NB Fish Identification & Ecology

New Brunswick is home to over 50 species of inland freshwater fish, from the iconic Atlantic salmon to tiny blacknose dace no bigger than your finger. Knowing how to **identify key species, classify their thermal preferences, and understand their role in the food web** is a core Envirothon aquatic ecology skill.

1. Why fish matter for aquatic ecology

Fish are the apex consumers in most freshwater food webs - but their significance goes far beyond being at the top of the chain. In NB streams and rivers, fish are the essential link between the macroinvertebrate community below them and the terrestrial world above: otters, herons, eagles, anglers, and First Nations harvesters all depend on healthy fish populations.

Fish are also critical hosts for freshwater mussels. Many native mussel species - including NB's Brook Floater and Yellow Lampmussel - require specific fish species to complete their larval (glochidia) stage. Lose the host fish, lose the mussel. The Dwarf Wedgemussel's extinction from the Petitcodiac is the clearest NB example of this dependency.

Fish role	Why it matters for aquatic ecology
Apex consumer	Controls populations of invertebrates, smaller fish, and amphibians; cascading effects down the food web
Nutrient transport	Anadromous fish (salmon, shad, eel) carry ocean-derived nutrients into freshwater when they spawn and die
Mussel host	Carry mussel glochidia larvae on gills; essential for native mussel reproduction and range expansion
Bioindicator	Cold-water fish (brook trout, Atlantic salmon) are sensitive indicators of water temperature and habitat quality
Recreational & cultural value	Atlantic salmon fishing is economically and culturally central to NB; treaty rights for Wolastoqey and Mi’kmaq peoples
Species at risk signal	Declining fish populations often signal broader watershed degradation before other indicators respond

2. Thermal classification of NB fish

One of the most important skills for the aquatic ecology station is classifying fish by their thermal preference. This classification links directly to water quality (temperature and DO thresholds from Module 3), habitat assessment, and the impacts of climate change and riparian clearing.

Thermal group	Temperature range	Characteristics	NB examples
Cold-water	Optimal: 10–18°C Max: ~20–22°C	High dissolved oxygen (DO) required (>9 mg/L ideal); found in shaded headwater streams, spring-fed systems, deep cold lakes; first to disappear with warming	Atlantic salmon, brook trout, lake trout, arctic char, rainbow smelt
Cool-water	Optimal: 18–25°C Max: ~28°C	Moderate DO tolerance; found in mid-order streams, lakes with cool zones; intermediate sensitivity to NPS impacts	Striped bass, white perch, yellow perch, chain pickerel, fallfish
Warm-water	Optimal: 24–30°C Max: ~34°C	Lower DO tolerance; found in slow, warm rivers, lakes, ponds; often tolerant of higher nutrients and turbidity	Largemouth bass, smallmouth bass, pumpkinseed, brown bullhead, carp

COLD-WATER SPECIES AS NPS INDICATORS

The presence or absence of brook trout and Atlantic salmon in a stream is one of the most powerful indicators of cumulative watershed health. These species require: temperature below 20°C (necessitating intact riparian shade), dissolved oxygen above 6.5 mg/L, clean gravel substrate for spawning (low turbidity and sedimentation), and good insect prey (high EPT richness). Each of these requirements is directly threatened by NPS pollution. Cold-water fish are the biological endpoint of everything covered in Modules 1–4.

3. Life history — anadromous, catadromous, and resident fish

Fish in NB can be classified by whether they migrate between freshwater and the ocean as part of their life cycle. This distinction affects how they respond to dams and culverts, and how they connect marine and freshwater nutrient cycles.

Life history	Definition	NB examples
Anadromous	Spawns in freshwater; matures in the ocean; returns to freshwater to spawn	Atlantic salmon, striped bass, American shad, alewife, blueback herring, rainbow smelt (some populations), Atlantic sturgeon, shortnose sturgeon
Catadromous	Matures in freshwater; migrates to the ocean to spawn	American eel — the only NB example; spawns in the Sargasso Sea
Resident (potamodromous)	Spends entire life in freshwater; may migrate within river systems	Brook trout, white perch, yellow perch, white sucker, chain pickerel, most minnows
Landlocked anadromous	Ancestrally anadromous but population now trapped in lakes	Lake Utopia rainbow smelt (both populations); some Atlantic salmon populations

WHY ANADROMOUS FISH MATTER BEYOND THE RIVER

When Pacific salmon die after spawning, their carcasses deliver massive pulses of marine-derived nutrients (nitrogen, phosphorus) into freshwater streams, fertilizing riparian trees and feeding invertebrates. Atlantic salmon in NB play a similar role, though populations are greatly reduced. American shad historically spawned in huge numbers in the Wolastoq (Saint John River) system - their reduction from dam construction has impacted both nutrient cycling and the host fish availability for mussels like the Dwarf Wedgemussel.

