



# NOVA SCOTIA SPECIES SPOTLIGHT: LOBSTER (*Homarus americanus*)

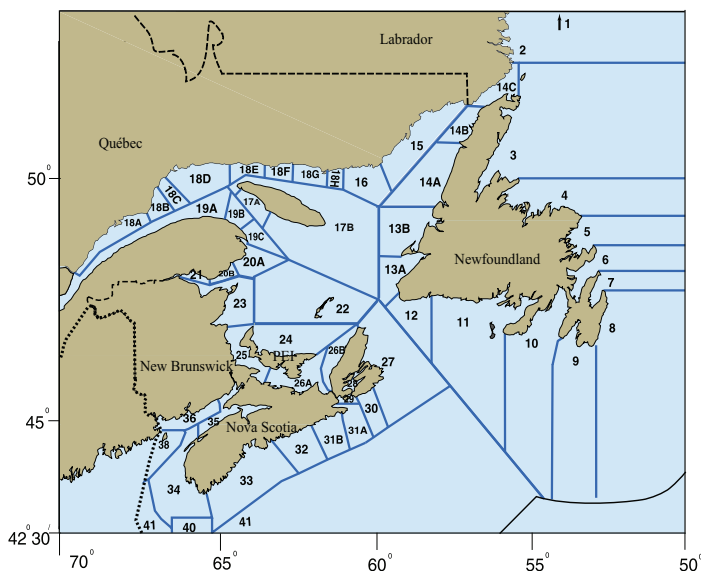
## FISHERY

The commercial inshore fishery for American Lobster (*Homarus americanus*) has been active for over 150 years. In Nova Scotia, lobster is targeted by both a food, social, and ceremonial (FSC) fishery, and a commercial fishery in both inshore and offshore waters. Lobster fishing areas (LFA) consist of LFA 26A and B in the Gulf region, and LFA 27-41 in the Maritimes region.

All inshore fishing takes place within 50 nautical miles of shore using traps, and represents the dividing line between inshore (LFA 27-38) and offshore fisheries (LFA 41).

Each LFA has unique management measures, where LFA 27 to 32 is active in the spring, starting from April to May until June to July, whereas LFA 33 to 37 is active in the fall starting from October to November until May to June.

In 2021, Nova Scotia lobster fisheries landed over 100M pounds of live lobster or nearly 46% of total Canadian landings, and represented a landed value of over \$1B.



**Figure.** Lobster fishing areas in Atlantic Canada

## BIOLOGY

Lobster is found in coastal waters from the southern tip of Labrador to Long Island Sound on the New York/Connecticut border, but the fishery is concentrated in the Gulf of Maine and the Gulf of St. Lawrence.

Juvenile lobster prefers habitats that provide protection from predators including cobble, gravel, or even eel grass, whereas adults are less susceptible to predation and are found in sandy or muddy bottom areas.

To grow, lobster must moult, a process where they shed their exoskeleton and form a larger new shell. With each moult, they grow up to 50% in weight, and 10 to 15% in length. It takes 15 to 20 moults, or 8 to 10 years to reach a legal size of 82.5 mm carapace length, where they weight approximately 1 lbs. Larger lobster moult less often, with 3 lbs lobster moulting every 2 to 3 years.

Seasonal migrations in response to changing water temperatures bring lobsters inshore to moult, reproduce, or hatch eggs. Along the outer continental shelf, lobsters are believed to travel tens to hundreds of kilometers.

Juvenile lobster feed on a planktonic species such as cladocerans (water flea), copepods, and crab larvae, and are predated by fish including cunners, sculpins, skate, and crabs. Adult lobsters actively feed on crabs, clams, mussels, scallops, fish, marine worms, opportunistically feed on dead fish and other organisms, and are predated by flounder and cod, eels, crabs, and seals.

## LIFE CYCLE

It is estimated that 50% of lobsters are mature when carapace lengths measure from 80 mm to over 100 mm throughout the Atlantic region. Age of maturity depends on the local water temperatures. Egg production increases exponentially with lobster size and improvements in egg quality are found from repeat spawners.

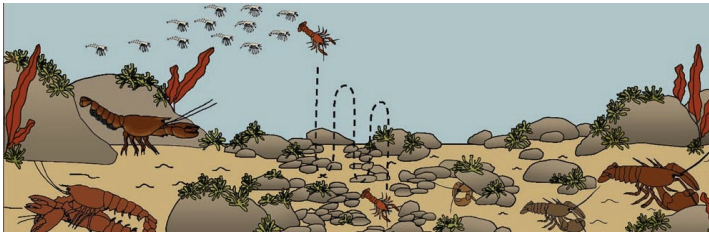
After a summer moult, mature females mate with males and store the spermatophore until the following summer once egg development is complete. Females then fertilize their eggs with the spermatophore and extrude the eggs to the underside of the tail. Eggs are carried for up to 1 year, and hatch the following summer (July-August).



