's exports concentrate on Portugal while Iceland's exports concentrate on Spain. Norway is the main exporter to Brazil, although Portugal is also a small supplier.

### *Analyses of Key Player Programs and Strategies*

#### *General*

Both Norway and Iceland are major fish exporting countries and are largely successful at it, but not without their problems. Norway, in particular, still looks to Iceland as a profitability model in many respects. Both countries emphasize rationalization in harvesting and processing and maximization of marketing opportunities. Both countries keep a sharp eye on their industries and are able to report on the profitability of each fishing sector so that particular problems can be focused on.

## **Norway**

### **Norwegian Fisheries Overview**

Norway produces about 3% of the world's fish resources (3.3 million tonnes), but is the world's second largest fish exporter, after China. In 2004, Norway exported 2 million tonnes of seafood at a value of \$US 4.2 billion. Norway's exports of salted and dried fish (excluding smoked, salted livers and roes and fish meal) accounted for about 16% of total exports by value in 2004. Approximately 90 per cent of the landed and farmed fish is exported; the remaining 10 per cent is sold in the domestic markets. Because of its large oil and gas exports, seafood only represents 5% of total exports. Direct employment in the industry is about 12,000 – down from 25,000 in 1980. Much of the fishing industry is centered in the north of the country.

In terms of value, fish farming now accounts for almost half of production. Norway is now farming cod, a program that started only recently, but is expected to produce 100,000 tonnes by 2010.

<b>Table 40 Norway Landings of Groundfish Species 2003-2005 (tonnes live weight and \$US ) (Value and Quantity)</b>						
	<b>2003</b>		<b>2004</b>		<b>2005</b>	
<b>Species</b>	<b>Tonnes</b>	<b>\$US (000)</b>	<b>Tonnes</b>	<b>\$US (000)</b>	<b>Tonnes</b>	<b>\$US (000)</b>
Cod	217,352	350,790	230,734	417,592	225,833	447,896
Saithe	212,228	120,293	211,267	125,647	230,269	164,868
Haddock	59,329	61,932	64,932	68,258	63,392	78,845
Cusk	13,463	14,687	11,897	12,435	11,851	13,251
Ling	14,547	23,274	14,553	26,397	15,129	26,829

Source: Norwegian Ministry of Fisheries

Table 40 illustrates Norway's resources in the main salted and dried species, excluding herring. Landings of saithe are comparable to cod, but valued much less. Norway is working on methods of improving the quality and value of salted saithe, however. Cusk and ling are the other two major salted species as most haddock is shipped fresh or frozen. Ling is valued almost as much as cod on a pound for pound basis. Norway's salt fish production guidelines are found in Appendix 6.



Salt Fish Products and Markets

Table 41 Norway Exports of Salted and Dried Groundfish (HS 6) By Year and Country (Value and Quantity)								
Country	2003		2004		2005		2006	
	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes
Portugal	\$176,327,318	32,075	\$218,032,768	34,600	\$227,092,247	32,870	\$239,287,495	31,649
Brazil	\$68,323,045	17,895	\$105,587,412	25,625	\$115,270,221	23,263	\$160,427,541	27,824
Italy	\$103,682,051	11,227	\$114,094,586	10,951	\$106,385,149	10,033	\$121,235,395	10,071
Spain	\$28,978,092	6,250	\$34,185,307	6,342	\$30,642,433	5,515	\$41,279,907	6,800
Dominican R	\$15,853,764	6,823	\$14,822,095	5,928	\$23,712,359	7,708	\$25,453,653	7,935
France	\$18,415,889	3,620	\$20,380,220	4,182	\$20,607,333	3,905	\$25,242,906	4,333
Greece	\$16,117,118	3,716	\$16,022,107	3,318	\$16,684,595	3,392	\$18,975,231	3,384
Congo D R	\$3,158,729	1,126	\$5,470,677	1,930	\$8,609,183	2,740	\$14,010,169	4,087
Sweden	\$14,861,176	4,490	\$15,271,622	3,895	\$14,463,610	2,656	\$12,897,104	2,192
Jamaica	\$9,374,967	3,579	\$11,169,301	4,211	\$12,800,343	4,021	\$12,676,316	3,670
Nigeria	\$10,252,239	1,596	\$11,839,790	1,857	\$14,389,877	2,402	\$12,391,199	2,183
Mexico	\$7,631,462	1,103	\$6,780,625	945	\$9,673,717	1,354	\$10,649,082	1,358
USA	\$24,970,796	3,432	\$27,727,853	3,169	\$21,008,209	2,342	\$9,797,378	982
Denmark	\$4,710,893	1,443	\$9,229,901	2,664	\$17,222,607	3,493	\$9,365,287	1,803
Switzerland	\$7,990,514	1,008	\$8,743,125	993	\$8,823,329	1,000	\$9,349,572	970
Canada	\$12,397,691	4,575	\$11,747,307	3,447	\$7,532,152	2,413	\$9,210,937	3,071
Other	\$52,170,265	11,076	\$61,039,721	13,018	\$64,655,253	11,693	\$68,108,497	11,680
<b>World Total</b>	<b>\$575,216,009</b>	<b>115,034</b>	<b>\$692,144,417</b>	<b>127,076</b>	<b>\$719,572,617</b>	<b>120,802</b>	<b>\$800,357,674</b>	<b>123,993</b>

Note: The HS codes reported above are the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559). Source: Comtrade

Table 41 illustrates Norway's exports of salt fish under HS 0305. In 2006, 95% of these exports (both value and tonnage) fell under the five principal HS 6 codes of salted and dried fish (i.e., excluding smoked products, salted livers and roes and fish meal). Total value has taken a colossal 28% jump in recent years; from \$US 575 million in 2003 to \$US 800 million in 2006. Considering total production remained relatively constant over this period suggests Norway's recent R&D efforts are paying off. Portugal and Brazil were the two major markets in 2006. Norway pays 7% to 20% tariff on exports to EU countries, which makes it less competitive in Europe than Iceland.<sup>18</sup>

<sup>18</sup> Iceland is not a member of the EU either, but currently the duty free entry of fish products covers over 90 % of Iceland's exports to the EU.

### **Government Support for Fisheries**

A master plan for Norwegian fisheries development was adopted by the Norwegian Parliament (Storting) in 1998. Key policy elements include responsible management of resources, increased marketing effort and product development, and better utilization of secondary products, including heads and guts.

In March, 2002 the government produced a White Paper stating the need for the principle of sustainable development to be integrated into management plans. More specific targets set by the White Paper include further development of the fishing industry and the implementation of an ecosystem based management and precautionary approach. The Paper also acknowledges the need to strike a balance between commercial interests, e.g. fisheries, aquaculture and the petroleum industry, and the need to protect the marine environment and biological diversity. Other future governmental plans are to reduce the fleet capacity to a level that will allow efficient harvesting of the marine resources in a sustainable way.

In order to meet these objectives the government has made plans to place more emphasis on research into the marine ecosystem and to establish a new comprehensive legal framework ('Marine Resources Law') covering all living marine resources. The fleet capacity reduction will be aided by a proposal to establish structural adjustment schemes.

### **Research Support**

The first fisherman's training school in Norway was founded in 1939. Norwegian scientists cooperate closely with other countries and research organizations such as the International Council for the Exploration of the Sea (ICES). Chilean and Norwegian scientists cooperate on research into aquaculture. The overall planning, promotion, evaluation and allocation of national research funding is the responsibility of the Research Council of Norway. It is publicly financed and responsible for strategic long-term development of Norwegian research.

Universities provide the core of basic research and the education of scientists, with the Universities of Tromsø, Bergen and Oslo prominent in this respect. The Department of Fisheries and Marine Biology, University of Bergen, has its main activities in fisheries science, marine biology and ecology. The Norwegian College of Fishery Science is a university faculty connected to the University of Tromsø, and is the main institution for higher fisheries education in Norway. The Centre for Fisheries Economics, Norwegian School of Economics and Business Administration, Bergen, is specialized in bio-economic modeling, economics and market research.

The Norwegian Institute of Fisheries and Aquaculture Research (**Fiskeriforskning**) is a contract research institute for the Norwegian fisheries and aquaculture industry. Fiskeriforskning conducts research and development for the fisheries and aquaculture industry. The Institute covers virtually all links in the value chain – “from sea bottom to tabletop.” Fiskeriforskning is a national research institute owned by the Norut Group and the Norwegian Ministry of Fisheries and Coastal Affairs. Located in Tromsø (head office) and Bergen, the facilities at Fiskeriforskning are an important part of the national infrastructure for fisheries and aquaculture research. The Norwegian Marine Technology Research Institute (MARINTEK) in Trondheim also undertakes marine technology research and development services for national and international companies and organizations.

#### **Fiskeriforskning industry and market-oriented research**

- 1) Strategy and industrial economics:** To contribute to profitable businesses, focusing on the industrial sector with studies of the companies' general conditions, profitability, efficiency and productivity. The companies' strategies for survival, growth and internationalization, and the importance of changes in these, are studied.
- 2) Market studies:** To build a knowledge base about international marketing, new markets and trends, and consumer behaviour. Through studies of the most important markets for Norwegian seafood, an understanding of the factors that influence the consumers' choice of seafood will increase.
- 3) Product development:** To achieve competitive advantages through innovation and knowledge. Important areas include barriers and success criteria, product development, market orientation, evaluation of product concepts, and consumer test.
- 4) Industrial processing:** To reveal and show how industrial processes can produce safe and healthy seafood, better quality, further developed products and increased profits. Another goal is to develop cost effective industrial solutions for processing of pelagic fish, residual raw materials and plankton
- 5) Marine raw materials:** To learn and understand how to handle raw materials in aquaculture, during catching and live storage, and during slaughter and stocking to obtain maximum product quality and food safety in a traceable system. Work is being done to gain insight into the basic mechanisms for why different kinds of seafood behave differently by processing
- 6) Marine biotechnology:** To contribute to a complete utilization of raw materials through use of residual raw materials for development of products for human consumption, health food, cosmetics, high-technology applications and feed ingredients. Within bio-prospecting, the aim is to utilize valuable biochemical and genetic marine resources.

### **The Fishery and Aquaculture Industry Research Fund (FHF)**

The Fishery and Aquaculture Industry Research Fund is a funding scheme for industrial and marketing research and development (R&D) work within fisheries and aquaculture and is based on a levy of 0.3 percent on all exported fish and fish products. The funds are used for R&D work for the benefit of all or part of the industry and are distributed in the form of grants for research programmes and major projects. The levying of a research and development tax in the fisheries and aquaculture industry came into force on January 1, 2001.

The funds are administered by a Board appointed by the Norwegian Ministry of Fisheries and Coastal Affairs. Board members are representatives from the fisheries and aquaculture industry. Primary duty of the board is to develop short- and long-term strategies for the fisheries and aquaculture industry for using funds from the R&D tax, based on an ongoing dialogue with the entire industry. The board also distributes the research funds and stipulates the terms for the allocation of funds in accordance with strategies drawn up. It is also their responsibility to follow up the R&D initiatives.

The Research Council of Norway and the Norwegian Industrial and Regional Development Fund are important partners in both strategy planning and the co-funding of R&D work in the fisheries and aquaculture industry. The FHF reports to the Norwegian Ministry of Fisheries and Coastal Affairs through annual reports.

### **Sample Research Projects**

#### Market Research

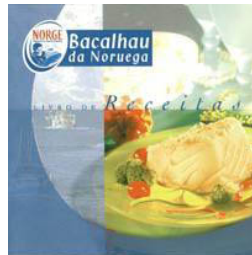
Market-Based Product Development of Cliffish – Conducted by Fiskeriforskning - funded by Research Council of Norway

- Brazil - Objective was to assess the quality of Norwegian cliffish (saithe) at store level. Customers and salespersons in shops were interviewed on their opinions about the quality and user-friendliness of cliffish.
- Lisbon, Portugal - Objectives: 1) bacalhau product evaluation tests at store level to answer “what fish would you buy and why?” (Indicated that consumers who rated fish that looked good to them in the store, scored poorly for taste). 2) Study also identified different purchase motivations for older and younger audiences (e.g., older audiences prefer stronger flavour)

3) initial research to develop a common vocabulary for describing bacalhau (e.g., “fibrous,” “firm,” “soft,” “chewy,” etc.)