4. Native NB fish species profiles

These are the species most likely to appear at the NB Envirothon aquatic ecology station. They are drawn from the NBM Flashcard Guide, the Meduxnekeag River Association profiles, and the Binder5 NB native fish section. For each species know: the key ID features, thermal preference, conservation status, and NB significance.

COLD-WATER SPECIES

Atlantic Salmon

Salmo salar ● **Inner Bay of Fundy: ENDANGERED (SARA)**

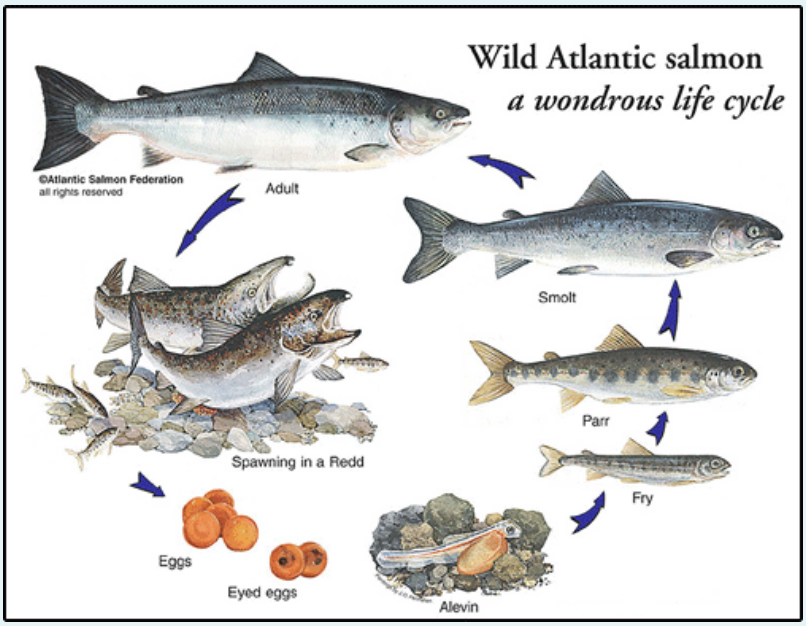
Size: Parr to 12 cm; smolts to 20 cm; adults typically 70–75 cm

Appearance: Parr: 8–11 dark vertical bars (parr marks) on sides with red spots between them. Smolts: silvery. Adults: silvery belly, brown/green back with black spots. Spawning males develop a hook (kype) on lower jaw.

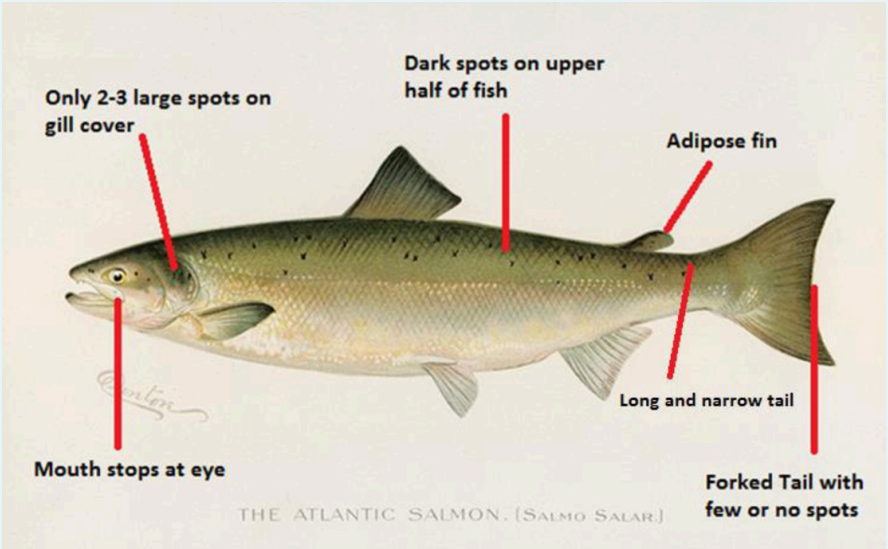
Food: Insectivore as parr (macroinvertebrates, especially EPT); crustaceans and small fish at sea.

Habitat: Clear, cold rivers and streams with gravel/cobble/boulder bottoms. Anadromous — spawns in freshwater, matures at sea.

NB notes: The Miramichi watershed is one of the world's most important Atlantic salmon rivers. Inner Bay of Fundy population: Endangered (SARA). Suspected host for Dwarf Wedgemussel. The smolt wheel (rotary screw trap) is the primary NB monitoring tool.



