

# **MARKET STUDY – Scallops**

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# **1. MARKET OVERVIEW**

Scallops have a broad, worldwide distribution and can be cultured in many countries. Approximately 96% of the scallops consumed in the United States are captured from the wild and most of these are from domestic U.S. fisheries; the rest are wild-caught product imported from Canada. The bulk of Canadian landings, 72%, are exported to the US. Although only about 4% of scallops consumed domestically are farmed, nearly all of these are imported from China and Japan. (Seachoice 2008).

Scallops are economically important to both the US and Canada. In 2003, sea scallops were the 4th most important Atlantic fishery in Canada, with over 123 million dollars Canadian in landings (DFO 2004). In the US, scallop landings in 2002 totaled over \$US 202 million. Although these figures are from a couple years ago, it remains true and the scallop market industry has continued to increase.

# 2. SPECIES DESCRIPTION

Common Names:	Scallops		
Scientific name:	Marine bivalve mollusc		
Family:	Pectinidae		
Migrations:	None, but scallop can use its adductor muscle to open and shut its two shells to propel itself in the water column. By doing this, bay scallops can migrate several miles from where they were born. Scallop larvae also drift in the current.		

### **3. SCALLOP VARIETIES**

# 3.1. BAY SCALLOPS (ALASKA & ATLANTIC)

#### • Size & Abundance

- Among the smallest of scallop varieties
- Adductor muscle is normally about <sup>1</sup>/<sub>2</sub> inch in diameter and rarely grows over 2 inches
- A pound of Bay Scallops may yield as many as 90 scallops
- Not as plentiful as some other varieties, thus somewhat more expensive

#### • Life Cycle

- Only live until they are 12 to 18 months
- Spawning season is in the fall

### • Flesh, Flavor & Culinary Uses

- Sweet and flavorful
- Often used in casseroles, stews, and stir-fry; largely because of their manageable size

### • Geographic Range:

- Native to the western North Atlantic, ranging from Maine down to Florida (3 subspecies of Bay Scallops exist within this range)
- Most U.S. native Bay Scallop populations are depleted; for this reason, most Bay Scallops come from China & Japan (farmed)
- Small amounts of premium Bay Scallops still come from New England
- In New England, Bay scallops are sometimes referred to as Nantucket scallops

### • Harvesting

• Found at low tide tangled in eelgrass and also jumping in tidal pools

### 3.2. SEA SCALLOPS

### • Size & Abundance

- A large species of scallops
- Adductor muscle is usually about 1-1 ½ inches in diameter
- A pound of Sea Scallops yields about 20 to 30 scallops

### • Life Cycle

- Live up to 20 years
- Spawning season is late summer to fall, but timing varies according to latitude
- Reach reproductive maturity at 2 years, but do not significantly contribute until around 4 years
- A single Sea Scallop can produce as many as 270 million eggs during its lifetime

### • Flesh, Flavor & Culinary Uses

- o Less flavorful than smaller Bay Scallops
- Sea Scallops are the type of scallops most often found in stores and on restaurant menus
- Their large size makes them easier to cook there is less chance of overcooking and you can broil the Sea Scallop until it's brown on the outside and soft and tender on the inside
- Popular for use in appetizers, such as scallops wrapped in bacon
- Because of their large size, they are generally shucked at sea and only the meat or "nut" is brought to shore

### • Geographic range

- Found in the Northwest Atlantic Ocean, from Newfoundland to North Carolina
- The majority of Sea Scallops are caught in the Georges Bank, far from shore

### • Harvesting

- Adult Sea Scallops form dense aggregations called "beds" on the ocean floor
- Commercially valuable Sea Scallop beds are usually found at depths between 59 and 360 feet

# 3.3. PINK & SPINY SCALLOPS

### • Size & Abundance

- A bit larger than Sea Scallops, but not as readily available
- Adductor muscle can be up to 3 inches in diameter
- o A pound of Pink Scallops yields about 20-25 scallops

### • Life Cycle

- Mature at 2 years of age
- Spiny Scallops spawn from mid-August to late October
- Pink Scallops spawn from January to March
- Flesh, Flavor & Culinary Uses
  - Color ranges from ivory to pinkish-white
  - Chewy but sweet and moist flavor

### • Geographic Range

 Found off the coast of Washington state and British Columbia – mostly in the Strait of Georgia.