### Market Development

- New recipe ideas that are making traditional clipfish products more attractive for consumers in established markets like Portugal, Spain or Brazil. (Apparently very successful in Norwegian market development efforts in Portugal – see Appendix 7.)



Left: Norwegian bacalhau recipe book

- New, ready-to-eat clipfish products. (Apparently very successful in Norwegian market development efforts in Portugal - put products back into the high-price market segment).

### Marketing

- Branding stockfish - Stockfish from Lofoten is deemed as having a good basis for developing into a branded good with high value; i.e., unique taste, based on a special raw material and a distinctive production method. Main challenges: “get producers to join forces to develop and use a common brand. A brand scheme means that certain demands must be made of the product and that there are controls to ensure that these demands are met, including being able to guarantee quality, taste and origin, and preventing overproduction.” (Italy is Norway’s biggest market for stockfish.)

### Value-added studies

- Surveys of Norwegian seafood companies to seek value-added processing ideas conducted by marketing researchers at Fiskeriforskning - funded by the Ministry of Fisheries and Coastal Affairs
- “Market-based harvesting strategies” (studies to increase quality and prices, in lieu of increasing catches) - financed by the Fishery and Aquaculture Industry Research Fund.
  - Cod feeding on capelin are softer and less valuable.
  - Larger saithe are worth more to the salting industry.
  - Understanding fishermen's behaviour to improve productivity at sea.
- Research goal to achieve the whitest possible fillet found fish must be salted before rigor mortis sets in. Conducted by Fiskeriforskning - funded by Research Council of Norway.
- Research goal to achieve the whitest possible fillet found that heavier salting contributes to a whiter fillet. Adding calcium to the salt also increases the weight.

- Research goal to achieve a whiter clipfish of saithe found that adding antioxidants to the salt provides a whiter fish (saithe has oil that becomes rancid, turning the fish yellow). Higher processing temperature also creates a whiter fish - funded by FHF and Innovation Norway.
- Testing temperature, humidity and air circulation effects on the storage of stockfish to improve quality
- In Iceland and the Faeroe Islands, salting methods result in a plumper fish with higher water content compared to fish produced using traditional methods. "The industry in the Faeroes uses exclusively machines with needles that inject brine into the fish flesh. This also speeds up the production. In Iceland, they use both injection and tanks filled with brine in which they lay the fish. These methods are not common in Norway." The market apparently prefers such a product. "The fish flesh becomes plumper, has a lighter colour and looks more delicate. More water also means greater profits because the products weigh more." Producers in Iceland and the Faeroes have also focused on sorting the fish by quality such that the customers know what they are buying. In Norway, it is common to mix good quality and low quality fish, making it difficult to assert oneself in the quality-conscious market sectors.

#### Harvesting - Increasing Quality

- Fewer licenses and less catch rights to prevent over-harvesting and extend season.
- Further specialisation of individual quotas (quota banks, long term contracts)
- Development of a sea trawl towing bag for landing live fish – funded by the Norwegian Raw Fish Association and the Fisheries Research Fund (FHF)
- Studies on food traceability (back to harvester or fish farm).
- Investigation of quality defects research is part of several studies concerning catch damages and quality since 2002. The principals have been the Research Council of Norway, the Norwegian Fishing Commodities Association, the Fillet Forum, the Salt Fish Forum, and the Stockfish Forum (the three fora are operated by the Federation of Norwegian Fishing Industries). The projects are financed by the Federation of Norwegian Fishing Industries, the Norwegian Fishing Commodities Association and the Research Council of Norway. Example: Investigation of gear damage (8,000 tonnes of cod per year are damaged by five main categories of defects: marks left by gear, extravasation, poor bleeding of the fish, cuts caused by gaffing/hooking and fish that died on gear at sea).

*“**Poor product quality** was the cause of a sharp fall in Norwegian salt fish exports in 2003. Norwegian klipfish, salted fish and stockfish exports fell by 14% compared to 2002. In 2004, the klipfish segment increased export value by 21% during the first six months and the salted fish segment by 37%; thereby putting a stop to the quality problems in what is Norway’s most important salted fish market. Per capita consumption of salted fish in Portugal is nearly 10 kg, but from 2000 to 2003 Norwegian salted fish exports to Portugal had fallen by half.*

## **Other Support**

Norway's fisheries are served by a number of organizations and associations that often initiate or collaborate, and sometimes even partially finance, research projects. These include:

### **The Norwegian Seafood Export Council**

The Norwegian Seafood Export Council was established by the Storting (Norwegian Parliament) and its activities are founded in the Fish Export Act. Approval of exporters, dissemination of information to the industry and joint marketing of Norwegian seafood on both national and international levels are tasks imposed upon NSEC through legislation. In addition, NSEC will act as a contact link between education, research and industry in the marketing of seafood.

<http://www.seafoodfromnorway.com/>

Address: P.O. Box 6176, 9291 Tromsø

Tel: +47 77603333

Fax: +47 77680012

Christian Chramer, Director of Information: [christian.chramer@seafood.no](mailto:christian.chramer@seafood.no)

### **The Norwegian Seafood Federation (FHL: Fiskeri- og Havbruksnæringens Landsforening)**

Represents the interests of approximately 600 member companies and 9000 employees. It is part of the Norwegian Confederation of Business and Industry. FHL consists of the following branch associations: FHL fishmeal, FHL fishfeed, FHL aquaculture, FHL industry and export, Marine - biomarine ingredient industry

<http://www.fhl.no/category/English/category.php?categoryID=73>

Address: Sørkedalsveien 6, Postboks 5471 Majorstuen, 0305 OSLO

Tel: +47 23 08 87 30

[firmapost@fhl.no](mailto:firmapost@fhl.no)

Geir Andreassen, Managing Director: [geir.andreassen@fhl.no](mailto:geir.andreassen@fhl.no)

Tlf: +47 23 08 87 39

Otto James-Olsen, contact person for FHL Industry and Exports: [Otto.James-Olsen@fhl.no](mailto:Otto.James-Olsen@fhl.no)

**The Bacalao Forum and the Stockfish Forum** both operate under the Norwegian Seafood Federation. There is no separate email for these two forums. However, there is limited information about the Bacalao Forum on their website (in Norwegian): [http://www.fhl.no/om\\_industri\\_og\\_eksport/article997.html?CorepublishSession=1928a3392d2f014c7c921d15369242c7](http://www.fhl.no/om_industri_og_eksport/article997.html?CorepublishSession=1928a3392d2f014c7c921d15369242c7).

For more information about the Bacalao Forum contact:

Bacalao Forum – FHL industry and export division Ålesund

Røysegt. 15 – 6001 Ålesund

Tel: +47 70 10 32 50, Fax: +47 70 10 32 69

The Project Leader of the Bacalao Forum is Mr. Arnt Olav Aarseth

Tel: +47 70 10 32 53

Email: [arnt.olav.aarseth@fhl.no](mailto:arnt.olav.aarseth@fhl.no)

Project Leader of the Stockfish Forum is Frank Jakobsen

Tel: +47 77 66 29 54.

Email: [frank.jakobsen@fhl.no](mailto:frank.jakobsen@fhl.no)

The Stockfish Forum may no longer be in place. The project was started in 2005 and was presenting results at the end of that year.

### **The Norwegian Seafood Association (Norsk Sjømatbedrifters Landforening)**

Norwegian Seafood Association (NSL) has 180 members: Exporters/wholesalers, Processing Enterprises, Retailers, Landing/harvesting enterprises, fish farmers.

The objective of NSL is to work for optimal framework conditions for the industry in general and for affiliated enterprises in particular; work to make member enterprises as competitive and profitable as possible, and encourage co-operation and adjustment; work to increase the consumption of seafood in Norway and internationally, and to ensure that the industry and the member enterprises obtain a satisfactory share of the increase; work to encourage co-operation with other organizations in the industry. <http://www.nsl.no/>

Address: Box 639 Sentrum, 7406 Trondheim

Ingebrigt Overby, Managing Director: [ingebrigt.overby@nsl.no](mailto:ingebrigt.overby@nsl.no)

Tel: +47 73841400

### **Norconserv AS**

Norconserv AS - Seafood Processing Research is an independent institute working for the food processing industry. The key activities are research, development and training in industrial production of food with extended shelf-life.

Address: P.O Box. 327, N-4002 Stavanger

Phone +47 51 84 46 00

Helge Bergslien, Managing Director: [hb@norconserv.no](mailto:hb@norconserv.no)

Tel: +47 51 84 46 96

### **Fiskeriforskning (Norwegian Institute of Fisheries and Aquaculture Research)**

[www.fiskeriforskning.no](http://www.fiskeriforskning.no)

Ivan Burkow, Managing Director: [ivan.c.burkow@fiskeriforskning.no](mailto:ivan.c.burkow@fiskeriforskning.no)

Tel: +47 77 62 90 00

### **Norwegian College of Fishery Science, University of Tromsø**

Knut Heen, Rector: [knuth@nfh.uit.no](mailto:knuth@nfh.uit.no)

Tel: +47 77 64 60 00

**SINTEF** is a Norwegian-based private research institute, the largest in the Nordic countries.

They have an extensive English website for more information:

<http://www.sintef.no/default490.aspx>.



## ***Iceland***

### ***Iceland Fisheries***

Iceland lands less than three percent of the world's seafood, but it is second only to Norway in the export of salt fish. It exports a full range of products, from low cost dried cod heads to high value, top quality salt cod. In 2005, dried/salted fish products represented approximately 20% of the value of seafood exports from Iceland and seafood exports represented 57% of total exports. The major salt fish products are obtained from groundfish, with cod being the predominant species (86%). About half of the cod catch has traditionally been salted, but in recent years the percentage has been declining, with about 35% being salted in 2005. Other species that are salted include pollock, ling, cusk and herring.

The Icelandic fishing industry is characterized as being highly industrialized, using modern technology and highly automated processing. Iceland relies on modern technology in catching and processing its fisheries resources. Only about 7% of the workforce was directly employed in the fishing industry in 2002. The country's fishing fleet has shrunk, but productivity of the fleet has increased and is considered now the most efficient in the world. Profitability and efficiency within the fishing sector have risen substantially.

The Norwegian research group, Fiskeriforskning, noted that Iceland's salt fish typically sells for 20-25% more than Norway's and that the Norwegian salt fish industry, although the largest in the world, is not as profitable as that of Iceland.

### **Fishery Resources**

Most of the Icelandic salt fish is produced from cod, although other species are also used to a lesser extent. Cod is also farmed in Iceland, producing 9,000 tonnes in recent years. The quantity and value of the catches of the different species of demersal and pelagic fish caught for the years 2003-2005 are shown in Table 42 (over). Of the demersal species, cod provides by far the largest catch, and is obtained at a fairly consistent supply level. The other species that are used in significant quantities, pollock, ling and cusk, are also available in relatively consistent supply, as seen in the table.