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Lobster larvae spend 3 to 10 weeks in surface waters in the planktonic phase. Once they measure 1 cm in length, post-larvae lobsters settle to the ocean bottom and seek protection in an optimal habitat.

Lobsters seek protection until measuring 4 to 5 cm carapace length, or when they outgrow their initial shelter, and look for new shelter and feeding areas. As they grow larger, they spend more time outside of their shelter, increasing their risk of predation. Overall, risk of mortality decreases with age.



**Figure.** Life cycle of American lobster

## MANAGEMENT AND CONSERVATION

Lobster fishing is managed by Fisheries and Oceans Canada (DFO). Their general management strategies focus on areas of fishery productivity, impact on biodiversity and habitat, access for traditional culture and sustenance, and overall prosperity.

The conservation objectives for the lobster fishery are to allow sustainable use that safeguards ecological processes and genetic diversity for present and future generations. This involves not causing unacceptable reduction in productivity, biodiversity, and habitat modification.

Tactics to achieve the above conservation objectives include limited entry licences, prescribed access (LFA), trap limits, minimum legal size, defined fishing seasons, release of berried females, v-notching of berried females, gear fitted with escape vents and biodegradable panels, coral and sponge areas closures, and marine protected areas, among others.

The Maritimes inshore lobster fishery has been certified sustainable by the Marine Stewardship Council (MSC) since 2015.





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## SEAFOOD LABELLING

	Terminology	Description
<b>Common Name</b>	<b>English:</b> Lobster, American Lobster <b>French:</b> Homard, Homard American	Accepted common name(s) for <i>Homarus americanus</i>
<b>Production Method</b>	Wild	Harvested from the ocean
<b>Product Forms</b>	Marine Stewardship Council (MSC)	Certifies that fish products come from wild fisheries that meet environmental standards for sustainable fishing
<b>Product Forms</b>	Live	Living animal
	Split	Cut lengthwise along the cephalothorax and abdomen
	T/C/K/L	Meats from tail, claw, knuckle, or leg
	Tail	Abdominal muscle with shell-on
	Mince	Ground meats
	Scored	Shell is pre-cracked, aiding meat removal
	HPP	High-pressure processing is a technique used to enable shell removal and the separation of CKL and tail meat without cooking
	Tomalley	Term describing the hepatopancreas - the internal organ that functions as the liver and pancreas
	Culls	Claws missing or of unequal size
<b>Process Description</b>	Fresh	Not previously frozen
	Refreshed/ Previously Frozen	Thawed and sold fresh
	Cooked	Heat processed until an internal temperature of 74 °C is achieved
	Blanched	Heat processed, but an internal temperature of 74 °C is not achieved
	Brine frozen	Frozen using a mechanically chilled liquified salt solution
	Glazed	A protective layer of ice on the product surface to protect against dehydration.
<b>Quality Grading</b>	Grade A	Hard shell, two full size claws, no open wounds or lesions
	Grade B	Soft shell or hard shell culls with open wounds or lesions
<b>Size Grading</b>	Canners	< 1.0 lbs
	Chicks	1.0 – 1.24 lbs
	Quarters	1.25 – 1.49 lbs
	Halves	1.5 – 1.74 lbs
	Selects	1.75 – 1.99 lbs
	Deuces	2.0 – 2.99 lbs
	Jumbos	3.0 + lbs



# NOVA SCOTIA SPECIES SPOTLIGHT: LOBSTER

## (*Homarus americanus*)

### PROCESSING AND HANDLING OF PROCESSED LOBSTER

#### Processing Yields

Meat = **20 - 25%**

#### Primary Products

Live, Shell-on Tails, Meat

#### Secondary Products

Specialty Products, Mince

#### By-Products

Lobster Bodies, Shell

#### Generic Process Flow for Cooked Lobster

Live Lobster Receiving » Cooking » Cooling » Sectioning, Meat Extraction » Grading/ Weighing » Freezing » Glazing » Packaging » Storage » Transportation

#### Post-Harvest Practices Affecting Quality

- Prioritizing the processing of weak lobster
- Cooking schedule
- Chilling and freezing practices
- Delays in processing
- Use of packaging

### CHEMICAL COMPOSITION

	Proportion (g / 100 g)	
	Raw	Cooked
<b>Moisture</b>	80.95	78.11
<b>Protein</b>	16.52	19.00
<b>Fat</b>	0.75	0.86
<b>Carbohydrate</b>	0.00	0.00
<b>Ash</b>	1.88	2.14

USDA Nutritional Database ID, 15147 (Raw), 15148 (Cooked)

### STORAGE

Fresh cooked, or thawed lobster products stored chilled keep from four to five days before becoming spoiled.

