Atlantic Salmon

Salmo salar

WORLD FISH MIGRATION FOUNDATION

Native to most
North Atlantic coasts

Recreation

Highly attractive for **anglers**

Reproduction

Female salmon lay
4.000-10.000
eggs in a depression called a **redd**

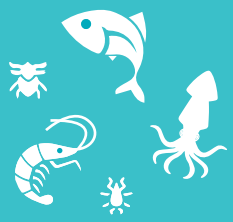
Average weight 10-20 kg

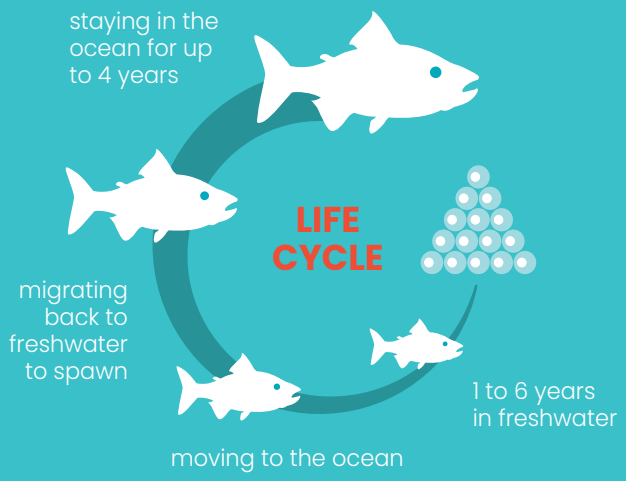
RECORD

Weight
46 kg
Length
150 cm

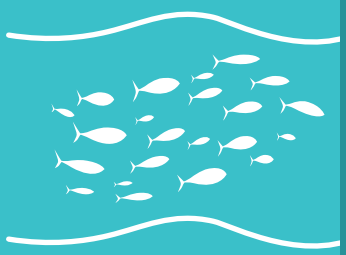
Food

Juveniles mainly feed on **aquatic insects**. Adults predate mostly on **fish, squid and marine crustacea**





VULNERABLE



Vulnerable

Vulnerable due to ongoing **habitat degradation** and **climate change**

Smell

Can smell their way back to their **river of birth**

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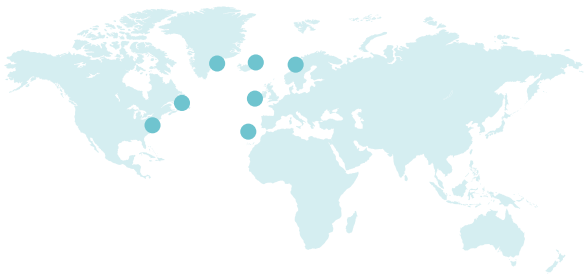
RANGE AND HABITAT

The Atlantic salmon, Salmo salar, is a cold-water species. This determines their broad native geographical range that consists of countries surrounding the Northern Atlantic ocean, from Quebec to New York in the west and, in the east from the White Sea and the Barents Sea to countries surrounding the North Sea.



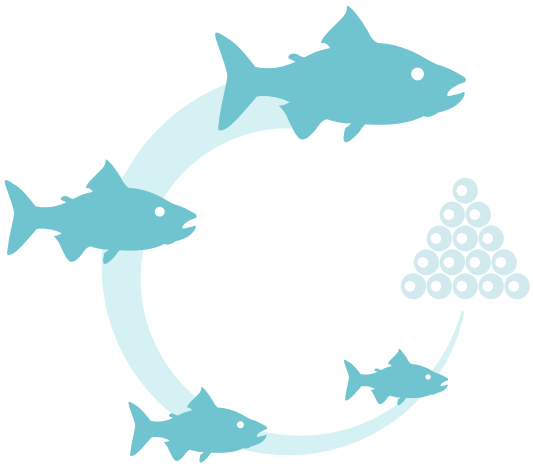
Furthermore, they have been introduced for aquaculture purposes in New Zealand, Australia, and some parts of southern Argentina and Chile. Throughout its range it is widely distributed, commonly occuring in streams, rivers and very rarely in lakes. The Atlantic salmon is one of the comparatively few anadromous species of fish, meaning that they have the ability to live in both fresh- and saltwater. Almost all populations demonstrate this ability although a small number of land-locked populations persist.

Salmon spend the first part of their lives in freshwater where the fish breed and their offspring grows prior to migrating to the ocean. After a period of one or two years, occasionally in northern areas up to 6 or 7 years, the young salmon migrate downstream to the ocean where they distribute widely to feed. Up to four years later the adult salmon migrate from the ocean back to spawn in the rivers and streams of their own birth. Here, they select their spawning habitat to complete their life cycle.

LIFE CYCLE

Mature salmon return to their home rivers at the onset of their sexual maturity. Most adult salmon migrate into freshwater between March and November, with the age and month at which they return varying between rivers of different sizes with older fish occurring in larger rivers. Most returning fish have spent one or two winters at sea. After the initial upstream migration in the river, the fish remain almost dormant prior to an autumn spawning migration triggered by seasonal floods. The fish arrive at their spawning site where breeding usually occurs at water temperatures between 2 and 10 degrees Celsius. As the fish mature, they lose their silvery shine. Females become yellowish or dull brown whilst males typically develop a red mottled skin with small black patches. The males also develop a smooth leathery skin and elongated jaws with a hook-shaped kype on their lower jaw.