Atlantic Salmon Federation



https://www.bringbackthesalmon.ca

Brook Trout

Salvelinus fontinalis

Size: 10–50 cm; typically 10–20 cm in streams

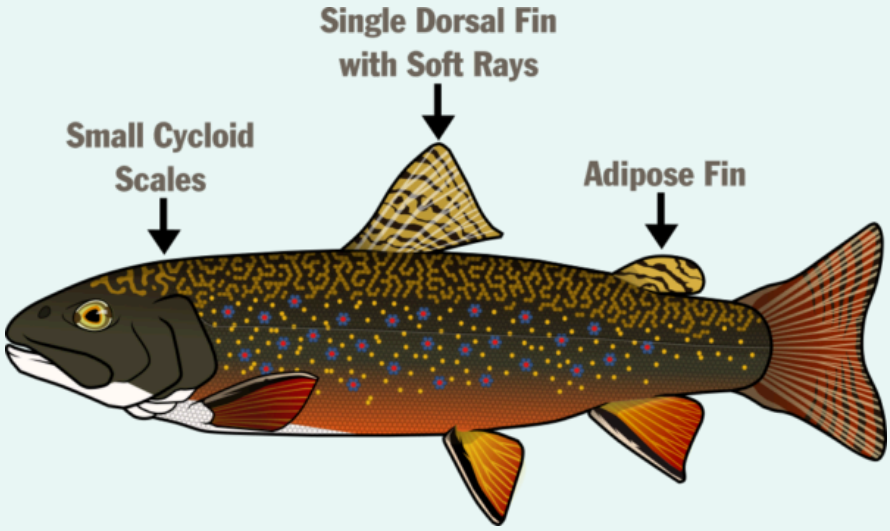
Appearance: Caudal fin square or nearly so. Back with dark wavy lines (vermiculations). Sides with pink/red spots many with blue borders. Lower fins with pure white leading edges followed by black. Young: 8–10 parr marks.

Food: Carnivorous — insects (aquatic and terrestrial), crustaceans, worms, small fish; even their own eggs.

Habitat: Native to NE North America. Requires cold, well-oxygenated headwater streams and lakes. Widely distributed in NB Maritimes and NE United States.

NB notes: NB's benchmark cold-water species. Declining in many NB watersheds due to warming temperatures from riparian clearing and climate change. Absence from a suitable stream is a strong indicator of water quality impairment.

https://www.thefisherman.com/article/freshwater-native-brook-trout/



https://dwr.virginia.gov/wildlife/fishes/

Atlantic Sturgeon

Acipenser oxyrinchus • **THREATENED (COSEWIC 2011)**

Size: Typically 1.8–2.4 m; to 5.5 m; to 365 kg

Appearance: Five rows of bony plates (scutes) along body. Long pointed snout. Mouth small (< 50% of head width). Blue-black on back, white belly. Unmistakable prehistoric appearance.

Food: Bottom feeder — invertebrates (worms, molluscs, crustaceans) and small fish from the bottom.

Habitat: Coastal, large rivers and estuaries. Anadromous — enters rivers to spawn in spring.

NB notes: Present in the Wolastoq (Saint John River) estuary and Bay of Fundy. Can live 60+ years. One of the largest fish in NB waters.

www.cbc.ca

https://dwr.virginia.gov/wildlife/fishes/

Shortnose Sturgeon —

Acipenser brevirostrum ● **SPECIAL CONCERN (SARA 2009; COSEWIC 2015)**

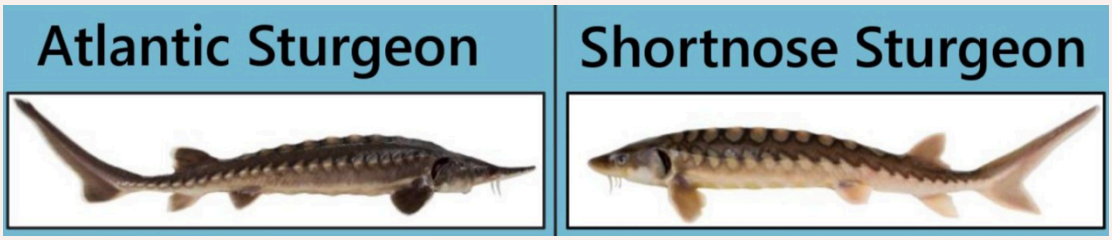
Size: Typically 46–61 cm; to 143 cm; to 27 kg

Appearance: Short, blunt snout (unlike the long-snouted Atlantic Sturgeon). Mouth large (> 60% of head width). Dark brown to black dorsal surface, white belly. Two bony plates behind dorsal fin.

Food: Bottom feeder — crustaceans, molluscs, worms, aquatic insects.

Habitat: Large rivers and estuaries. In Canada found only in the Wolastoq (Saint John River), NB.