Products held in frozen storage should be adequately packaged to prevent against freezer burn and dehydration of the product. Glazing helps to protect in-shell lobster products against these mechanisms of deterioration.

Shelled meats are optimally stored under vacuum.

Short-term cold storage of all lobster products at -18 °C can be adequate, but long-term storage should use temperatures < -30 °C to preserve both the texture and flavour throughout the storage period.

### KEY FOOD SAFETY AND QUALITY CONCERNS

Cooked lobster products are ready-to-eat (RTE) foods. The post-cooking handling increases the risk of re-contamination with microbial hazards including *Staphylococcus aureus* and *Listeria monocytogenes*.

Lobster is susceptible to accumulate paralytic shellfish poisoning (PSP). These toxins are formed naturally by microalgae in the open ocean, and they accumulate in the hepatopancreas (tomalley) when consumed by lobsters.

Lobster shells and joints are susceptible to black discoloration or melanosis, due to melanin formation. It does not occur in the meat tissues. It can be delayed by applying sulphites.

Brine freezing involves the immersion whole animals or sections into a salt solution chilled to -18 °C. Process schedules should be validated to ensure a consistent temperature distribution within the brine tank, and that salt uptake into the flesh does not impact any sensory properties.

Extended product chilling using chilled seawater can also drive excessive salt uptake into the flesh.

The microbial loads in chilling water, glaze water, brine tanks, etc. should be routinely monitored to prevent excess bacterial build up.

Lobster tails sometimes present as mushy and heavily deteriorated without any other observable defects of the whole animal, which can be caused by either parasitic infection, or by processing dead lobsters.



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## REFERENCES

Cook, A.M., Cassista Da-Ros, M., and Denton, C. 2017. Framework Assessment of the Offshore American Lobster (*Homarus americanus*) in Lobster Fishing Area (LFA) 41. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/065. viii + 186 p. [https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40644881.pdf?\\_gl=1\\*5kdj96\\*\\_ga\\*ODYxNzQ3NTE1LjE2NTE1MTM4NDY.\\*\\_](https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40644881.pdf?_gl=1*5kdj96*_ga*ODYxNzQ3NTE1LjE2NTE1MTM4NDY.*_)

DFO. 2015. Lobster. Fisheries Sustainability. Fisheries and Oceans Canada. <https://www.dfo-mpo.gc.ca/fisheries-peches/sustainable-durable/fisheries-peches/lobster-homard-eng.html>

DFO. 2018. American Lobster. Species Profile. Fisheries and Oceans Canada. <https://www.dfo-mpo.gc.ca/species-especes/profiles-profil/american-lobster-homard-eng.html>

DFO. 2019. Lobster Fishing Areas 27 – 38 Integrated Fisheries Management Plan. Fisheries and Oceans Canada. <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/maritimes/2019/inshore-lobster-eng.html>

DFO. 2019. Offshore lobster and Jonah crab – Maritimes Region. Fisheries and Oceans Canada. <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/lobster-crab-homard/2019/index-eng.html>

DFO. 2021. Assessment of American Lobster (*Homarus americanus*) in Lobster Fishing Areas 35–38. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2021/020. <https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/4097943x.pdf>

DFO. 2021. Assessment of Lobster (*Homarus americanus*) in Lobster Fishing Area 34. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2021/015. <https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40976002.pdf>

DFO. 2022. Seafisheries Landings. Fisheries and Oceans Canada. <https://www.dfo-mpo.gc.ca/stats/commercial/sea-maritimes-eng.htm>

FAO and WHO. 2020. Code of Practice for Fish and Fishery Products. Rome. <https://doi.org/10.4060/cb0658en>

Fisheries and Oceans Canada. Canadian Trade. Last updated January 10, 2023, <https://inter-j01.dfo-mpo.gc.ca/canadiantrade?rpt=true&rptYearFrom=2021ctr/&rptYearTo=2022&tradeTypeId=X> (accessed January 23, 2023).

FRCC. 2007. Sustainability framework for Atlantic Lobster 2007: report to the Minister of Fisheries and Oceans. Fisheries and Oceans Canada. [https://publications.gc.ca/collections/collection\\_2009/mpo-dfo/Fs158-2-2007E.pdf](https://publications.gc.ca/collections/collection_2009/mpo-dfo/Fs158-2-2007E.pdf)

Government of Canada. 2013. Information Update: Health Canada reminds Canadians about the consumption of lobster tomalley. Recalls and Safety Alerts. <https://recalls-rappels.canada.ca/en/alert-recall/health-canada-reminds-canadians-about-consumption-lobster-tomalley>