**Table 42  
Iceland Landings of Groundfish Species  
(Tonnes – whole ungutted fish)**

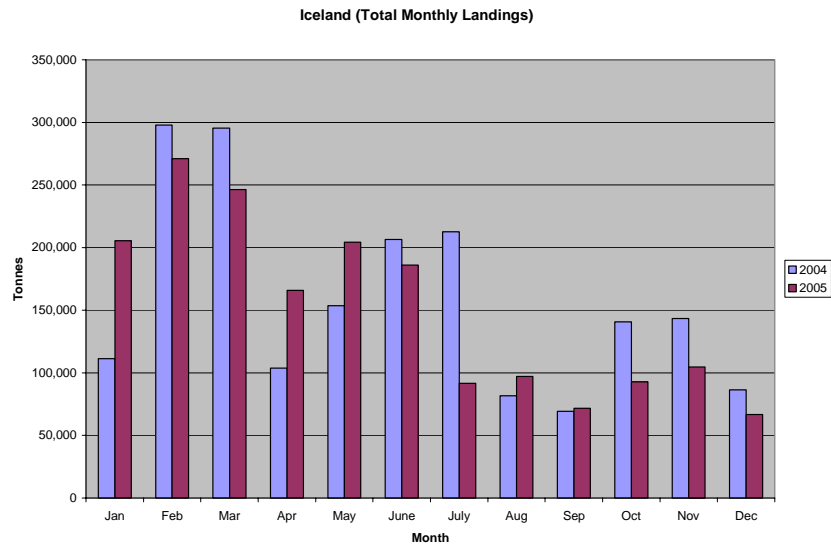
Species	2003	2004	2005
Cod	206,405	227,258	212,456
Pollock	51,935	62,965	67,736
Ling	3,584	3,718	4,307
Cusk	4,030	3,124	3,533

Source: Statice

The percentages of each species used for salting in 2005 were: cod 35%; pollock 11%; ling 65%; and cusk 38%. Other species are also used for salting, but in much less significant quantities.

As noted in the Fiskeriforskning study, one factor that contributes to the success of the Icelandic salt fish industry is the consistency of supply throughout the year. This allows for more efficient use of processing facilities. The chart of monthly landings (Figure 7 below) illustrates year-round levels of harvesting that are able to provide processing facilities with feedstock throughout the year.

**Figure 7**



The management of fisheries stocks is the responsibility of the Icelandic Ministry of Fisheries. The Directorate of Fisheries controls the catch size by allocating quotas as recommended by the Marine

Research Institute. It should also be noted that the population of Icelandic harbour seals has decreased sharply in the last 20 years, whereas the Canadian seal population has doubled in that period.

### **Salt Fish Production Methods**

Icelandic salt fish processing plants vary in size from small family operations to large modern factories, some of which are equipped with very efficient computer interfaced processing facilities. Some fish is prepared in the traditional manner and some by the technique of injecting brine into the flesh. All of the salt fish processing in the Faeroe Islands is now prepared by this latter method. A description of this process and equipment from one manufacturer is found in the Appendix 8.

Groundfish is normally gutted and iced at sea and kept in chilled storage until it is taken for salting. In the traditional method, it is headed and split or filleted, trimmed and soaked in brine for one to two days. It is then dry-salted and stacked in layers interspersed with salt for one to two weeks. At this stage the fish is “tender cured” and may be further processed at controlled temperature and dried to specific levels.

The cod heads and trimmings from the cod are also used. The cod heads are dried and exported, primarily to Nigeria. (Norway was a previous supplier to Nigeria for heads and stockfish; however, apparently cod heads from Iceland have more meat on them because fish collar bones are left on.) The trimmings are salted, minced and block frozen.

The export by airfreight of fresh white fish fillets from Iceland and Norway has risen dramatically, with Icelandic producers being particularly profitable. Part of the reason for this is Iceland’s catch quota system which has reduced the cyclic nature of harvests and led to a more even supply of raw material of higher quality. Norway has made progress on evening out landings as well. High prices for fresh/frozen fish may be contributing to a decline in salt fish production in Iceland.

### Salt Fish Exports and Markets

Iceland Statistics lists six categories of dried/salted fish exports. The dollar value of exports in each of these categories for the years 2002 to 2005, are shown in the Table below.

<b>Table 43 Iceland Exports of Salted and Dried Groundfish (Species) (FOB \$US 000)</b>				
<b>Product</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Dried Salt Fish	3,354	7,516	7,580	8,162
Uncured Salt Fish	231,754	200,600	211,193	176,268
Salted Fish Fillets, bits, etc.	93,717	86,767	91,518	79,065
Salted Roes	20,263	1,677	1,355	11,786
Stockfish	2,634	4,329	5,449	3,731
Dried Fish Head	42,515	34,837	41,779	39,361
<b>Total</b>	<b>394,796</b>	<b>336,299</b>	<b>360,014</b>	<b>319,247</b>

Source: Statice

<b>Table 44 Iceland Exports of Salted and Dried Groundfish (HS 0305) (Value and Quantity)</b>								
<b>Country</b>	<b>2003</b>		<b>2004</b>		<b>2005</b>		<b>2006</b>	
	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>	<b>\$US</b>	<b>Tonnes</b>
Spain	\$84,422,352	15,324	\$104,906,333	16,070	\$129,877,928	19,221	\$107,829,759	15,193
Portugal	\$78,643,248	12,067	\$89,865,136	15,102	\$73,352,065	12,254	\$67,544,817	10,908
Nigeria	\$38,309,296	15,358	\$48,448,079	17,209	\$51,470,597	17,177	\$54,584,148	18,051
Holland	\$10,876,794	2,273	\$2,384,760	514	\$13,296,321	2,335	\$43,057,326	6,546
Italy	\$22,959,338	3,285	\$21,989,242	3,160	\$18,824,728	2,673	\$21,370,171	2,961
Greece	\$12,666,042	2,332	\$12,782,719	2,106	\$10,712,243	0	\$9,526,903	1,461
France	\$17,512,266	3,672	\$25,634,834	4,290	\$10,568,213	1,792	\$7,405,090	1,577
Sweden	\$10,368,306	3,675	\$8,964,972	3,502	\$8,112,586	2,202	\$6,908,398	1,839
USA	\$8,379,329	2,391	\$5,923,685	1,483	\$4,513,297	2,219	\$4,812,612	807
Canada	\$4,155,696	1,732	\$5,666,233	2,581	\$4,229,985	993	\$4,005,201	1,467
Norway	\$1,145,404	208	\$1,432,223	198	\$1,409,591	1,553	\$2,009,336	448
Finland	\$3,275,389	1,762	\$1,576,286	762	\$844,258	199	\$1,907,908	917
UK	\$2,651,319	459	\$1,672,558	247	\$702,128	279	\$1,577,402	304
Germany	\$3,248,557	686	\$2,847,812	467	\$879,279	161	\$1,437,766	303
Denmark	\$3,843,536	1,028	\$6,143,876	2,102	\$3,317,014	200	\$1,390,104	354
Brazil	\$81,549	25	\$390,858	126	\$309,825	998	\$959,826	197
Other	1,202,651	179	2,677,671	669	\$2,034,226	546	\$1,565,561	346
<b>World Total</b>	<b>\$303,741,056</b>	<b>66,456</b>	<b>\$343,307,277</b>	<b>70,589</b>	<b>\$334,454,285</b>	<b>64,802</b>	<b>\$338,616,180</b>	<b>63,782</b>

Note: The HS codes reported above are the five main codes applicable to salted and dried fish (i.e., HS 030530, HS 030551, HS 030559, HS 030562, HS 030559). Source: Comtrade

Table 44 illustrates Iceland's exports of salt fish under HS 0305. In 2006, 96% of these exports (both value and tonnage) fell under the five principal HS 6 codes of salted and dried fish (i.e., excluding

smoked products, salted livers and roes and fish meal). Iceland sells most of its salt fish in the countries of southern Europe, with Spain and Portugal being the primary customers. Lower priced products are exported to Nigeria (mostly dried fish heads and some stockfish) and the West Indies. The chart below shows the value of exports to its top ten customers over the period from 2002-2006. The sales to Canada are believed to have been mostly product for re-processing.

**Figure 8**



### **Government Support of Fisheries**

The Icelandic government supports the fisheries at all levels: stock research and management, capture research, process research and development, and marketing support.

The Ministry of Fisheries has responsibility for the management of fisheries in Iceland and does this through the Directorate of Fisheries, the Marine Research Institute and the Icelandic Fisheries Laboratory. The Directorate of Fisheries is responsible for allocation of quotas, under the advice of the Marine Research Institute, which conducts research on fisheries stocks. Iceland has a system of tradable catch-quotas allocated to individual vessels. The quotas can be bought and sold freely.

## **Research Support**

The Marine Research Institute (MRI) provides research on the resource side of the industry. It assesses the size and condition of stocks and recommends the total allowable catch. As well, the institute conducts research on the marine ecosystem, fishing methods, gear and other factors that might affect the efficient harvest of the resources. A second research institute, the Icelandic Fisheries Laboratories (IFL) provides support in the processing and aquaculture sectors.

The Institute for Freshwater Fisheries carries out research into the freshwater environment and freshwater assessments. The University of Iceland and the University of Akureyri also carry out research into fisheries and environmental issues.

## **Marketing Support**

Marketing support is provided by the several organizations. The *Trade Council of Iceland* helps Icelandic companies to sell their products, services and know-how in the international marketplace. It employs a total of 25 marketing professionals, 19 based in Iceland and 6 overseas, and is organized into five main service areas:

- Information Services
- Training & Consultancy Services
- Trade Fairs
- Market Development
- Invest in Iceland

The *Overseas Business Services* (OBS) operates within the External Trade Department of the Ministry for Foreign Affairs. It provides Icelandic exporters with professional marketing and business services, working on a contract basis. Preliminary information is free of charge and special assignments for exporters are carried out for a very moderate fee. The OBS supports the globalization of Icelandic companies by providing them with market information, opening business contacts, providing company credit reports and searching for business partners across the globe. Currently professional trade representatives are working in the Icelandic Embassies in USA, UK, France, Germany, Denmark, Russia, China and Japan.

The *Iceland Chamber of Commerce* is an association of businesses and individuals from all sectors of the Icelandic business community. It is an independent voluntary organization, established in 1917, and has always been free of state involvement or official contributions. It seeks to further strengthen the open market ideas, promote free trade and competition on equal terms, to facilitating international trade and establish business contacts between dynamic businesses.

The *Iceland Export Directory* aims to provide information on Icelandic exporters and their products through a book publication and an internet site. Iceland Export Directory is Iceland's official export market place, published by the Trade Council of Iceland and Icelandic Firms in co-operation with the Federation of Icelandic Industries, the Iceland Chamber of Commerce, Overseas Business Services, Euro Info Centre and Invest in Iceland Agency. The directory is available in English at www.icelandexport.com. The website has a variety of search criteria that selects Icelandic exporters, and links to websites related to Icelandic business and trade.

## ***China***

This report did not focus on China; however, it is worth noting that China is also a big player in the world salt fish market. Chinese exports are a little difficult to fathom as they are reported for both the Mainland and the Hong Kong Special Advisory Region, which also trade back and forth with each other. The two China(s) import a huge value of dried fish, generally from other Asian countries. They are also major exporters of salt fish as well.

Table 45 and Table 46 (over) illustrate Chinese exports of salt fish under HS 0305. In 2005, 75% of Mainland China's exports (both value and tonnage) fell under the five principal HS 6 codes of salted and dried fish (i.e., excluding smoked products, salted livers and roes and fish meal). Total value has taken a colossal 25% jump in recent years for Mainland China; from \$US 156 million in 2003 to \$US 206 million in 2005. Approximately \$US 44 million (7,000 tonnes) of Mainland China's exports in 2005 were livers and roes to Japan and Korea; leaving the US and Canada as primary markets for salted and dried fish. Chinese main strategy, as reported by the salt fish trade in the US, is simply to offer the lowest price. Chinese trade in agri-foods has been recently affected by "tainted" food products and tariffs on some fish products, which may affect future export development.