### • Harvesting

- Of the 14 species of scallops in BC, only Pink and Spiny scallops are large enough to be commercially harvested
- Spiny scallops are found sub-tidally from 5-150 meters in depth and prefer gravel or rocky bottoms
- Pink scallop can be found up to depths of 200 meters and prefer sand or mud substrate bottoms
- Both Pink and Spiny Scallops prefer to live in areas with current

# 3.4. ATLANTIC CALICO SCALLOPS

• Size & Abundance

- Closely related to the Bay scallop, although slightly larger
- Grows up to a maximum width of 3 inches
- A pound of Calico Scallops yields about 70 scallops
- Caught in limited quantities

#### • Life Cycle

- Maximum lifespan is about 24 months
- Scallops may spawn many times intermittently during the spawning season

#### • Flesh, Flavor & Culinary Uses

- Raw ones tend to be white in color rather than the usual beige
- Similar shape and culinary uses as the more common Bay scallop

#### • Geographic Range

- Found in the South Atlantic from Delaware Bay south down to Florida
- Also found in the Gulf of Mexico closed to commercial fishing

#### • Harvesting

- Are still sometimes fished commercially
- Live in depths up to 100 feet

### 3.5. WEATHERVANE SCALLOPS (ALASKAN)

#### • Size & Abundance

- Three types of scallops exist in Alaska (Weathervane, Rock and Bay); however, only Weathervane are fished commercially
- Weathervane Scallops are the largest in the world and are commonly sold as "Jumbo" scallops on the market
- Caught in much smaller quantities than Atlantic Scallops and therefore yield a higher price
- Aside from size and it's exotic locale, one reason for the higher cost of Alaskan Scallops is that they generally are not treated with STP
- Life Cycle
  - May live up to 18 years
  - Reach sexual maturity at age 3 or 4 years and are of commercially harvestable size at 6 to 8 years
  - Spawning season is in June and July
  - Growth is very rapid the first few years and is minimal after age 10

#### • Flesh, Flavor & Culinary Uses

• Sweet and mild flavor with a delicate texture

- Their large size makes them easier to cook there is less chance of overcooking and you can broil the scallop until it's brown on the outside and soft and tender on the inside
- Popular as appetizers, such as scallops wrapped in bacon, as well as entrees

### • Geographic Range

- Found in the eastern North Pacific Ocean
- Distribution ranges from Point Reyes, California to the Pribilof Islands of Alaska
- The highest known densities in Alaska are in the Bering Sea, off Kodiak Island, and along the eastern gulf coast from Cape Spencer to Cape St. Elias

### • Harvesting

- The only scallop species targeted by commercial harvesters in Alaska at this time
- There are only nine permit-holders that fish for scallops in Alaska
- Found in distinct "beds," usually on sand, silt, and clay substrates on the continental shelf at depths of 120 to 750 ft
- These beds are typically elongated and oriented in the direction of the prevailing currents
- Highest catch rates are at depths of 240 to 360 ft

# **4. PRODUCT FORMS**

### • Adductor Muscle Only

- Fresh Whole adductor muscles
- IQF Individually quick-frozen whole adductor muscles
- Block Whole adductor muscles frozen together in a uniform block

### • Adductor Muscle with Roe Attached

- Fresh Whole adductor muscles with roe attached
- IQF Individually quick-frozen whole adductor muscles with roe attached
- Block Whole adductor muscles with roe attached frozen together in a uniform block

### • Whole Scallops

- Fresh Live scallops marketed in the shell
- Generally, Pink and Spiny scallops can be bought in their shell, either fresh or frozen. Larger scallops from other regions of the world can often be found for sale without their shell.
- IQF Individually quick-frozen whole scallops marketed in the shell

