



# NOVA SCOTIA SPECIES SPOTLIGHT: SEA SCALLOP (*Placopecten magellanicus*)

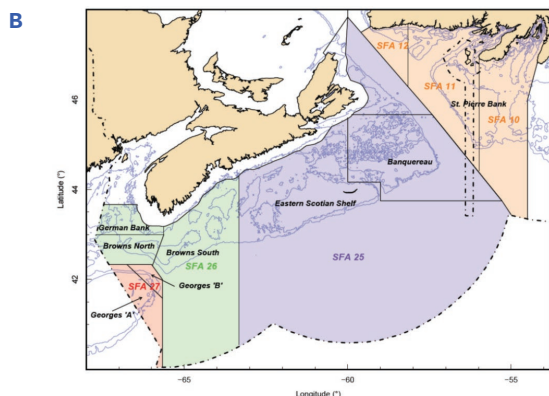
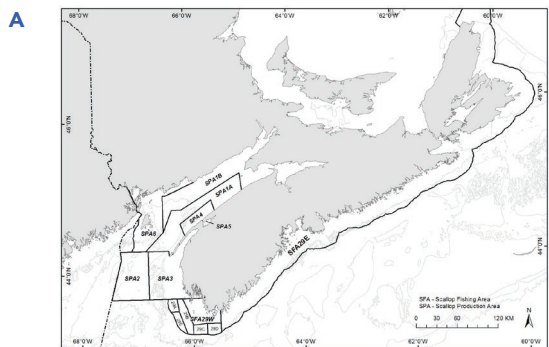
## FISHERY

Sea scallops are targeted by both inshore and offshore fisheries. Inshore fisheries take place in Scallop Fishing Areas (SFA) 28, 29W, and 29E in the coastal waters of Nova Scotia from Wedgeport to the Cape Breton highlands. SFA 28 is fragmented into 6 Scallop Production Areas (SPA) that include distinct scallop beds important for reproduction. Offshore fisheries take place in SFA 25, 26 and 27 on the Eastern Scotian Shelf, Browns and German Banks, and Georges Bank, respectively, and SFA 10 – 12 in Newfoundland.

The offshore fishery takes place from Jan.1 to Dec. 30 annually, whereas the inshore fishery takes place in the summer in SFA 29W and in the fall in SPAs.

Sea scallops are fished using dredges with sizes varying between inshore and offshore fisheries. Offshore vessels have on-board factories that process and freeze scallops immediately after harvest.

In 2020, Canadian fisheries harvested \$122M of sea scallops, generating an export value of \$170M. Nova Scotia represents 90% of all Canadian production.



**Figure.** Sea scallop fishing areas in (A) inshore, and (B) offshore waters around Nova Scotia

## BIOLOGY

Sea scallops are bivalve molluscs. The adductor muscle is targeted for food use, but a smaller abductor muscle (or side-muscle) is physically attached to the adductor. The adductor muscle functions to close the shell and unlike all other bivalve species, produces enough force to 'swim' through water.

The top shell is reddish-pink to brown and the bottom shell is white to cream. The shells of sea scallop are smooth with ribbed edges, unlike all other scallop species that have ribbed, or 'scalloped', shells.

Sea scallops live in groups called beds, on sandy or gravel ocean bottoms, at depths from 10 to 300 m.

Sea scallops feed by filtering phytoplankton and detrital matter, and predated by sea stars, fish, crabs, and lobster.

## LIFE CYCLE

Sea scallops spawn twice a year, once in the spring and another in later summer. Fertilization of eggs takes place within the water column, and larvae settle along the ocean bottom after 1 to 2 months.

Sea scallop larvae measure ~ 0.25 mm when they settle to the ocean bottom, and after 4 months grow to 3 to 10 mm.

Scallops grow rapidly during the first several years of life and reach sexual maturity by age 2 and can live for up to 20 years.

It is estimated sea scallops take 3 to 5 years to reach commercial size. A 3 year-old sea scallop would be graded to a 30-40 count per lbs (30/40s), whereas a 5 year old sea scallop is graded to the under 10 count per lbs (U/10).





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## MANAGEMENT AND CONSERVATION

The Nova Scotia scallop fisheries is managed by Fisheries and Oceans Canada using various control measures, including limited entry licenses, minimum harvested shell height size and meat counts, seasonal/area closures, individual transferable and competitive quota systems, TAC set annually, dockside monitoring, vessel monitoring systems, and at-sea monitoring for offshore vessels.

Inshore SFA 28 and 29W, and offshore SFA 10-12, 25-27 are certified as “Well Managed and Sustainable Fisheries” by the Marine Stewardship Council (MSC).