Table 45 Mainland China Exports of Salted and Dried Groundfish (HS 0305) (Value and Quantity)						
Country	2003		2004		2005	
	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes
Japan	\$48,276,247	13,050	\$57,271,116	15,241	\$60,039,482	17,192
Rep. of Korea	\$23,205,391	5,296	\$39,489,685	7,513	\$49,815,142	8,078
USA	\$21,064,553	6,798	\$18,632,259	5,523	\$30,244,777	9,226
Hong Kong	\$40,435,647	3,109	\$44,279,196	4,898	\$21,542,812	3,396
Canada	\$1,002,958	317	\$3,161,903	480	\$10,700,289	2,520
Portugal	\$4,929,086	1,417	\$4,355,307	1,201	\$10,269,505	2,868
Russia	\$499,586	150	\$4,289,422	1,094	\$9,874,712	2,120
Spain	\$1,406,687	479	\$3,052,029	871	\$5,491,398	1,670
North Korea	\$12,622,349	2,746	\$5,057,712	1,294	\$2,417,724	488
Other Asia	\$239,907	230	-	-	\$1,023,031	398
Singapore	\$504,237	39	\$1,116,565	178	\$985,658	37
UK	\$461,089	153	\$953,186	281	\$682,973	205
Norway		0	\$384,814	315	\$650,875	186
Bermuda	\$443,417	105	\$254,814	48	\$553,578	93
France	\$212,640	65	\$188,166	72	\$413,129	140
Philippines	\$141,300	550	\$1,103,820	1,267	\$322,510	556
Germany	-	0	-	-	\$296,436	74
Netherlands	\$120,558	84	-	-	\$283,927	124
Viet Nam	-	0	\$259,216	93	\$249,056	72
Other	\$547,548	380	\$1,797,652	912	\$896,364	462
World	\$156,113,200	34,967	\$185,646,862	41,280	\$206,753,378	49,902

Source: Comtrade

Table 46 China (HK) Exports of Salted and Dried Groundfish (HS 0305) (Value and Quantity)								
Country	2003		2004		2005		2006	
	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes	\$US	Tonnes
China	\$131,557,254	14,670	\$136,618,816	13,167	\$118,241,285	11,133	\$94,491,496	10,834
USA	\$7,338,200	622	\$6,720,190	573	\$8,935,155	418	\$8,292,441	382
Canada	\$5,722,316	229	\$6,053,252	181	\$6,060,597	187	\$6,907,889	203
Other	\$20,798,078	777	\$28,894,803	1,636	\$38,807,557	3,223	\$38,549,121	2,697
World	\$165,415,848	16,298	\$178,287,061	15,557	\$172,044,594	14,961	\$148,240,947	14,116

Source: Comtrade



***Summary of Global Competition in Salt Fish Markets***

Iceland has high labour costs, yet competes effectively in world fisheries industry by having modern, high technology operations in all aspects of the industry. The world's largest provider of salt fish, Norway, has a salt fish industry that is less profitable, but improving rapidly. The Norwegian research group, Fiskeriforskning, stated that salt fish from Iceland and the Faeroe Islands were achieving 20 to 25 percent higher prices than Norwegian fish. They studied the differences between the Norwegian and Iceland industries and identified several factors that account for Iceland's excellent performance.

The management of quotas to provide a year-round supply of raw material was cited as a major factor in allowing the industry to efficiently utilize the production facilities.

Another reason for Iceland's excellent performance is that many of its fish processors have invested in the latest generation of processing systems that help to maximize yields, increase throughput and efficiency, as well as optimize product quality, consistency and customer satisfaction. A modern processing system is able to produce a greater volume of top quality products with high flexibility, producing fresh fillets, salted fish and IQF frozen fillets or portions. There is an increasing demand in the salt fish market for lightly salted IQF frozen fillets that can be made with a spiral freezer, which is ideal for producing these products.

Iceland and the Faeroe Islands use methods that produce a plumper fish with higher water content. They use machines with needles that inject brine directly into the flesh of the fish. As well as providing a better product, this method also speeds up production. Fiskeriforskning's studies also confirm that salted fish produced by injecting brine has a better quality than with use of traditional methods.

Other factors that mitigate against obtaining higher quality product are the damage caused by fishing gear and poor handling on board the boats.

Producers in Iceland and the Faeroes have also focused on sorting the fish by quality such that the customers know what they are buying. In Norway, it has been common to mix good quality and low quality fish, making it difficult to assert oneself in the quality-conscious market sectors. Iceland also provides significant support in development of efficient methods in all aspects of the industry, and in the marketing of the products.

Norway now has an excellent research program in place to improve fish quality and maximize value from the sea to the table. Research goals are developed through an interactive consultative process starting with industry and industry organizations and funded primarily by an export tax, with other government departments or organizations often sponsoring some the cost. The program is dynamic and far-reaching, often collaborating with other international research institutes. Norway now appears to be ready to leave no stone unturned in pursuit of fisheries harvesting, production and marketing excellence, perhaps replacing Iceland as a model.



(Above: Blood and liver stains, pieces of flesh missing and cuts in the skin are some of the quality problems with salt fish.)

# *Appendix*

## *Appendix 1*

### *Project Overview - Summary of the Nova Scotia Salt Fish Industry: Situation and Prospects 2004; Gardner Pinfold Report*

## **Nova Scotia Saltfish Industry: Situational Profile and Proposed Next Steps**

### **Current Situation**

The saltfish industry has an important economic impact in many areas of Nova Scotia, but the industry is in crisis. In 2003, saltfish production totaled \$90,000,000, employing 500 persons. Although this is substantial, it represents a tremendous decline from 1990 when production was \$160,000,000, with 1,400 people employed in the industry. Nova Scotia holds less than 10% of the global saltfish market, down from about 25% in 1990.

The Gardner Pinfold report, "The Nova Scotia Saltfish Industry: Situation and Prospects 2004", summarizes the industry situation as follows:

- The groundfish collapse has resulted in a loss of markets in Europe, and the lack of recovery presents an on-going challenge to the industry.
- Nova Scotia producers have substituted Norwegian, Russian, Icelandic and Alaskan raw product, but higher cost have limited production levels.
- Nova Scotia saltfish production has dropped 65% between 1990 - 2003.
- Production has shifted from mainly cod to 50:50 cod and pollack.
- 70-80 Nova Scotia producers have stopped producing, and others have downsized due to loss of market share.
- China entered the saltfish market in the mid 1990's taking increasing market share from Nova Scotia.
- Rising raw material costs and price pressures are squeezing margins.
- A 25% drop in the U.S. dollar has put additional pressure on margins.
- Several Nova Scotia producers have turned to China for lower cost product in order to broaden product offerings and maintain competitiveness.
- The Nova Scotia market share has dropped from 75% in 1990 to 45% in 2003.
- Consensus on industry's future direction is still evolving.

### **Future Direction**

To address the current situation, the Nova Scotia government is investing \$250,000 to assist in industry development initiatives, which may lay the groundwork for a longer term plan for industry's future.

The Nova Scotia government proposes a four component initiative to assist industry:

1. Market Development Initiative - \$50,000
  - generic marketing materials
  - development of market development plan for in-market promotion with buyers and other end-users, in partnership with industry
2. Market Research & Business Analysis - \$50,000
  - Complete commissioned research focused on:
  - identifying new markets
  - identifying new products
  - profiling successful saltfish infrastructure and market development models from other areas
  - identifying industry organizational models
3. Industry Development Program \$150,000
  - As detailed in the attached operational guidelines
4. Industry/Product Development Initiative (currently unfunded)

- Implement a product development initiative having strong industry application and co-ordination. The project would require a strategic alliance between multiple companies working co-operatively in the product development process

Industry will need to organize the sector and take leadership in addressing the market pressures. The generic marketing materials, market research, product development opportunities and the industry development program will provide the groundwork necessary to guide future direction and industry planning from a strategic perspective.

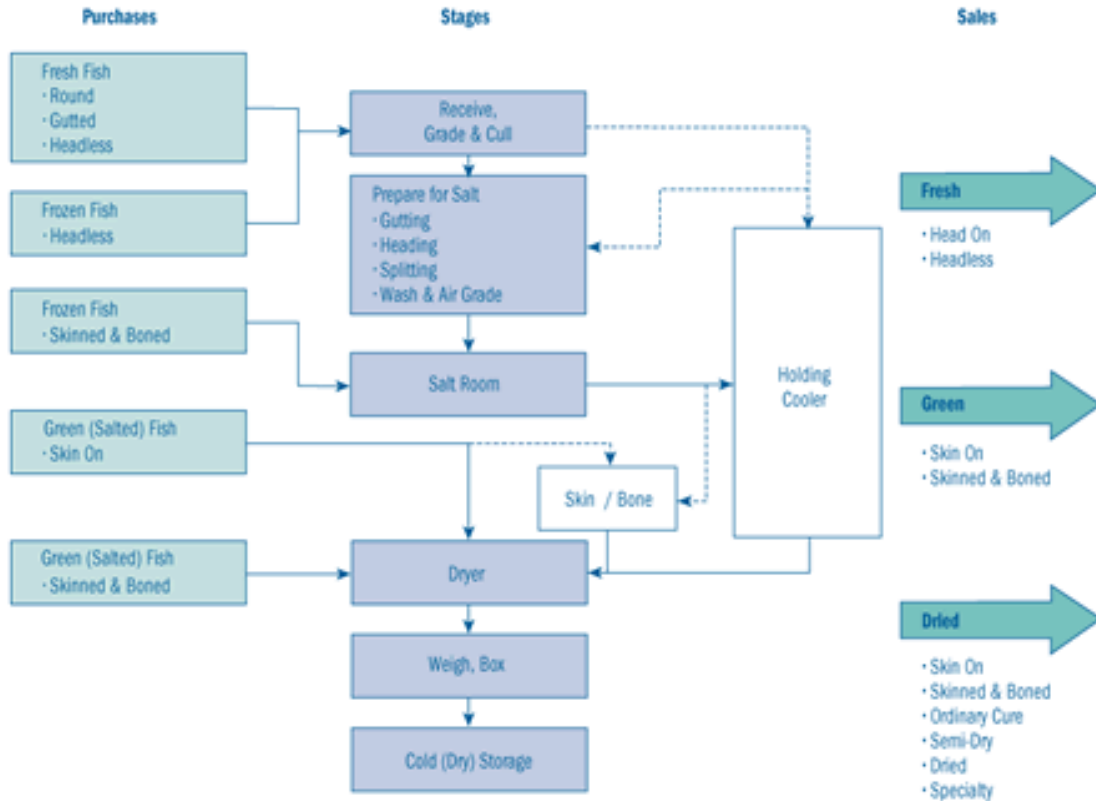
## *Appendix 2*

### *Overview of Typical Salt Fish Process in Nova Scotia*

## Typical Nova Scotia Saltfish Plant Process Description

A simplified view of the salt-and-dry production process is presented below.

### Generic Salt-and-Dry Production Process



Fishing boats deliver freshly caught fish directly to the wharf of the processing plant. At the plant, these fish are first graded, basically to identify those that are suitable for fresh sale and those that are to be salted and dried. The fish are then gutted and cleaned – if this has not already been done aboard the fishing boat. Fish that have been gutted and cleaned are termed "round" fish. At this stage, fish that are to be shipped to market for "head on" fresh sale are packed in ice and shipped immediately or stored. The next stage of processing involves removing the head of the fish (deheading). Some of these fish are then shipped for (headless) fresh sale.

To supplement a local catch that is insufficient to fill a plant's processing capacity, some operators purchase additional fresh or frozen fish from other sources, notably other local plants. Some salt-and-dry operations also make bulk purchases of frozen (headless) fish from the north Atlantic or Pacific oceans caught by offshore trawlers. These fish are stored at the plant and are thawed and introduced to the salt-and-dry production line as required.



Next, headless fish that are to be salted are "split," an operation that removes the backbone. The split fish are then packed in layers with salt for several weeks (as long as 28 days in winter, perhaps only 16 days in summer). This salting operation begins the process of removing moisture from the fish flesh, which is approximately 70 percent water by weight, prior to salting. By the time the salting operation is completed, the fish are soaked in a brine solution in which the salt draws the moisture out of the fish flesh. The fish lose approximately 30 percent of their weight during the salting operation. Fish prepared in this way are referred to as "green."

After salting, some plants remove the skin and bones from a small proportion of the green fish. Plants sometimes sell a portion of their salted fish output (both "skin on" and "skinned and boned") to other salt-and-dry plants that have drying capacity that exceeds the output of their own salting operations.

At any time during these first production stages, when the fish have to be stored prior to further processing, they are placed in "wet" coolers. After the salting operation, the fish are stored in "dry" coolers. Customarily, these coolers are large, refrigerated warehouses within the plant itself, accessible by loaded forklifts. At some plants, additional cold storage has been acquired by purchasing trailers that were originally produced for portable storage on ocean-going trawlers. These trailers are similar in size to the freight containers hauled by 18-wheelers and have self-contained cooling systems that have been adapted to run on utility-supplied electrical current.