# 4.1. WET, DRY & FAKE SCALLOPS

### 4.1.1. Dry Scallops

- Wild and natural scallops; they are not treated with any chemicals whatsoever
- Harvested directly from the ocean, shucked on deck, then immediately frozen on the boat to capture their quality
- Generally have a natural vanilla color and caramelize during cooking to a golden brown color that is very attractive when serving

### 4.1.2. Wet Scallops

- Commonly treated with phosphates; when cooked, wet scallops do not brown properly and taste dry and less flavorful
- It is generally easy to discern wet/treated scallops as they will usually appear snow-white in color

### 4.1.3. Fake Scallops

- Some unscrupulous markets have been known to substitute stamped large deep Sea Scallops for the smaller, more delectable Bay Scallops
- If the scallops are all of exactly uniform size and shape this is an indication the producer may have cut out the scallops from larger, less tender deep Sea Scallops
- Another common substitute for scallops is shark meat

# **5. EDIBLE CHARACTERISTICS**

- Top quality scallops should have an ivory translucence and elastic springiness that allows them to keep their shape
- o Cooked meat is opaque with a firm, lean texture
- All parts of the scallop body are edible; however, different parts tend to be consumed in different regions of the world.
  - In North America, the adductor muscle is traditionally the only part eaten, with the rest of the body discarded
  - In Europe, Australia and Tasmania, the adductor muscle is usually marketed and eaten with the gonad attached
  - Japan utilizes the whole animal, and most of the product is cooked in the shell prior to sale
- Any body parts not sold for human consumption can be used as bait, or in poultry feed and fertilizer

# 6. FISHERIES

### 6.1. BAY SCALLOPS – USA EAST & CHINA

### Seasons

- o New England
  - October thru May, peaking in the fall
- North Carolina
  - The end of January to start of April
- o **Florida** 
  - July 1<sup>st</sup> thru September 10<sup>th</sup>
- o China
  - Year-round

### Sustainability Status

- New England
  - Sea scallops were overfished and a rebuilding plan was implemented in 1998. Populations have been rebuilt to sustainable levels since 2001 as a result of effort reductions, gear restrictions and closed areas established to reduce fishing mortality
- o North Carolina
  - North Carolina Bay Scallop populations are depleted
- o **Florida** 
  - Healthy populations can be found in selected locations along Florida's West Coast - principally St. Joseph Bay, and the area between the Suwannee and Weeki Wachee rivers.
- o USA
  - Seachoice indicated that the US management effectiveness is moderate (yellow rank).
- o China
  - Bay Scallops farmed in China are ranked Green by Blue Ocean Institute, Monterey Bay Aquarium and Sea Choice

### • Fishery Management

- New England
  - The New England Fishery Management Council manages Bay scallops and other fishery resources with the federal 200 mile limit off the coasts of Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut
- o North Carolina
  - Under the Bay Scallop Fishery Management Plan, the NC Division of Marine Fisheries has closed both the commercial and recreational Bay Scallop season indefinitely to allow the population to increase

- o Florida
  - Florida Fish & Wildlife Conservation have an ongoing monitoring program to evaluate populations and open/close areas accordingly

### • Method of Catch

- o USA
  - Dredging fishermen drag a heavy frame with an attached mesh bag, called a dredge, along the seafloor. As the gear is dragged it stirs up shellfish which flow into the bag.
  - Dredges can have long-term effects on habitat by damaging the seafloor
  - Some areas are closed to scallop dredges in order to protect sensitive habitats and scallop populations
  - Bycatch of finfish (such as yellowtail flounder, skates, and monkfish), sea turtles, and undersized scallops have been identified as concerns in this fishery
- o China
  - Farmed Bay Scallops from China are raised by suspension culture. This method of aquaculture has a relatively low impact on the environment and is preferable to bottom harvesting.
  - Scallops feed on phytoplankton in the water column; therefore farming does not strain wild stocks, nor does water require chemical treatments to decrease harmful algal bloom.
  - Introducing an exotic species to China poses a risk, however Bay Scallops appear unable to survive cold waters in China and no wild populations have been reported to date.
  - There is one farming operation in the US (Nantucket); their production is minor compared to that of China.