NB notes: Canada's only population is in the Wolastoq (Saint John River). Listed under SARA. Habitat loss from dams and water quality degradation are primary threats.



https://mikmawconservation.ca/

Lake Utopia Rainbow Smelt: Large-Bodied Population

Osmerus mordax • **ENDANGERED (COSEWIC 2018); THREATENED (SARA 2019)**

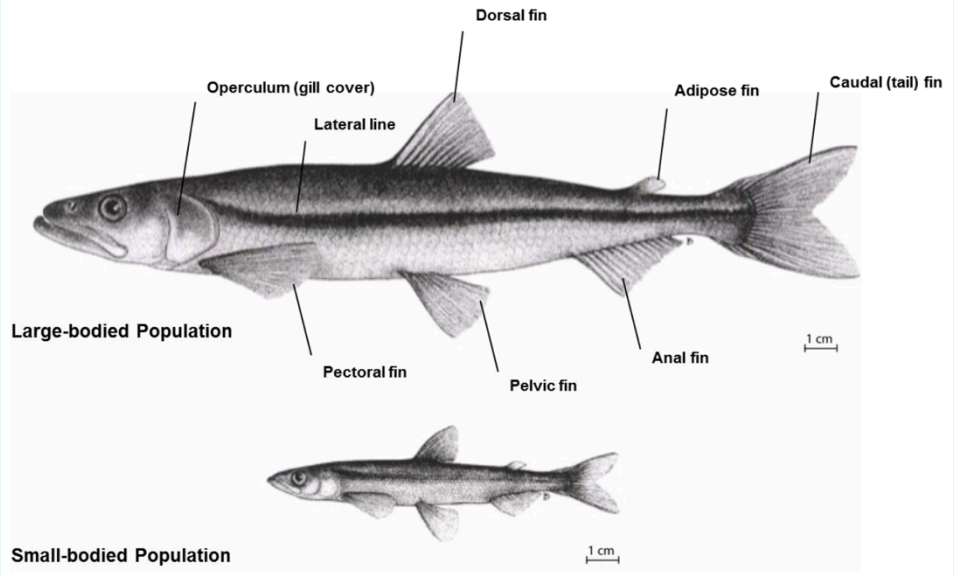
Size: 13–29 cm

Appearance: Slender, laterally compressed body. Protruding lower jaw. Deeply forked tail. Back pale green to dark blue; sides silver with iridescence.

Food: Zooplankton, aquatic worms, small fish.

Habitat: Unique to Lake Utopia, Charlotte County, NB. Cool-water, low-nutrient lake. Spawns in inlet tributaries.

NB notes: Restricted to a single NB lake. This unique large-bodied population is found nowhere else on Earth.



Fisheries and Oceans Canada

American Eel

Anguilla rostrata • **THREATENED (COSEWIC 2012)**

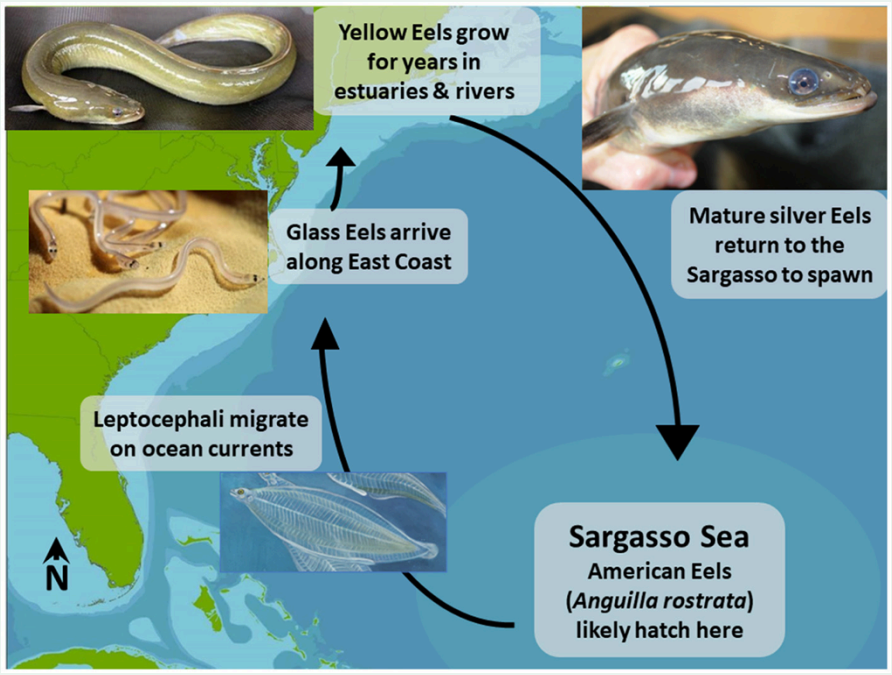
Size: Males to 50 cm; females to 1.5 m

Appearance: Snakelike body. Jaw present (unlike sea lamprey). Continuous dorsal, caudal, and anal fins. Colour variable: olive brown to gray above, pale yellow to white below. No pelvic fins.

Food: Carnivore — wide variety of fish, insect larvae, crayfish, worms.

Habitat: All freshwaters and estuaries accessible from the Atlantic Ocean. Catadromous — matures in freshwater, spawns in the Sargasso Sea.