To begin the drying process, the green fish are laid out on wooden racks that are piled four to six feet high on pallets. Forklifts move the pallets into the drying rooms. The temperature of the drying rooms is maintained at approximately 21°C (70°F) as banks of fans constantly recirculate the warm air to advance the drying process. Moisture is removed from the air by large dehumidification units contained within the drying rooms.

Salted/green fish enter the drying process at approximately 55 to 60 percent moisture content. Three standard levels of dry products are produced, depending on the remaining moisture level of the fish. "Ordinary cure" (the most common) product has between 44 and 48 percent moisture remaining when packed for market. "Semi-dry" product has 40 to 44 percent moisture, and "dry" product has 38 to 40 percent moisture. Reported drying times vary from 6 to 20 hours for ordinary cure and 36 to 40 hours for dry product.

(Abstract from Corporate Renaissance Group (CRG) Report for Natural Resources Canada  
See <http://oee.nrcan.gc.ca/publications/industrial/fish-processing/fish-processing.cfm?attr=24>)

*Appendix 3*

*Project Contact Personnel*

*Appendix 4*

*Detailed Canadian and US HS Codes*

<b>Detailed Canadian Exports Under HS 0305</b>		<b>Detailed Canadian Imports Under HS 0305</b>	
<b>HS 8</b>		<b>HS 10</b>	
03051000	Flours, meals and pellets of fish fit for human consumption	0305100000	Fish meal fit for human consumption
03052020	Herring roe, dried, smoked, salted or in brine	0305200020	Roes of fish, dried, smoked, salted or in brine
03052030	Salmon roe, dried, smoked, salted or in brine		
03052090	Fish livers and roes, nes, dried, smoked, salted or in brine	0305200010	Livers of fish, dried, smoked, salted or in brine
03053010	Herring fillets, dried, salted or in brine but not smoked	0305300000	Fish fillets, dried, salted or in brine, but not smoked
03053020	Mackerel fillets, dried, salted or in brine but not smoked		
03053030	Cod fillets, dried, salted or in brine but not smoked		
03053090	Fish fillets, nes, dried, salted or in brine but not smoked		
03054100	Salmon, Pacific, Atlantic, smoked including fillets	0305410000	Salmon, Pacific, Atlantic, smoked incl fillets
03054210	Herring, kippered, including fillets		
03054220	Herring, boneless, smoked, including fillets	0305420000	Herring, smoked, including fillets
03054230	Herring, bloaters, smoked, including fillets	0305490010	Cod fillets, smoked
03054900	Fish nes, smoked including fillets	0305490090	Fish smoked, nes, including fillets but excluding cod fillets
03055100	Cod dried, whether or not salted but not smoked	0305510000	Cod, dried, whether or not salted but not smoked
		0305590010	Shark fins, dried, whether or not salted but not smoked
03055900	Fish nes, dried, whether or not salted but not smoked	0305590090	Fish, dried, except cod, o/t shark fins, whether or not salted but not smoked
03056100	Herrings, salted or in brine, but not dried or smoked	0305610000	Herring, salted or in brine, but not dried or smoked
03056210	Cod, green salted, wet salted		
03056221	Cod, light salted, over 43% moisture content		
03056222	Cod, light salted, 43% or less moisture content		
03056231	Cod, heavy salted, over 45% but not over 50% moisture content		
03056232	Cod, heavy salted, over 43% but not over 45% moisture content		
03056233	Cod, heavy salted, 43% or less moisture content		
03056290	Cod, salted or in brine, nes, but not dried or smoked	0305620000	Cod, salted or in brine, but not dried or smoked
03056300	Anchovies, salted or in brine, but not dried or smoked	0305630000	Anchovies, salted or in brine, but not dried or smoked
03056921	Hake, salted or in brine, but not dried or smoked		
03056922	Pollock, salted or in brine, but not dried or smoked		
03056923	Haddock and cusk, salted or in brine, but not dried or smoked		
03056991	Mackerel, salted or in brine, but not dried or smoked		
03056992	Salmon, salted or in brine, but not dried or smoked		
03056993	Alewife, salted or in brine, but not dried or smoked		
03056999	Fish nes, salted or in brine, but not dried or smoked	0305690000	Fish, nes, salted or in brine, but not dried or smoked

United States		
HS 0305 - Fish, cured, smoked, fish meal for human consumption		
HS 10	Name	Description
0305102000	FH ML ED,IN BULK	FISH FLOUR/MEAL/PELLETS EDIBLE IN BULK CONT >6.8KG
0305104000	FH ML ED,IN CONT	FISH FLOUR/MEAL/PELLET EDIBLE IN CONT NOT OVER 6.8KG
0305202000	STRGN ROE,D/SM/S	STURGEON ROE, DRIED, SMOKED, SALTED OR IN BRINE
0305204020	SALMON ROE,D/S/S	SALMON ROE, DRIED, SMOKED, SALTED OR IN BRINE
0305204040	HRRNG ROE,D/S/S/	HERRING ROE, DRIED, SMOKED, SALTED OR IN BRINE
0305204060	FH LVR,ROE D/S/S	FISH LIVERS/ROES NESOI DRIED/SMOKED/SALTED/BRINE
0305302000	HERR FILL,D/S/B	HERRING FILL, CONTAINERS 6.8 KG OR LESS, DRIED, SALTED OR IN BRINE, NOT SMKD
0305304000	MACK FILL D/S/B	MACKEREL FILL, CONTAINERS 6.8 KG OR LESS, DRIED, SALTED OR IN BRINE, NOT SMKD
0305306000	FISH FILL, D/S/B	OTHER FISH FILLETS, DRIED, SALTED OR IN BRINE, NOT SMOKED
0305306010	HERRING,D/S/B	HERRING FILLETS, DRIED, SALTED OR IN BRINE
0305306030	COD FILL,D/S/B	COD FILLETS, DRIED, SALTED OR IN BRINE
0305306080	OTH FSH FL,D/S/B	FISH FILLETS NESOI, DRIED, SALTED OR IN BRINE
0305410000	P/A/D/ SALMON SM	PACIFIC, ATLANTIC AND DANUBE SALMON, SMOKED
0305420020	HERR,WHL,BHD,SMK	HERRINGS, WHOLE OR BEHEADED, SMOKED
0305420040	HERR/FILL,SM,NES	HERRING FILLETS, NESOI, SMOKED
0305420050	HERR/FILL,BNLESS	HERRINGS INCLUDNG FILLETS, BONELESS, SMOKED
0305420060	HERR/FILL,OTHER	HERRINGS, INCLUDING FILLETS, NESOI, SMOKED
0305492000	MACK,FILL,SMK	MACKEREL, INCLUDING FILLETS, SMOKED
0305494020	COD,CSK,HAD,ETC	COD, CUSK, HADDOCK, HAKE AND POLLOCK, SMOKED
0305494040	FISH,FILL,SM,NES	FISH INCLUDING FILLETS, SMOKED, NESOI
0305510000	COD,DRIED,NT/SMK	COD, DRIED, WHETHER OR NOT SALTED BUT NOT SMOKED
0305592000	SHARK FINS DRIED	SHARK FINS DRIED WHETHER OR NOT SALTED NOT SMOKED
0305594000	FISH,DRIED,N/SMK	FISH, DRIED, WHETHER SALTED BUT NOT SMOKED, NESOI
0305612000	HERR CNTRS<6.8KG	HERRINGS, CONTAINERS NOT OVER 6.8KG, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305614000	HERRINGS, SALTED	HERRINGS, SALTED, NOT DRIED/SMOKED, IN BRINE NESOI
0305620010	COD,WH,MS OV 50%	COD WHOLE/PROCESSD SALTED NOT DRIED/SMOKED MOISTURE > 50%
0305620020	COD WH,HD REMOVE	COD, WHOLE/PROCESSED SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305620025	COD,WH,MS 45-50%	COD, WH/PROCESSED SALTED OR IN BRINE, NOT DRIED/SMKD, MOISTURE >45% <50%
0305620030	COD,WH,MS 43-45%	COD, WH/PROCESSED SALTED OR IN BRINE, NOT DRIED/SMKD, MOISTURE >43%<45%
0305620040	COD,SLTD,NT/DRD	COD, WHOLE/PROCESSED SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305620045	COD,WH,MS <44%	COD, WH/PROCESSED SALTED OR IN BRINE, NOT DRIED OR SMOKED, MOISTURE <= 43%
0305620050	COD,OT,MS OV 50%	COD, SALTED OR IN BRINE, NOT DRIED OR SMOKED, NESOI MOISTURE >50%
0305620060	COD,OT,MS OV 45%	COD, SALTED OR IN BRINE, NOT DRIED OR SMOKED, NESOI MOISTURE >45%<50%
0305620070	COD,OT,MS 43-45%	COD, SALTED OR IN BRINE, NOT DRIED OR SMOKED, NESOI, MOISTURE >43%<=45%
0305620080	COD,OT,MS <44%	COD, SALTED OR IN BRINE, NOT DRIED OR SMOKED, NESOI, MOISTURE <43%
0305632000	ANCHOY,AIRT CONT	ANCHOVIES, AIRTIGHT CNTR NOV6.8KG, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305634000	ANCHOY-CONT<6.8K	ANCHOVIES IN CONTAINER <= 6.8KG, NOT AIRTIGHT, SALTED/BRINE, NOT DRIED/SMKD
0305636000	ANCHOY CONT>6.8K	ANCHOVIES IN CONTAINRS OVER 6.8KG, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691020	CSK/HAD/HAKE/POL	CUSK, HADDOCK, HAKE, POLLOCK, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691021	HAKE,SLTD,NT/DRD	HAKE WHOLE/SIMPLY PROCESSED, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691022	POLLOCK,ST/NT/DR	POLLOCK WHOLE/SIMPLY PROCESSED, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691029	HADDOCK,ST/NT/DR	HADDCK/CUSK WHOLE/PROCESSED, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691040	CSK/HAD/HAKE/POL	HAKE, CUSK, HADDOCK, POLLOCK, OTHER, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305691041	OT HAKE,SL/NT DR	HAKE, SALTED BUT NOT DRIED/SMOKED; IN BRINE, NESOI
0305691042	OT PLK,SL/NT DR	POLLOCK SALTED NOT DRIED/SMOKED; IN BRINE, NESOI
0305691049	OT HADD,SL/DT DR	HADDOCK/CUSK SALTED NOT DRIED/SMOKD; IN BRINE NESOI
0305692000	MACK CONTR<6.8KG	MACKEREL IN CONTAINER <= 6.8KG SALTED OR IN BRINE, NOT DRIED OR SMOKED, NES
0305693000	MACKEREL,SALTED	MACKEREL IN CONTNRS OVER 6.8KG, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305694000	SALMON SLT/DR/SM	SALMON, SALTED BUT NOT DRIED OR SMOKED, IN BRINE
0305695000	FSH NES,CNT<6.8K	FISH NESOI, CNTRS NOT OV6.8KG, SALTED OR IN BRINE, NOT DRIED OR SMOKED
0305696000	FISH,NESOI,SALT	FISH, NESOI, SALTED BUT NOT DRIED OR SMOKED, BRINE

*Appendix 5*

*Brazil Focus Group Results*

**Summary of Focus Group Results**  
**Sao Paulo, Brasil, Feb. 27, 2007**

R. Rodger, Group Interviewer, met with two groups of advanced English language students at the Cellib Language School, Pedro de Toledo, 200, São Paulo. The students were not screened, except for their ability to speak English and a desire to participate in a discussion on fish. The teacher noted that a recent class had focused on food preparation, flavours and tastes and welcomed the opportunity for class discussion on the subject. Altogether there were seven females and three males ranging in age from late teens to early 30s, with an average age of 25. The results of both meetings have been tabulated together in the answers below. The various responses have been summarized.