### 6.2. SEA SCALLOPS

#### Seasons

o Available year-round, peaking from late spring to early fall

#### • Sustainability Status

- o USA
  - Sea Scallop populations in Northeast regions are healthy and overfishing is not occurring. In fact, population levels appear to be increasing
  - Sea Scallop populations in the Mid-Atlantic region are overfished
  - Monterey Bay Aquarium and Blue Ocean Institute rank Atlantic Sea Scallops as Yellow

- o Canada
  - Sea scallops exhibit a high intrinsic population growth rate, high individual growth rate, low age at first maturity and high egg production. Scallops reach harvestable size between the ages of 4 – 7 and live as long as 29 years old.
  - SeaChoice ranks Canadian Sea Scallops as Red, where as Blue Ocean Institute ranks Atlantic Sea Scallops as Yellow

#### • Fishery Management

- o USA
  - The New England Fishery Management Council manages Atlantic sea scallops in cooperation with the Mid-Atlantic Fishery Management Council under the 'Atlantic Sea Scallop Fisheries Management Plan' (FMP).
  - Today, Atlantic Sea Scallops are managed using a combined approach of effort limitation and rotating harvest areas, which maximizes scallop yields while protecting beds of young scallops.
  - The U.S. Atlantic Sea Scallop fishery is currently undergoing an assessment for MSC certification.
- o Canada
  - An industry-funded dockside monitoring program and vessel monitoring programs are used to monitor catches.
  - The Eastern Canada offshore Sea Scallop earned MSC certification in March 2010.

#### • Method of Catch

- Most fishermen in Canada and in US Northeast use dredge gear; some in the Mid-Atlantic use trawl net gear
- Dredging fishermen drag a heavy frame with an attached mesh bag, called a dredge, along the seafloor. As the gear is dragged it stirs up shellfish which flow into the bag.
- Dredges can have long-term effects on habitat by damaging the seafloor
- Bycatch of finfish (such as yellowtail flounder, skates, and monkfish), sea turtles, and undersized scallops have been identified as concerns in this fishery
- **Farmed** Eastern Canada (NS, NB & QC), the giant or sea scallop and Northern Bay Scallop are the primary farmed scallops

### 6.3. PINK/SPINY SCALLOPS

Seasons

 Pink and spiny scallops are harvested in Washington and British Columbia and are available year-round except for spawning season in summer.

### • Sustainability

- o Canada
  - Due to depleting stocks, the Canadian fishery was closed in 1999. Today, a scaled-back fishery is open and stocks are recovering.
  - David Suzukis' State of the Catch ranks Canadian Pink and Spiny Scallops as Green

### • Fishery Management

- o Canada
  - BC's scallop fishery is managed federally by *Department of Fisheries and Oceans Canada*. Experimental scallop harvests are managed by local area TACs, using precautionary exploitation rates, and minimum size limits. Other management measures are limited entry, hails, traceability tagging, logbooks, fish slips, refugia and permanent closures.

### • Method of Catch

- Wild Pink and Spiny Scallops are caught by **divers** (75-80%) or by modified trawls (20-25%)
- Modified trawls a trawl hovers about 20 cm above the seafloor, sitting on runners or rollers. This method of catch has some environmental concerns with respect to habitat damage and bycatch.
- **Divers** hand-caught on the ocean floor; considered more environmentally friendly than modified trawl.

\*Note: There are U.S. Pink & Spiny scallop fisheries but very limited information is available.