Spawning occurs in stretches of river with a gravel bottom in flowing well-oxygenated waters. The female selects the spawning site. She excavates a depression, called a redd in the gravel by turning on her side and vigorously flexing her body to move the water with such force that the gravel is moved. This behaviour attracts males, and competition to mate may occur before two fish spawn. During spawning, a female lays between 4,000 and up to 10,000 eggs. These are fertilised by the male while they sink into the redd. After spawning, the female covers the eggs by displacing gravel from immediately upstream to complete the nest or redd.



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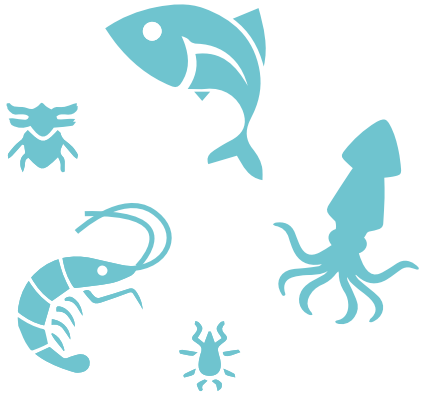
Spawning can take between a few hours to three days. Females sometimes create multiple redds. Males may defend the redd and the female during this time. In the meantime, both sexes may subsequently spawn with other partners. After spawning, most fish die. Yet, a small proportion of the females survive and quickly start to recondition themselves. These females, known as kelts, migrate back to sea. After a year a small proportion of them return to their rivers to spawn a second time. A very small number may even spawn a third time.

The eggs hatch in spring where the hatched larvae, called alevins, remain within the gravel away from light and feed on their yolk sac. After the sac is depleted the fish emerge from the gravel and disperse, to occupy territories where they feed on drifting invertebrates. The fish, then known as parr, remain in their territories for between one to seven years. When parr reach a critical size, a process called smoltification is triggered. This prepares them for a life in saltwater. It leads to changes in the appearance of the fish (external morphological changes) as well as changes in physiology (changes in the internal processes) and hormonal changes in the metabolism of the fish. The smolts become silvery with grey/black fins and migrate downstream towards the sea. This migration is triggered by increasing water temperatures and increases in flow during spring. After reaching the sea, the young salmon disperse to remote ocean feeding areas where they grow towards the onset of maturation, a process that usually takes between 1 and 4 winters, before returning to spawn.

SIZE AND FEEDING

The size of adult salmon is determined by the time they spend feeding at sea with older fish reaching sizes of up to 10 - 20kg. Exceptional fish are known with fish from some large rivers growing to record weights of 30kg and lengths of as much as 150cm.

The largest fish recorded weighed 46.8 kilos, whilst the oldest salmon known was 13 years of age, however most salmon do not live past 5 years or so.



Both in fresh- and seawater salmon are carnivorous. Juveniles feed mainly on aquatic insects such as mayfly nymphs and crustaceans such as freshwater shrimps. Adult salmon predate mostly on fish, squid and various marine crustacea.

Perhaps the most remarkable facet in the life cycle of the Atlantic salmon is their remarkable ability to return to their river of birth, based on their smell. This is thought to be possible because rivers have unique odours based on some variation of the geology and water chemistry. This unique odour is recognised from the time salmon spent in the river as parr and smolts. Their sense of smell is developed to such an extent that they are even able to distinguish between pheromones from siblings and non-siblings within a population of salmon.

RECORD

Weight
46 kg
Length
150 cm

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COMMERCIAL AND RECREATIONAL ROLE AND CURRENT STATUS

The Atlantic salmon has been subject to fishing pressure as long as it can be recorded. During the Middle Ages, the species was highly prized for consumption by the elite across western and northern Europe. This began a depletion in some European stocks during the Middle Ages followed by further decline in many areas due to declining water quality and river connectivity during the industrial revolution.

Salmon have always been highly attractive for recreational fishing, becoming an elite target for many fishermen and fishery owners leading to substantial growth in fishery costs and value. The capital value of rod fisheries is generally based on the annual numbers of fish caught and recorded, hence there is much incentive to return runs of salmon to their former abundance.
The development of intensive aquaculture for Atlantic salmon in the 1980s reduced fishing pressure on wild stocks considerably. However, it also led to new threats pressuring wild stocks through the escape of selectively bred farmed salmon. These introduced new diseases and parasites to wild populations, just like new problems such as interbreeding between farm-escapees and wild fish placing important selected genetic traits of wild stocks at risk.

Besides overfishing, historic habitat degradation also became a growing problem and today new pressures arising from intensive agriculture and climate change are now threatening the remaining populations of salmon. The historic decline and loss of populations in many countries in Europe, combined with the ongoing impact of habitat degradation and climate change are still damaging the remaining stocks of salmon. Consequently, the IUCN considers the Atlantic salmon to be 'vulnerable'.

SOURCES

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