**Q. How many of you have eaten bacalhau?**

*A. Seven of the ten respondents said they had eaten bacalhau in the past. Of the remaining three who were not consumers of bacalhau, one was a vegetarian, one was of Chinese origin and the family members were not big fish eaters and one was from the interior of Brazil where he said fish was not a common food.*

**Q. What is bacalhau?**

*A. While the students all knew that bacalhau was a salt fish and had seen it in stores; the common opinion was that it was a species of fish, rather than a method of preparation.*

**Where does it come from?**

*One person said Norway, the remainder didn't know.*

At this juncture, the Group Interviewer (GI) briefly described the history of bacalhau to the group. This included a discussion of European trade in salt fish (mainly cod) between Northern Europe and Mediterranean countries starting in the Middle Ages, the influence of the Roman Catholic Church, why fish was salted, and a discussion of how Basque and Portuguese fishermen were leaders in fishing and salting cod from Newfoundland. The GI drew a rough map of the North and South Atlantic to show fishing grounds and the various trade connections involved. Salt cod from Norway was reported to have been shipped to Brazil as early as 1550, while Portugal was also shipping salt cod to Brazil that is believed to, at least partly, originated from Canada's Grand Banks, at the same time. None of the students seemed to know this history, although the teacher, originally from Holland, had some knowledge of it.

**Q. Where and when do you consume bacalhau (restaurants, home)?**

*A. It is primarily eaten at family gatherings, particularly at Easter, but also at Christmas. Two or three said that they might eat it at their parents' home once a month or so. No one cooked it themselves or had ordered it in restaurants.*

**Q. How do you prefer it be prepared (product features/taste)?**

*A. The general answer was “with vegetables.” One person said that they preferred it as thick steak. Another said it was “rubbery” when cooked in thin cuts.*

**Q. Is it usually served as a side dish or a main meal?**

*A. All responded that it is always served as the main dish.*

**Q. Do you think it is expensive?**

*A. Several responses that it is “expensive” or “very expensive.”*

**Q. What do you drink with Bacalhau?**

*A. Anything - beer, wine, water, soda drinks, coffee.*

**Q. Do you think it is becoming more popular now?**

*A. (One person seemed to speak on behalf of the group.) Young people don’t have the time their parents did to cook large meals. For that reason, she thought that bacalhau is becoming less popular with the younger generation. The other respondents either agreed or, at least, didn’t disagree.*

**Q. Have you had bolinhos de bacalhau?**

*A. Everyone laughed. This was one product they were all familiar with.*

**Q. How is bacalhau promoted?**

*A. No real answer.*

**Q. Would you try Canadian bacalhau?**

*A. No real answer. In terms of this somewhat upwardly mobile group, which does not represent the population as a whole, bacalhau was not an important tradition in their particular lifestyle, at this time of their lives.*



Consultant with some of the focus group participants in Brasil.



## *Appendix 6*

### *Norway's Salt Fish Production Guidelines*

## Standard

# *Salted Fish and Klippfish Products*

Industry Standards for Fish  
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Industry standard no.: NBS 20-01  
Version: 1  
First published: 1998  
Key words:  
- salted fish, salted fillets, klippfish, klippfish fillets, quality classifications

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<b>Norwegian Species Approved for the Production of Saltfish and Klippfish*</b>		
Norwegian Name	English Name	Latin Name
Torsk	Cod	<i>Gadus morhua</i>
Stillehavstorsk	Pacific cod	<i>Gadus macrocephalus</i>
Polartorsk	Polar cod	<i>Boreogadus saida</i>
Grønlandstorsk	Greenland cod	<i>Gadus ogac</i>
Sei	Saithe (Pollock)	<i>Pollachius virens</i>
Lange	Ling	<i>Molva molva</i>
Blålange	Blue ling	<i>Molva dypterygia</i>
Brosme	Tusk	<i>Brosmius brosme</i>
Skjellbrosme (bustebrosme)	Forkbeard	<i>Phycis blennoides</i>
Hyse	Haddock	<i>Melanogrammus aeglefinus</i>

\*Norwegian Quality Regulations relating to Fish and Fishery Products 12-1, 1996

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## Introduction

The Norwegian Industry Standards for fish and their accompanying Codes of Practice have been drawn up by the project "Industry Standards for Fish". Five specialist sub-committees, representing the respective industries of whitefish, salted fish/klippfish, stockfish, pelagic fish and salmon/trout, have been responsible for the specialist content, drawing on professional resources within production and processing, exports and research.

The standards include product specifications, quality classifications and method descriptions, whereas the codes of practice provide guidelines and describe matters of importance to the production processes.

## 1. Object

This industry standard lays down general and specific requirements for salted fish and klippfish products. Use of the standard is voluntary and shall contribute to an unambiguous description and understanding of Norwegian fish products. The standard shall also serve to simplify market communication, for example as a tool when drawing up contracts and orders.

The Directorate of Fisheries' Quality Control Service may issue certificates in accordance with the industry standards accepted by the Director General of Fisheries.

## 2. Scope

This standard describes the classification of salted fish, salted fillets, klippfish and klippfish fillets and replaces the industry standard for salted fish, salted fillets and klippfish of 6 September 1996.

## 3. Definitions

**Salted fish:** fish of the species referred to in § 12-1 of the Quality Regulations relating to Fish and Fishery Products of 14 June 1996 that have been drained of blood, gutted, headed and split so that approximately two thirds of the backbone is removed, washed and fully saturated with salt.

**Salted fillets:** heavy salted fish of the species referred to in § 12-1 of the Quality Regulations relating to Fish and Fishery Products of 14 June 1996, where the sides of flesh are cut from the fish parallel to the backbone, and where the fins with accompanying bones are removed.

**Salt-matured fish:** heavy salted fish with the appearance, texture and flavour characteristic of the product.

**Heavy salted fish:** salted fish with a salt content of at least 18%.

**Klippfish:** salted fish that is dried so that the water content is reduced to less than 50% of the product's weight.

**Klippfish fillets:** salted fish fillets that are dried so that the water content is reduced to less than 50% of the product's weight.

**Saithe (coley) with entire backbone:** saithe with an overall length of less than 58 cm when raw and which is split without removing the backbone.

## 4. References

Norwegian Quality Regulations relating to Fish and Fishery Products of 14 June 1996.

CODEX STAN. 167-1989: Draft revised standard for salted fish and dried salted fish of the gadidae family of fishes.

CAC/RCP 27/1983: Recommended international code of practice for salted fish.

## 5. Description

### 5.1 Preconditions

#### 5.1.1 Government requirements

Salted fish and klippfish products according to this standard satisfy the requirements in the Quality Regulations relating to Fish and Fishery Products of 14 June 1996. These regulations include requirements to:

- wholesome and fresh products
- raw materials
- hygiene
- chilling
- parasite control
- labelling
- additives
- own checks, based on HACCP principles

#### 5.1.2 Labelling

The labelling on packaged salted fish or klippfish from which the collar bone has been removed must indicate this specifically. Such fish is also referred to as collar bone cut/fillet cut/J-cut fish

The labelling on packaged saithe with the entire backbone must indicate this specifically.

### 5.2 Classification generally

#### 5.2.1 Trade categories

All the products covered by this standard are classified according

to requirements set out for the given quality categories.

According to this standard, salted fish, klippfish and klippfish fillets are classified in the following trade categories:

IMPERIAL/SUPERIOR  
UNIVERSAL  
POPULAR  
MIX

Salted fish is classified as

IMPERIAL/SUPERIOR  
UNIVERSAL  
MIX

All the products in this standard may be packaged in a common trade category under the description "Mix" (in the appropriate language) if the fish is distributed fairly equally on the different trade categories.

Fish is to be sorted into the above trade categories in accordance with the description set out in this standard. Other categories may be employed for exports to countries using different trade category descriptions.

In all trade categories, the fish shall be wholesome and fresh, and fit for human consumption. Products that can be sold for human consumption are described in §1-10 of the Quality Regulations relating to Fish and Fishery Products of 14 June 1996.

Fish with defects that are not/cannot be corrected are to be down-graded according to the seriousness of the defect.

All trade categories may include fish with black membrane. In the case of klippfish products, this information is to be included on the package labels, together with other classification labelling in the appropriate language.

#### **5.2.2 Considerations when classifying the fish**

When classifying large fish, it must be remembered that such fish may often naturally appear coarse.

Fish that has been stuck flesh-side down to the drying grating is to be down-graded, depending on how pronounced this defect is.

When classifying saithe (coley), the naturally darker colour of this fish must be taken into account.

When classifying haddock, it should be remembered that the haddock belly may be darkish and the fish is often a little less firm in the nape.

Blue ling may be a little dark on the skin side, and this should be taken into account.

When classifying tusk, the slightly yellowish colour of this fish must be taken into account.

Salt must be sprinkled between the layers of salted fish products at regular intervals.

#### **5.2.3 Degrees of dryness**

The degree of dryness in klippfish products is to be determined by sensory assessment and classified in the following categories:

1. Soft Cure
2. 3/4 dried
3. 7/8 dried
4. Dried for shipment
5. Usual curing
6. Usual curing extra dry
7. Extra curing
8. Tropical curing

If the degree of dryness is to be certified by the authorities, the certifying official's experience and judgment shall form the basis for the assessment.

### 5.3 Quality classification of salted fish

#### Imperial/Superior

Fish products in this trade category are made from fish that is thoroughly bled, well washed and rinsed to remove remains of blood and entrails, and with nape skin attached.

The fish is to be properly split and evenly salted, well pressed and restacked during processing. The fish is to be light-coloured and firm, and without blemishes.

This category may include fish with the following characteristics:

1. poorly bled bellies
2. small tears or longitudinal cracks
3. not properly rinsed
4. some blood clots
5. somewhat unevenly salted

When assessing fish for this category, special consideration will be given to fish that has been thoroughly bled and properly restacked during production. In this case, somewhat larger defects will be tolerated if the overall impression justifies this, particularly if the fish is light-coloured and firm.

#### Universal

Fish that do not meet the requirements to Imperial/Superior are to be classified as Universal.

This trade category may include fish with the following characteristics:

1. inadequately split
2. round tail
3. inadequately washed or rinsed
4. insufficient removal of backbone
5. moderate blood clot
6. major tears or longitudinal cracks
7. moderate cracking
8. minor blood, liver and/or bile stains

The fish must retain its natural shape. Disfiguring blemishes such as stains/lumps of dried blood or remains of entrails shall be removed.

#### Popular

Fish that does not satisfy the requirements to Universal, but which nevertheless is fit for human consumption (cp. § 1-10 of the Quality Regulations for Fish and Fishery Products of 14 June 1996) is to be categorised as Popular. However, this trade category must not contain fish that is sour, has been exposed to contamination, has ragged bellies, bile or gut content, or fish that is badly cracked/loose-fleshed.

### 5.4 Quality classification of salted fillets

#### Imperial/Superior

In this trade category, the product comes from fish that has been emptied of blood, but includes fillets that are slightly darker and bear the traces of incomplete bleeding.

This trade category may include fish with the following characteristics:

1. small tears or longitudinal cracks
2. insignificant mechanical damage

The fish is to be light-coloured and firm, and without blemishes.

#### Universal

Salted fillets which do not satisfy the requirements to Imperial/Superior are to be classified as Universal.

This trade category may include fish with the following characteristics:

1. signs of yellowing
2. larger tears or longitudinal cracks
3. moderate cracking
4. minor blood, liver and/or bile spots
5. darker colour. The degree of darkness acceptable in Universal is to be assessed on the basis of the overall impression of the fish
6. minor marks from mechanical damage.

## 5.5 Quality classification of klippfish

### Imperial/Superior

In this trade category, the product comes from fish that is thoroughly bled, well washed and rinsed clean of blood and intestinal residue, and with nape skin attached.

The fish is to be expertly split and evenly salted and well-pressed. The fish shall be light-coloured and firm, and without blemishes.