NB notes: Once incredibly abundant throughout NB river systems. Severely declined due to dam blockages preventing migration. Fort Folly Habitat Recovery conducts eel passage work on the Petitcodiac. Essential to distinguish from sea lamprey — eel has a jaw; lamprey does not.



https://www.frontiersin.org/journals/human-dynamics/articles/10.3389/fhumd.2023.1270644

Striped Bass

Morone saxatilis ● **Bay of Fundy: ENDANGERED (COSEWIC); S. Gulf of St. Lawrence: SPECIAL CONCERN**

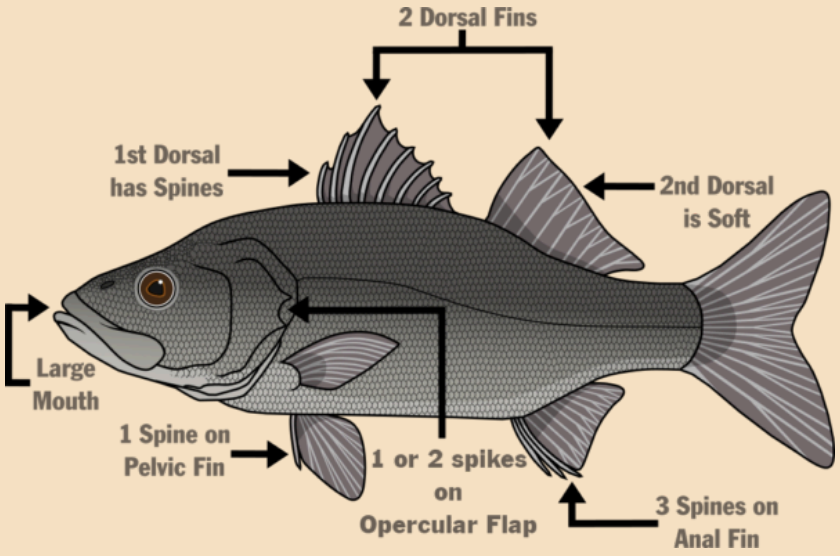
Size: To 183 cm; commonly 0.5–18 kg

Appearance: Elongate, laterally compressed. 6–9 horizontal dark stripes on each side. Two separate dorsal fins (first spiny). Forked tail. Protruding lower jaw. Opercular flaps each with 2 spines.

Food: Piscivore and invertivore — fish, crustaceans, squid.

Habitat: Variable — freshwater, estuarine, and coastal marine. Anadromous. Present in Saint John, Petitcodiac, and Miramichi rivers in NB.

NB notes: Bay of Fundy population is Endangered (COSEWIC 2012). Southern Gulf of St. Lawrence population is Special Concern. Recovering in some NB rivers after historical overfishing.



https://dwr.virginia.gov/wildlife/fishes/

American Shad —

Alosa sapidissima • **Suspected host for Dwarf Wedgemussel (Extirpated, SARA)**

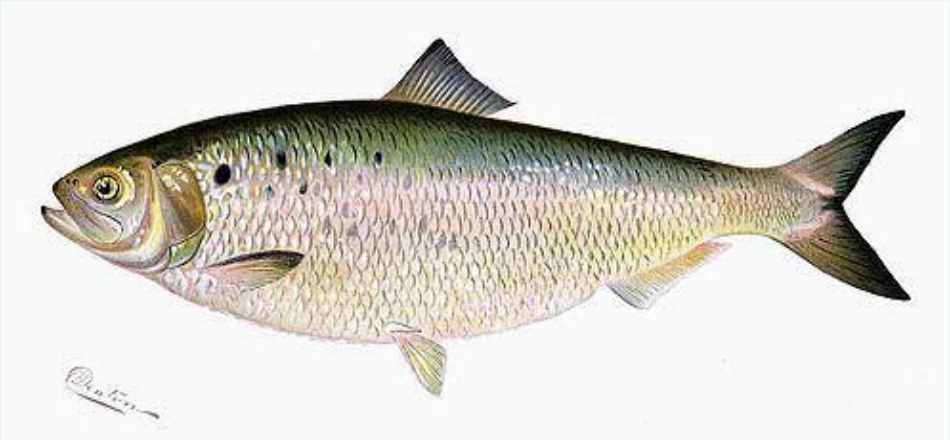
Size: Average 38 cm; to 76 cm; to 6.8 kg

Appearance: Elongate, laterally compressed. Triangular head. Mouth extends past eye. Silvery with blue to blue-green metallic back. Row of dark spots behind head.

Food: Filter feeder — plankton, small crustaceans.

Habitat: Anadromous. Marine; ascends rivers and streams to spawn in spring.