# 6.4. CALICO SCALLOPS

- Seasons
  - Year-round
- Sustainability
  - Populations have almost collapsed due to fishing pressures

#### • Fishery Management

• Florida Fish & Wildlife Conservation

### • Method of Catch

- Dredging- fishermen drag a heavy frame with an attached mesh bag, called a dredge, along the seafloor. As the gear is dragged it stirs up shellfish which flow into the bag.
- Dredges can have long-term effects on habitat by damaging the seafloor
- Bycatch of finfish (such as yellowtail flounder, skates, and monkfish), sea turtles, and undersized scallops have been identified as concerns in this fishery

### 6.5. WEATHERVANE SCALLOPS

### Seasons

- Prince William Sound Jan-Feb and July-Sept
- o Cook Inlet Mid August til end of November
- Kodiak Jan-Feb and July thru December
- Alaska Penninsula Jan-Feb and July thru December

### • Sustainability

- Alaska Scallops, like all Alaska fisheries, are managed for protection against overfishing and habitat damage. By proactively ensuring a healthy, wild and sustainable harvest, Alaska has helped to preserve and protect its superior scallops for future generations.
- The Alaska Scallop fishery requires 100% At-Sea Observer coverage. Scientific observers collect scallop fishery data and report suspected regulatory violations.
- Harvests during the period 2001 to 2005 averaged 471,894 pounds of shucked meats per year.

### • Fishery Management

- Management of all aspects of the scallop fishery, except limited access, is delegated to the State of Alaska. To limit access, the Council developed a scallop license limitation program, implemented in 2000.
- The worldwide history of overfishing scallops has led to conservative management practices including gear regulations, area-specific catch limitations, and bycatch limitations, among others.

### Method of Catch

- Dredging fishermen drag a heavy frame with an attached mesh bag, called a dredge, along the seafloor. As the gear is dragged it stirs up shellfish which flow into the bag.
- Dredges can have long-term effects on habitat by damaging the seafloor

- Bycatch of finfish (such as yellowtail flounder, skates, and monkfish), sea turtles, and undersized scallops have been identified as concerns in this fishery
- Farmed BC's primary species of farmed scallop is a Japanese/weathervane hybrid scallop known as Pacific or Qualicum scallop

# 7. SUPPLY TRENDS

- 7.1. BAY SCALLOPS
- USA
  - Average commercial landings of Bay Scallops in the US in the 1950s was 222,000 bushels
  - Since 1980, Bay Scallop landings have fallen sharply (Figure 1)
  - Since 2000, commercial fisheries for Bay Scallops have only existed in a few areas (e.g. Martha's Vineyard and Nantucket), and even these areas have noticed sharp declines (New England)



Note: 1986 data not available Source: Nantucket Shellfish Department

 $_{\odot}$  Landings of US Bay Scallops peaked in 2007 (Figure 2)



Source: NOAA, US Department of Commerce

• 4% of Bay scallops consumed in the U.S. are imported from China and Japan (farmed).

### 7.2. SEA SCALLOPS

- USA
  - Since 1993, total US Sea Scallop landings increased fishery closures in 1994, 1998, 2004 and 2007, in conjunction with reductions in efforts, contributed to a ten-fold increase in scallop biomass since its low point in 1993 (Figure 3).
  - The 2003-2005 average of Sea Scallop landings (26,639 MT meats) was almost four times the typical amount landed during the 90s.
  - Increased Sea Scallop landings occurred primarily in the Mid-Atlantic, while landings in Georges Bank remained around the same (Figure 4).



Source: Northeast Fisheries Science Center



Source: NOAA

- More recently, Sea Scallop landings have ranged between 23,466 MT meats and 28,910 MT meats - landings peaked in 2004 (Figure 5).
- In 2007, Massachusetts and New Jersey were the leading states in Sea Scallop landings, representing 76% of national landings



Source: NOAA

- Landings in more recent years have been larger; the mean weight of a landed scallop in 2005 was about twice that of a scallop in the 1990s
- Canada
  - Landings of Sea Scallops off of Newfoundland decreased between 2005 and 2007. More recently (2007-2009) Sea Scallop landings increased, but not up to 2005 levels (Figure 6)



Source: Department of Fisheries and Aquaculture, Newfoundland and Labrador

 Sea Scallop landings in Canadian waters of Georges Bank increased between 1996 and 2000



• Between 2000 - 2005 landings show a downward trend (Figure 7)

Source: Northeast Science Fisheries Center

# 7.3. PINK/SPINY SCALLOPS

- Canada
  - Compared to harvests in the 1990's, wild Pink/Spiny Scallop harvests are low; 2007 harvest was approximately 16% of that in 1994 (Figure 8).