This trade category may include fish with the following characteristics:

1. bellies incompletely emptied of blood
2. small tears or longitudinal cracks
3. not rinsed satisfactorily
4. some blood clots
5. somewhat unevenly salted
6. dried too quickly, but not burnt
7. a little dried blood at the collar bones
8. inadequately pressed during the drying process

When assessing the fish in this trade category, special consideration will be given to fish that has been thoroughly bled and drained of blood. In this case, somewhat larger defects are tolerated provided the overall impression justifies this, particularly if the fish is light-coloured and firm.

### Universal

Fish that do not satisfy the requirements to Imperial/Superior, are to be classified as Universal according to the following criteria.

This trade category may include fish with the following characteristics:

1. inadequately split
2. round tail
3. inadequately washed or rinsed
4. insufficient removal of backbone
5. larger clots of dried blood
6. major tears or longitudinal cracks
7. moderate cracking
8. slight slime encrustation
9. minor blood, liver and/or bile spots

The fish is not to be yellowish in colour and must retain its natural shape. Disfiguring blemishes/clots of dried blood and entrail residues should have been removed.

### Popular

Fish that does not satisfy the requirements to Universal, but which nevertheless is fit for human consumption (cp. § 1-10 of the Quality Regulations for Fish and Fishery Products of 14 June 1996) is to be categorised as Popular. However, this trade category must not contain fish that is sour, has been exposed to contamination, has ragged bellies, bile or gut content, or fish that is badly cracked/loose-fleshed.

## 5.6 Quality classification of klippfish fillets

### Imperial/Superior

Fish in this trade category is manufactured from fish that is fully bled and drained of blood, but may also include fillets that are slightly darker in colour and contain traces of incomplete bleeding. The fillet is to be light-coloured and firm, and without blemishes.

This category may include fillets with the following characteristics:

1. slightly blood-stained bellies
2. small tears or longitudinal cracks
3. somewhat uneven salting
4. dried too quickly
5. inadequately pressed during the drying process

When assessing fillets for this category, special consideration will be given to fish that is fully bled and drained of blood. In this case, somewhat larger defects will be tolerated provided the overall impression justifies this, particularly if the fish is light-coloured and firm.

### Universal

Klippfish fillets that do not meet the requirements to Imperial/Superior are classified in the category Universal.

This trade category may include fillets with the following characteristics:

1. larger cuts or longitudinal cracks
2. moderate cracking
3. darker colour. The degree of darkness accepted in the Universal category is based on an assessment of the overall impression of the fillet.
4. minor blood, liver and/or bile stains
5. minor marks from mechanical damage
6. slight brine-encrustation

### Popular

Fish that does not satisfy the requirements to Universal, but which nevertheless is fit for human consumption (cp. § 1-10 of the Quality Regulations for Fish and Fishery Products of 14 June 1996) is to be categorised as Popular. However, this trade category must not contain fish that is sour, has been exposed to contamination, has ragged bellies, bile or gut content, or fish that is badly cracked/loose-fleshed

## 5.7 Other salted fish and klippfish products

The need to adapt salted fish and klippfish products to the requirements of the consumers requires the development of new products that basically are manufactured in the same way as the other products described in this standard. The Directorate of Fisheries may issue certificates that cover this type of product.

Such products may be:

1. klippfish pieces. Klippfish cut into pieces. The product may be with or without collar bone and tail.
2. dressed klippfish. Klippfish from which the collar bone, remains of the backbone and kidney, bone pipes, fins

and fin bones, as well as the tail have been removed.

This product is available with skin on or skin off.

3. klippfish strips: Skin and bone-free klippfish cut into strips.
4. salted cod tongues
5. salted jaws/cheeks/medaillions
6. salted heads (with or without tongues): heads split in two but which remain joined (heart-shaped) and salted.
7. necks
8. salted backs
9. swim bladders
10. fillet cuts (cuts of salted products and pieces)
11. collar bone piece (part of the fillet cut)
12. reconstituted salted fish or klippfish.

NORWEGIAN INDUSTRY STANDARD FOR FISH

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**Standard**

***Classification of stockfish***

Industry Standards for Fish  
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## Introduction

The Norwegian Industry Standards for Fish and their accompanying Codes of Practice have been drawn up by the project "Industry Standards for Fish". Five specialist sub-committees, representing the respective industries of whitefish, salted fish/klippfish, stockfish, pelagic fish and salmon/trout, have been responsible for the specialist content, drawing on professional resources within production and processing, exports and research.

The standards include product specifications, quality classifications and method descriptions, whereas the codes of practice provide guidelines and describe matters of importance to the production processes.

### 1. Object

This industry standard lays down general and specific requirements for stockfish according to quality and size. Use of the standard is voluntary and shall contribute to an unambiguous description and understanding of Norwegian fish products. The standard shall also serve to simplify market communication, for example as a tool when drawing up contracts and orders.

### 2. Scope

This standard describes classification of stockfish products according to quality and size. It applies to all markets.

### 3. Definitions

**Cod:** *Gadus morhua*

**Saithe (coley):** *Pollachius virens* (same as *Gadus virens*)

**Haddock:** *Gadus aeglefinus*  
(the same as *Melanogrammus aeglefinus*)

**Ling:** *Molva molva*

**Tusk:** *Brosme brosme*

**"Skrei":** spawning Norwegian Arctic cod

**Stockfish:** gutted, beheaded fish (round, split or fillet) produced by natural or industrial drying, without the addition of salt or other additives

**Split ('rotskjær'):** gutted, beheaded fish split down the backbone, but still joined at the tail. About two-thirds of the backbone from the nape and back has been removed. The lower part of the backbone remains attached to the other half of the fish

**Fillets:** pieces of fish obtained by splitting the fish lengthwise and removing the backbone

**Contact stains:** an area of the fish that has been insufficiently dried. This may occur when two fish touch and dry in contact with each other or when the fish is in contact with drying racks

**Frost damaged fish:** fish that has been damaged by low temperatures during the drying process

**Mould:** the name given to fungal growth appearing as small brownish-black, hard spots on the skin

## 4. References

Norwegian Quality Regulations relating to Fish and Fishery Products of 14 June 1996.

Industry Standard *Whitefish Fillets and Fillet Products*, NBS 40-02.

## 5. Description

### 5.1. Preconditions

#### 5.1.1 Government requirements

Stockfish produced according to this standard satisfy the requirements laid down in Norwegian Quality Regulations relating to Fish and Fishery Products of 14 June 1996. These regulations include requirements to:

- wholesome and fresh products
- raw material
- hygiene
- chilling
- parasite control
- labelling
- additives
- own checks, based on HACCP principles

In accordance with Norwegian Quality Regulations relating to Fish and Fishery Products of 14 June 1996, stockfish can only be made out of cod, haddock, saithe (coley), ling, blue ling, or tusk. The Director General of Fisheries may allow other types of dried fish also to be designated as stockfish.

## 5.2 Classification of stockfish

### 5.2.1 Classification in general

Common to all stockfish is that the criteria for classifying size, appearance and a number of quality characteristics together describe the quality of the product.

#### 5.2.1.1 Classification according to quality

There are two main categories for most fish species:

- Prima
- Secunda

Round and split cod which do not satisfy the requirements to Prima or Secunda are to be classified either as 'other round cod' (section 5.2.4.1) or 'other split cod' (section 5.2.4.3).

Cod is sorted into more categories than other species of fish. The grading of stockfish produced from Lofoten "skrei" is particularly fine.

#### Characteristics of Prima fish:

- Clean nape and belly
- No signs of slime formation
- Natural shape and open belly
- No contact stains
- No frost damage
- No mould
- Free of blemishes

#### Characteristics of Secunda fish:

- May have some coating in the belly area
- May have partially closed belly
- Must not have gaff marks, tears, or contain remains from the liver
- May be slightly frost damaged, but not to the extent that fresh flesh is not visible along the backbone
- May contain blood or blood stains
- Some mould is acceptable

While stockfish normally has a water content of 14-16%, it can also be sold with a lower or higher water content.

#### 5.2.1.2 Classification according to size

Classification according to size occurs on the basis of length, weight or number of fish to a given weight.

As shown in fig. 1, the length of the fish is measured according to the so-called stockfish measure. The fish is measured from the middle of the curve of the collar bone to the end of the tail arch.

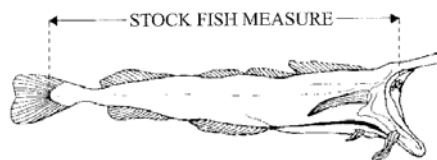


Figure 1: Measuring the length of stockfish

### 5.2.2 Classification of Lofoten 'Skrei'

Prima and Secunda categories for this type of fish are used mainly on the Italian market. For other markets, Lofoten 'Skrei' is classified as Finnmarken cod or other round cod.

Prima Lofoten 'Skrei' is classified into the following categories according to the characteristics describing Prima fish, section 5.2.1.1:

Designation with abbreviations	Characteristics
Ragno	<ul style="list-style-type: none"> <li>• over 60 cm</li> <li>• the slimmest fish</li> <li>• free of defects and of good quality</li> </ul>
Westre Magro - WM - 60/80 cm (thin Westre 60/80)	<ul style="list-style-type: none"> <li>• thin and lean classification</li> <li>• no sign of fullness</li> <li>• must have colour</li> </ul>
Westre Magro - WM - 50/60 cm (thin Westre 50/60)	<ul style="list-style-type: none"> <li>• same quality as above, but shorter</li> </ul>
Westre Magro - WM - 40/50 cm	<ul style="list-style-type: none"> <li>• same quality as above, but shorter</li> </ul>
Westre Demi Magro - WDM - 60/80 cm (semi-thin Westre 60/80)	<ul style="list-style-type: none"> <li>• same quality requirements as for the other first-class thin fish categories</li> <li>• may have some fullness on one side along the nape and down to the anal opening, or a little on both sides</li> </ul>
Westre Demi Magro - WDM - 50/60 cm (semi-thin Westre 50/60)	<ul style="list-style-type: none"> <li>• as above, but smaller</li> </ul>
Grand Premier - GP - 60/80 cm	<ul style="list-style-type: none"> <li>• considered a special category</li> <li>• must have colour</li> <li>• may be characterised as a slender Bremer</li> </ul>
Lub	<ul style="list-style-type: none"> <li>• 30-45 fish per 50 kg</li> <li>• minor defects may be accepted</li> </ul>
Bremer - BR	<ul style="list-style-type: none"> <li>• 40-55 fish per 50 kg</li> <li>• plump and muscular fish</li> </ul>
Hollender - HO (ordinary hollender)	<ul style="list-style-type: none"> <li>• 58-63 fish per 50 kg</li> <li>• plump fish</li> </ul>
Westre Courant - WC - (ordinary Westre)	<ul style="list-style-type: none"> <li>• 70-80 fish per 50 kg</li> <li>• plump and muscular fish</li> <li>• must have colour</li> </ul>
Westre Ancona - WA	<ul style="list-style-type: none"> <li>• 70-78 fish per 50 kg</li> <li>• plump Westre type of fish that cannot be classified as Westre quality</li> <li>• minor defects accepted</li> </ul>
Westre Piccolo - WP - (small Westre)	<ul style="list-style-type: none"> <li>• 100 - 120 fish per 50 kg</li> <li>• must have colour</li> </ul>

Fish smaller than Westre Piccolo and Westre Magro 40/50 are sold both as Westre Piccolo Piccolo (stating the number of fish per kg) or as Lofoten 1/2 (100-200 gr per fish).

Secunda Lofoten 'Skrei' is classified into the following categories according to the characteristics describing Secunda fish, point 5.2.1.1.

Designation with abbreviations	Characteristics
Italia Grande - IG - (Large Italian)	• 55-60 fish per 50 kg
Italia Grande Magro - IGM - (large thin Italian)	• a thinner version of the same size and classification as above
Italia Medio - IM - (medium Italian)	• 70-80 fish per 50 kg • same quality as Italia Grande
Italia Medio Magro - IMM - (medium, thin Italian)	• characterised as a thin Italia Medio or • Secunda Westre Magro 50/60
Italia Piccolo - IP - (small Italian)	• characterised as a secunda Western Piccolo • 100 - 120 fish per 50 kg

### 5.2.3 Classification of Finnmarken cod

Finnmarken cod is classified as Prima or Secunda according to the characteristics described under point 5.2.1.1.