NB notes: Historically present in huge numbers in the Wolastoq (Saint John River). Severely reduced by dams barring passage. Suspected host for Dwarf Wedgemussel in the Petitcodiac — their loss is directly linked to the mussel's extirpation.



https://commons.wikimedia.org/w/index.php?curid=13348442

White Perch

Morone americana • **Suspected host for Yellow Lampmussel (Special Concern)**

Size: 15–25 cm typically; to 58 cm

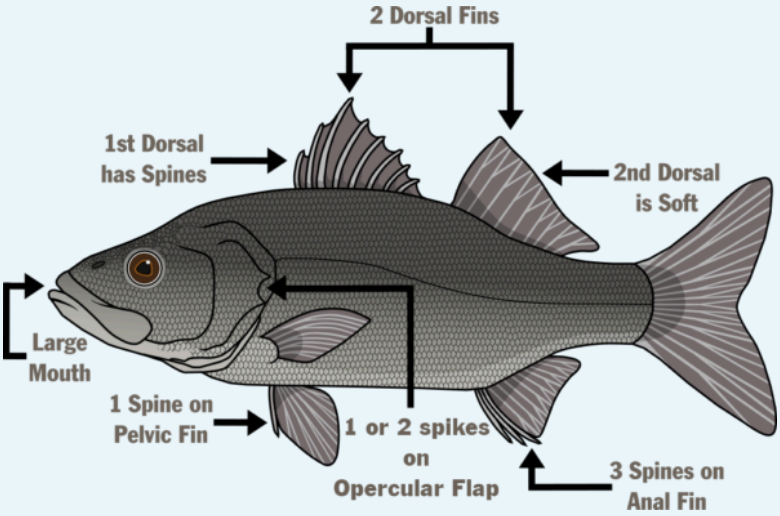
Appearance: Deep, laterally compressed body. Head concave profile. Olive to dark green back; silvery sides; silver-white belly. No lateral stripes. Two dorsal fins joined at base. Opercular fins with single spine.

Food: Carnivore — crabs, shrimp, small fish, crustaceans.

Habitat: Brackish and freshwater. Medium and large rivers and lakes; often on mud bottoms. Throughout the Maritimes.

NB notes: Common throughout NB. Suspected host for Yellow Lampmussel (*Lampsilis cariosa*; Special Concern). Tolerates a wider range of conditions than cold-water species.

iNaturalist



https://dwr.virginia.gov/wildlife/fishes/

Yellow Perch

Perca flavescens • **Suspected host for Brook Floater (Special Concern)**

Size: 10–25 cm typically; to 53 cm

Appearance: Laterally compressed. 6–9 green to brown tapering vertical bars extending down yellow sides. Pectoral fins amber to orange. Large mouth extends to middle of eye. First dorsal fin with 13–15 spines.

Food: Omnivore — decapods, fish eggs, small fish, invertebrates.

Habitat: Large and small rivers, creeks, ponds, and lakes. Widespread from NB to Alberta.

NB notes: Common throughout NB. Suspected host for Brook Floater mussel (*Alasmidonta varicosa*; Special Concern). School-forming; important forage fish for predators.

Fisheries and Oceans Canada

Chain Pickerel

Esox niger • **INVASIVE in NB (introduced 19th century)**

Size: 30.5–99.1 cm; to 5.6 kg; average 1.3 kg

Appearance: Long, narrow body. Long head with flat snout. Dorsal fin set far back. Caudal fin deeply forked. Cheeks and opercular flaps fully scaled. Bright green to olive-green or brown back. Distinctive dark chain-like pattern on sides. Dark vertical line below eye.

Food: Primarily piscivore — also takes amphibians, snakes, small birds, rodents.

Habitat: Shallow, vegetated rivers, lakes, and streams. Western and central NB; widespread in NS.

NB notes: Introduced to NB from the US in the 19th century. Now widespread. Canadian Conservation Significance: Invasive. Competes with and preys on native fish species.

NS Invasive Species Council

White Sucker

Catostomus commersonii

Size: To 61 cm; typically smaller

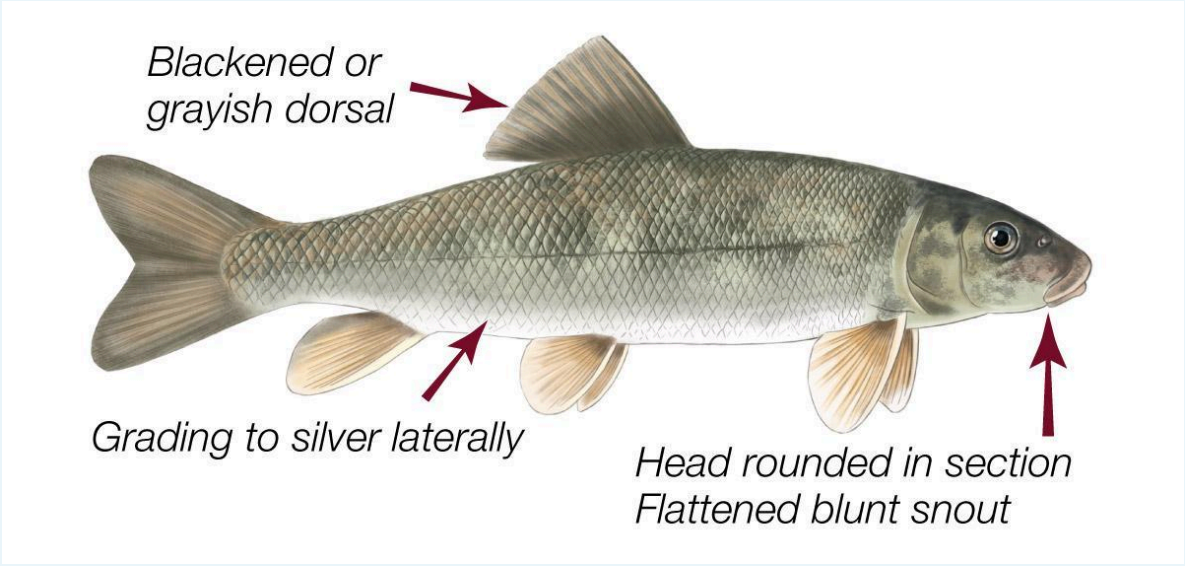
Appearance: Back dusky olive, sides greenish-yellow. Lower lip much wider than its height. Oblique rows of scales. Fewer than 90 scales in lateral line. No spiny rays.