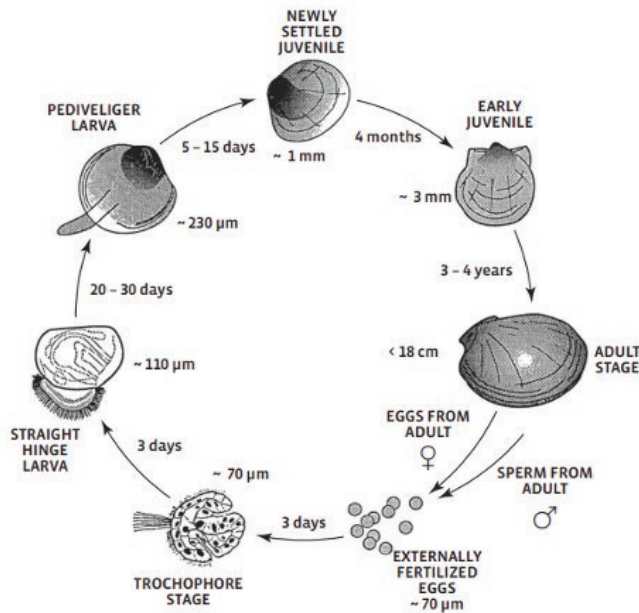


Figure. Scallop life cycle

## SEAFOOD LABELLING

	Terminology	Description
<b>Common Name</b>	<b>English:</b> Scallop, Sea Scallop, Atlantic Scallop, Giant Scallop <b>French:</b> Pectin D’amérique, Pétoncle, Pétoncle Géant de L’atlantique Nord, Noix De Saint-jacques, Pétoncle Géant	Accepted common name(s) for <i>Placopecten magellanicus</i>
<b>Production Method</b>	Wild; Farmed	Harvested from the ocean; Cultivated
<b>Certifications</b>	Marine Stewardship Council (MSC)	Certifies that fish products come from wild fisheries that meet environmental standards for sustainable fishing
<b>Product Forms</b>	Shucked Meats	Separated adductor muscle
	Pieces	Broken or cracked scallops when > 5% of total sample
<b>Process Description</b>	Glazed	Fresh water shield surrounding a frozen scallop
	Wet/Dry	Refers to treatment of scallops with (wet) or without moisture regulating additives
	Sushi-Grade	Previously frozen and stored at below -35 °C for over 15 hrs, or below -20 °C for over 7 days



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## PROCESSING/HANDLING

Codex Alimentarius has developed standards that apply to scallop products including fresh and quick-frozen raw scallops (CXS 315-2014), and live and raw bivalve molluscs (CXS 292-2008).

### Process Yields:

Meat Yield = ~ **12 – 15%**

Roe Yield = ~ **5%**

### Primary Products

Shucked Meats (side-muscle attached)

### Secondary Products

Half shell (meats, roe-on scallop meat), scallop blocks, bacon-wrapped scallops, broken/pieces, live

### By-Products

Shell, roe, viscera

### Post-Harvest Primary Processing Flow

**Processing on Land:** Receiving » Shucking (if necessary) » Washing » Grading » Freezing and Glazing (if necessary) » Packaging » Storage » Transportation

**Processing At Sea:** Deck Dump » Washing/Grading » Shucking » Washing » Chilling » Freezing and Glazing (if necessary) » Packaging » Storage

### Post-Harvest processes impacting quality

- Improper Cleaning (washing, separation of gonads and viscera)
- Handling (imprecise shucking)
- Temperature abuse (improper chilling)
- Freezing (clumping)
- Packaging (dehydration)

## CHEMICAL COMPOSITION

Proportion (g / 100 g)	
	Raw
<b>Moisture</b>	77.8
<b>Protein</b>	17.4
<b>Fat</b>	0.6
<b>Carbohydrate</b>	2.6
<b>Ash</b>	1.6

\*Sidwell, 1981

## STORAGE

Sea scallops can measure up to 10 °C when harvested during warm summer months. If left on the deck too long, temperature abuse will accelerate spoilage of internal organs that lower the quality of the meats.

Sea scallops should be stored as close to 0 °C as possible. Harvested sea scallops may require pre-chilling to prevent too much ice melt during bulk stowage. Bulk packing in cotton bags on vessels provides a manageable format to handle

shucked meats in bulk, offers protection against direct contact with ice, maintains shucked meats equal to the temperature of melting ice (0 °C), and benefits from the washing action of melting ice. If packed too warm, air pockets can form around bags and ice melting will not occur.

Fresh sea scallops have a shelf life from 7 to 10 days if their temperatures are maintained in melting ice at 0 °C. Storage at 4 °C will shorten the shelf life from 5 to 7 days.

Frozen scallops are often frozen onboard fishing vessels within 2 hours of harvest. Inshore sea scallops landed fresh but intended to be frozen should be stored for no more than 1 to 2 days at 0 °C.

Frozen sea scallops stored at -18 °C will remain optimal for up to 2 months, whereas storage at -23.5 °C or below will be optimal for up to 6 months. Sea scallops stored at -18 °C will remain acceptable for up to 10 months, whereas storage at -30 °C or below stored will remain acceptable for up to 18 months.

Care should be taken to prevent dehydration of frozen scallops during long-term cold storage. Glazing or vacuum packaging are effective strategies to prevent dehydration.



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## KEY FOOD SAFETY AND QUALITY CONCERNS

Sea scallops can accumulate marine biotoxins within the gonads and roe, but not in the adductor muscle. Care should be taken during processing of roe-on scallop products due to the presence of biotoxins that may accumulate in these tissues. Whole or roe-on sea scallop products must be sampled for toxicity prior to release for market.

Where sea scallops prefer sandy or gravel oceans bottoms and filter detritus material, the adductor muscle may contain residues of sand, rock, shell pieces, or other matter that is unappealing to consumers. Thorough washing of shucked meats should be performed to rid meats of these foreign materials.

The internal organs of sea scallops are positioned in contact with the adductor muscle. Delayed shucking, combined with warm temperatures, can impart sensory changes in the adductor muscle caused by close association to internal organs that spoil more rapidly than the muscle tissue.

Brown or grey meat is an indication of apicomplexan parasitic infection - the same parasite triggered a moratorium on fishing the Icelandic scallop.

Orange meats are related to diet and spawning. Female sea scallop gonads progressively turn orange in colour when preparing to spawn. Excess pigments from the gonads are stored in the adductor muscle causing it to turn orange. Male sea scallops are always white to cream in colour.

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