Prima and Secunda fish are classified according to weight:

- 100/200 g
- 200/400 g
- 400/600 g
- 600/800 g
- 800/1000 g
- 1000 g +

### 5.2.4 Classification of other stockfish

#### 5.2.4.1 Classification of other round cod

Other stockfish destined for the African market and Tipo B for the Italian market are placed in this category. This category contains all Lofoten 'Skrei' and Finnmarken cod that do not satisfy the requirements to Prima or Secunda fish, but that nevertheless are fresh and wholesome products suitable for human consumption.

Other cod are classified according to the lengths:

- 20/40 cm
- 30/50 cm
- 50/70 cm
- 70/90 cm
- 90/+ cm

For the Italian market, Tipo B is classified according to number of fish per 50 kg. For Tipo B IM, there are 75-80 fish per 50 kg. For Tipo B IG there are 55-60 fish per 50 kg.

#### 5.2.4.2 Classification of split cod

Prima and Secunda split cod are classified according to the characteristics described under point 5.2.1.1.

Split cod are sorted according to length:

- -/50 cm
- 50/60 cm
- 60/+

Split cod not satisfying the requirements for Prima or Secunda fish are classified as 'other split cod'.

### 5.2.4.3 Classification of other split cod

Split cod destined for the African market, inter alia, is placed in this category. This classification covers split cod that does not satisfy the requirements to Prima or Secunda fish, but that nevertheless is fresh and wholesome and suitable for human consumption. Other split cod is classified according to length.

- 20/50 cm
- 30/50 cm
- 50/70 cm
- 70/+

### 5.2.5 Classification of saithe, tusk, haddock and (round) ling

Saithe, tusk, haddock and ling (round) are sorted according to length:

- 20/40 cm
- 30/50 cm
- 50/70 cm
- 70/+ cm

## 5.3 Other dried fish products

### 5.3.1 'Boknafisk' - semi-dried stockfish

'Boknafisk' is produced by breaking off the stockfish drying process after two to four weeks, before the fish is completely dried out.

The water content in 'boknafisk' is higher than in ordinary stockfish and in order to preserve and prevent further drying, it is usual to freeze 'boknafisk'.

### 5.3.2 Mechanically dried fillets

Dried fillets are prepared mainly from ling, but some saithe and cod are also used. The collar bone and fins with accompanying bones have generally been trimmed off the fillets. The fillets can be produced in accordance with the Industry Standard *Whitefish Fillets and Fillet Products, NBS 40-02*.

Mechanically dried fillets are sorted according to lengths:

- -/50 cm
- 50/60 cm
- 60/70 cm
- 70/+ cm

These industry standards are drawn up by and for the Norwegian Fishing Industry, through the project "Industry Standards for Fish". This work is the joint effort of representatives from more than 20 different fishery enterprises throughout Norway. The project has also included representatives from different fishery organisations, official authorities and research institutions.

The Norwegian Seafood Export Council has assumed formal responsibility, initially for a period of two years, for continuing the work on these voluntary standards for fish and fish products.

All enquiries regarding the industry standards should be addressed to the secretariat, Industry Standards for Fish, Bergen.

**Industry standards published in 1999**

Title	Number
Quality Grading of Farmed Salmon	NBS 10-01
Quality Grading of Farmed Rainbow Trout	NBS 10-02
Norwegian Premium Smoked Salmon and Rainbow Trout	NBS 10-03
Salted Fish and Klippfish Products	NBS 20-01
Classification of Stockfish	NBS 30-01
Quality Grading of Fresh Fish	NBS 40-01
Whitefish Fillets and Fillet Products	NBS 40-02
Block Products of Whitefish	NBS 40-03
Norwegian Round Herring	NBS 50-01
Norwegian Round Mackerel	NBS 50-02
Processed Herring Products	NBS 50-03
Processed Mackerel Products	NBS 50-04
Measuring Central Quality Parameters in Herring and Mackerel	NBS 50-05

*Appendix 7*

*Norwegian Recipes for Bacalhau*



**Bacalhau Portugal**  
**Product: CLIPFISH COD**  
**Cooking Method: OVEN-BAKED, BOILED**



**Rice Dish with Bacalao**  
**Product: COD CLIPFISH**  
**Cooking Method: BOILED**



**Bacalao com Natas (Buttermilk)**  
**Product: COD CLIPFISH**  
**Cooking Method: OVEN-BAKED**



**Mirita-style Bacalhau (Beer sauce)**  
**Product: COD CLIPFISH**  
**Cooking Method: FRIED, OVEN-BAKED**



Mama Rosa's Bacalhau (Cod, bell peppers, black olives, Onions and garlic cooked in aluminium foil)

Product: COD CLIPFISH

Cooking Method: FRIED, OVEN-BAKED



Bohlinhos de Bacalhau (Cod Balls)

Product: COD CLIPFISH

Cooking Method: DEEP-FRY



Stockfish the Burrida Way

Product: STOCKFISH COD

Cooking Method: BOILED



Egusi (Ground Nut) Soup

Product: STOCKFISH COD

Cooking Method: BOILED





**Bacalhau Noite Feliz**  
Product: COD CLIPFISH  
Cooking Method: OVEN-BAKED



**Portuguese Style Bacalhau**  
Product: CLIPFISH COD  
Cooking Method: OVEN-BAKED



**Bacalhau à Baiana**  
Product: CLIPFISH COD  
Cooking Method: OVEN-BAKED



**Bacalhau da Noruega Gratinado**  
Product: CLIPFISH COD  
Cooking Method: OVEN-BAKED

*Appendix 8*

*Injection Brining Machine Brochure*



**TRAUST**  
KNOW HOW Ltd.

Iceland Address: Klappartígur 18, 101 Reykjavík

Phone: +354 567 4670, Fax: +354 567 4172

E-mail: [traust@isholf.is](mailto:traust@isholf.is),

Find further Information on the Internet:

<http://www.traust.is>

## Saltlake- injeksions- maskin

- Økt utbytte (5-15%)
- Kortere modningstid
- Hvitere fisk
- Høgere kvalitet



## Brine- injection- machine

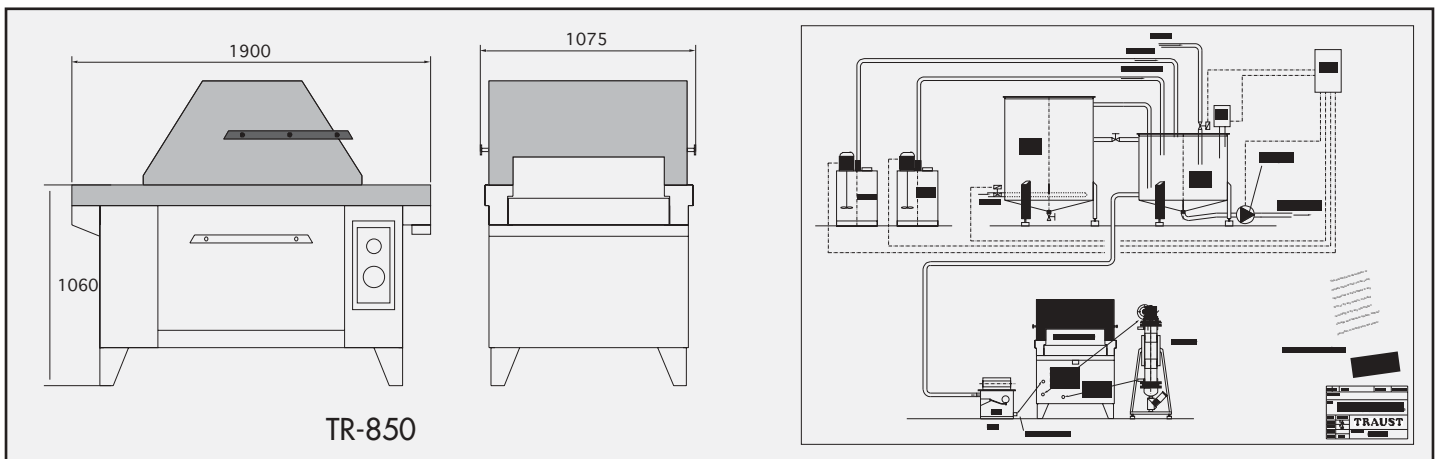
- Higher yield (5-15%)
- Shorter curing time
- Whiter fish
- Higher quality



## Инжекционно- посоляная машина

- Высочайший выход (5 - 15%)
- Кратчайшее время созревания
- Более привлекательный продукт лучшего вкуса





**TEKNISKE OPPLYSNINGER**  
 Kapasitet: 4-8000 kg/t  
 Kraftbehov: 5,3/3,5 kW  
 Båndbredd: 850/400 mm

**TECHNICAL INFORMATION**  
 Capasitit: 4-8000 kg/t  
 Power req: 5,3/3,5 kW  
 Conveyor with: 850/400 mm

**Техническая информация**  
 Мощность: 4-8000 кг/т  
 Потребность энергии: 5,3-3,5 кв  
 Ширина конвейера: 850/400 мм

## Saltlakesprøyten fra TRAUST har følgende fordeler

- Det er nu bevist at injeksjon gir 8-10% høyere utbytte i flekket fisk og 10-15% høyere utbytte i filletproduksjon.
- Nyeste utførelse av nålehodet med 294 nåler gjør at maskinen kan kjøres langsommere og får effektivere virkning. Denne nye konstruksjon medfører ytterligere 2-3% utbytteøkning.
- Injeksjonsmaskinen TR-850 er bred nok til å ta store fisker som fanges bl. a. omkring Island, Norge og Canada. TR-400 er tilpasset til fillet.
- Kapasiteten er tilpasset flekke- og filletmaskiner.
- Spesiell konstruksjon av nålebroen motvirker at nålerne brykker når de støter på ben i fisken.
- Maskinen er enkelt oppbygget for å minimere vedlikehold.
- Spesielt selvrensende filter renser saltlaken og muliggjør kontinuerlig drift og minimerer koaguleringsproblemer.
- Saltlakeblanding og tilførsel av laken til maskinen er automatisk.
- Transportbåndet i maskinen kan fås så langt at det rekkes til trimmebordene og på den måte sparer folk ved å legge fisken i maskinen.
- Båndet i TR-850 er så bredt at fisken kan sorteres i to størrelser.

## Special advantages of TRAUST Brine Injection Machine

- It is now proven that injection of split fish give higher yield by 8-10% and 10-15% higher yield when injecting fillet.
- Our new construction of the needle head with 294 pcs. needles make it possible to run the machine slower and more effective. This new construction give further 2-3% increased yield.
- The brine injection machine is wide enough for processing large fish.
- Output of the Brine Injector is adapted to splitting and filleting machines.
- A special needle support mechanism has been designed to prevent needle breakage.
- The mechanism is very simple and is consequently easy to maintain.
- A self cleaning filter for the brine has also been designed which makes possible to run the machine without any stop.
- Brine mixing and filling is automatic.
- The conveyor into the machine can be made long enough for all the people at the trimming tables to lay the fish straight on the conveyor.
- The conveyor is wide enough to grade the fish in two sizes or two quality grades.

## Особые преимущества машины ТРОИСТ инъекции рассола

- Машина инъекции рассола достаточно широка для обработки крупных рыб.
- Выход инжектора рассола приспособлен для разделочных и филетировочных машин.
- Разработан специальный поддерживающий механизм, предотвращающий поломку шприцов.
- Устройство достаточно простое и, соответственно, удобно в эксплуатации.
- Разработан также самоочищающийся фильтр для рассола, который обеспечивает работу машины без частых остановок.
- Смешивание и наполнение рассола происходит автоматически.
- Конвейер машины достаточно длинный для обслуживания работников разделочных столов, укладывающих рыб на конвейер.
- Конвейер также достаточно широк для сортировки рыб по размерам или качеству.