Food: Bottom feeder — insect larvae, molluscs, invertebrates, algae.

Habitat: Cool, clear streams and lakes throughout Canada and the US. Common throughout NB.

NB notes: Very common in NB streams. Tolerant of moderate degradation. A useful reference species — its presence doesn't indicate pristine conditions. Often the first fish caught in seine surveys.

USGS.gov



Parks Canada

Sea Lamprey
Petromyzon marinus

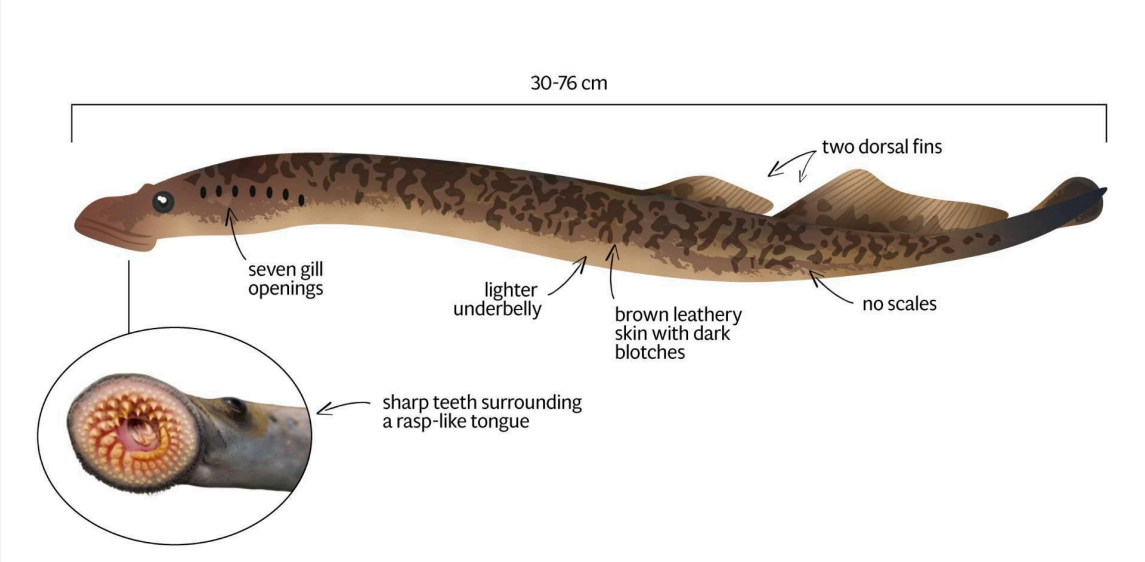
Size: 50–100 cm

Appearance: Scaleless, eel-like body. Olive to brown with dark patches. NO jaw — replaced by circular oral disc with rings of teeth. No pectoral or pelvic fins. Seven individual gill slits on each side. Two dorsal fins; the largest is continuous with the anal fin.

Food: Parasitic on fish as adults (attaches to host with oral disc and feeds on blood and body fluids). Filter feeder as larval ammocoetes.

Habitat: Anadromous. Marine phase as parasite on fish; spawns in freshwater streams where larvae live buried in sediment for 3–7 years as filter feeders.

NB notes: The only jawless fish in NB. Critical ID distinction from American eel: lamprey has no jaw, circular sucker mouth, and 7 individual gill slits. Larvae (ammocoetes) live in stream sediment and are pollution-sensitive bioindicators.



Invasive Species Centre

SMALLER NATIVE SPECIES — MINNOWS, DACE, AND KILLIFISH

NB has a rich community of smaller fish that are important components of stream food webs and bioindicator communities. These species are often encountered in seine surveys and are reliable indicators of specific habitat types.