# 7.4. CALICO SCALLOPS

- Calico Scallop Landings off the coast of Florida reached all time highs in the 1980's (Figure 9)
- Since then, landings have not reached even 50% of the 1984 peak year

Figure 9: Calico Scallop Landings in Florida, in pounds of meat, 1926-2007



# 7.5. WEATHERVANE SCALLOPS

- Weathervane scallop supply has remained fairly steady since 2002 with the exception of a dip in 2008 (Figure 10)
- $\circ$   $\,$  2009 recovered from the 2008 supply drop  $\,$



Source: Alaska Department of Fish and Game

# 8. PRICES

- Bay Scallops prices typically range from \$12.75 \$13.75 / lb except for a deep dive in 2007 where the price dropped to \$8.47 (Figure 11)
- Sea scallops have had fairly steady average prices ranging from \$6.51 -\$7.65 / lb (Figure 11)
- Weathervane scallops have been increasing steadily since 2000. The price almost doubled from 2001 (\$4.14/lb) to 2009 (\$8.00/lb) (Figure 12). The supply has not decreased substantially enough to be the sole factor in the price increase





# 9. PROJECTIONS

### • Weathervane Scallops

- Weathervane scallops are being farmed with great success. If the demand for Weathervane scallops continues, the farmed supplies should be able to keep up with demand. There is much lower risks and sustainability concerns with scallop farming.
- Weathervane scallops have had high price increases which can not be explained by supply alone meaning there is likely an increased market demand for the product.
- The limited Alaskan wild caught Weathervane scallops will continue to be in high demand and subsequently, prices will remain high

### Calico Scallops

- Calico scallop stocks are low and there are numerous warnings to consumers that they should avoid them.
- Until stocks improve and supply is available, consumers will continue to be encouraged not to purchase them.

### • Pink & Spiny Scallops

- Pink and Spiny Scallops are large enough to commercially harvest, but the supply is limited.
- The demand is likely to remain stable as it is more of a niche market, and supply is limited.
- Sea Scallops
  - UK stocks are low and further controls are expected to be implemented. With the UK supply down, France's explosive imports of scallops in the past two years and the MSC designation

for the US Atlantic and Canadian scallop fisheries, Europe bound exports will likely increase substantially. There could be more pressure on the Canadian and American suppliers which in turn could cause a rise in prices due to the shorter supply for North America.

- The U.S. supply of scallops remains steady, and increased acceptance of sustainably fished scallops will level-out North American supplies, despite Newfoundland's lower landings.
- The demand for scallops in North America is likely to remain the same, but could be influenced by prices.
- Bay Scallops
  - The majority of farmed Bay scallops are now coming out of China. Monterey Bay has given farmed Bay scallops from Japan and China it's green seal of approval.
  - If wild caught Bay scallops from the U.S. decrease, China and Japan will likely increase exports to fill the North American demand.

# **10. NUTRITION**

Scallops are low in saturated fats and cholesterol and high in protein. Sea Scallops: Scallops are a good low-fat source of protein and are high in selenium and B vitamins.

# Nutrition Facts

Serving Size	e	1 unit 2 large or 5 sr	ull (30g)	
Amount per	servi	ing		
Calories 26	5		Calories from Fat 2	
Hide Daily \	/alue	<u>s</u>	% Daily Value*	
Total Fat 0g	g		0%	
Saturated	l Fat	0g	0%	
Cholestero	<b>l</b> 10m	ıg	3%	
Sodium 48	mg		2%	
Total Carbo	ohyd	r <b>ates</b> 1g	0%	
Protein 5g				
Vitamin A	0%	Vitamin C	1%	
Calcium	1%	Iron	0%	
Riboflavin	1%	Niacin	2%	
Vitamin B6	2%	Vitamin B12	8%	
Potassium	3%	Phosphorus	7%	
Magnesium	4%	Zinc	2%	
Copper	1%		%	
* Percent D	ailv V	alues are based on	a 2 000 calorie diet	