Species	Size	Key ID features	Habitat & NB notes
Blacknose Dace *Rhinichthys atratulus* 	To 9.5 cm	Stout body; black stripe through eye onto snout; pointed barbel at angle of mouth. Breeding males: rust-red stripe below black stripe.	Cool, clear headwater streams. Suspected host for Brook Floater mussel. Distributed throughout NB Bay of Fundy and Northumberland Strait watersheds.

Golden Shiner *Notemigonus crysoleucas* 	To 30 cm	Laterally compressed; downward-curved lateral line; large scales; keel between pelvic and anal fins. Golden to olive-silver.	Clear, shallow, weedy waters; a lake species. Suspected host for Brook Floater mussel. Widespread in the Maritimes.
Ninespine Stickleback *Pungitius pungitius* 	To 90 mm	8–11 short alternating spines in front of dorsal fin. Slender body, narrow caudal peduncle.	Shallow vegetated ponds, lakes, slow streams; also shallow marine. Suspected host for Brook Floater mussel. Circumpolar distribution.
Creek Chub *Semotilus atromaculatus* 	To 30 cm	Olive back; silvery sides with greenish-purple sheen. Dark spot at front of dorsal fin (*very good ID feature).	Small clear to turbid streams and lakes in eastern North America. Common in NB headwater streams.
Fallfish *Semotilus corporalis* 	To 51 cm	Olive brown back, silvery sides. Largest member of the minnow family in eastern Canada.	Clear streams and lakes in NB, S. Quebec, Ontario, and Atlantic coast. Common in larger NB rivers.
Pumpkinseed *Lepomis gibbosus* 	To 25 cm	Highly colourful: dark greenish-gold back, mottled orange and blue-green sides, yellow-orange belly. Opercular flap with red spot.	Cool, quiet, slow, shallow streams, ponds, marshes, and lakes. From NB to Manitoba. Common in NB ponds and slow rivers.
Brown Bullhead *Ameiurus nebulosus*	To 48 cm	Dark olive back, whitish belly. Barbels (whiskers) around mouth — a catfish. Adipose fin	Clear water throughout NB. Tolerant of moderate degradation. Common in lakes and slow rivers.

		present. No spiny dorsal rays.	
Banded Killifish *Fundulus diaphanous* 	To 12.5 cm	Olive brown above; 12–20 greenish-brown vertical bars on silvery sides; throat and fins yellowish.	Quiet rivers, creeks, ponds, and lakes. Southern Newfoundland southwest to Great Lakes. Found in NB ponds and slow streams.

SUSPECTED MUSSEL HOSTS — KNOW THESE FISH

Three small NB fish are confirmed or suspected hosts for the Brook Floater mussel (*Alasmidonta varicosa*; Special Concern under SARA): Blacknose Dace, Golden Shiner, Ninespine Stickleback, and Yellow Perch. White Perch is a suspected host for the Yellow Lampmussel. This fish-mussel dependency is a key Envirothon topic linking fish ID, freshwater mussel conservation, and species at risk legislation.

5. Invasive fish species in NB

Several fish species that are native elsewhere in North America have been introduced to NB and are causing ecological harm. Knowing which species are invasive and why they matter is part of the aquatic ecology station.

Species	Introduced to NB	Origin	Ecological concern
Chain Pickerel *Esox niger* 	19th century	Eastern US	Aggressive predator of native fish; competes with brook trout; now widespread in NB and spreading in NS.
Smallmouth Bass *Micropterus dolomieu* 	Late 19th century	Eastern central North America	Voracious predator of juvenile salmon, trout, and macroinvertebrates; dramatically reduces EPT and macroinvertebrate communities in lakes it invades.

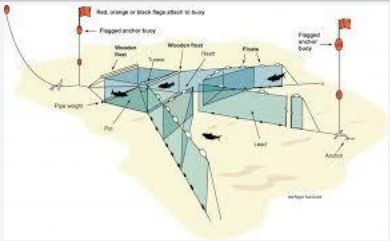
Largemouth Bass *Micropterus salmoides* 	First NB capture 2006	Eastern North America	Apex predator in warm, vegetated lakes; alters zooplankton, invertebrate, and fish communities; expanding in southern NB.
Muskellunge *Esox masquinongy* 	First NB capture 1988	Quebec west to Manitoba	Large predator introduced to Wolastoq (Saint John River); possibly present in some tributaries; not yet confirmed widespread.
Goldfish *Carassius auratus* 	Released by aquarium owners	Asia (introduced globally)	Disturbs sediments, increases turbidity, releases nutrients; highly adaptable to degraded conditions.

SMALLMOUTH BASS AND SALMON — A CRITICAL NB CONFLICT

Smallmouth bass are the most ecologically damaging invasive fish in NB. In lakes where bass have established, studies have shown dramatic declines in macroinvertebrate communities (especially EPT taxa), juvenile salmon and trout, and overall biodiversity. This creates a direct link between an invasive species and the water quality indicators covered in Module 4. NB rivers and lakes containing smallmouth bass should be treated as impaired for cold-water species conservation purposes.

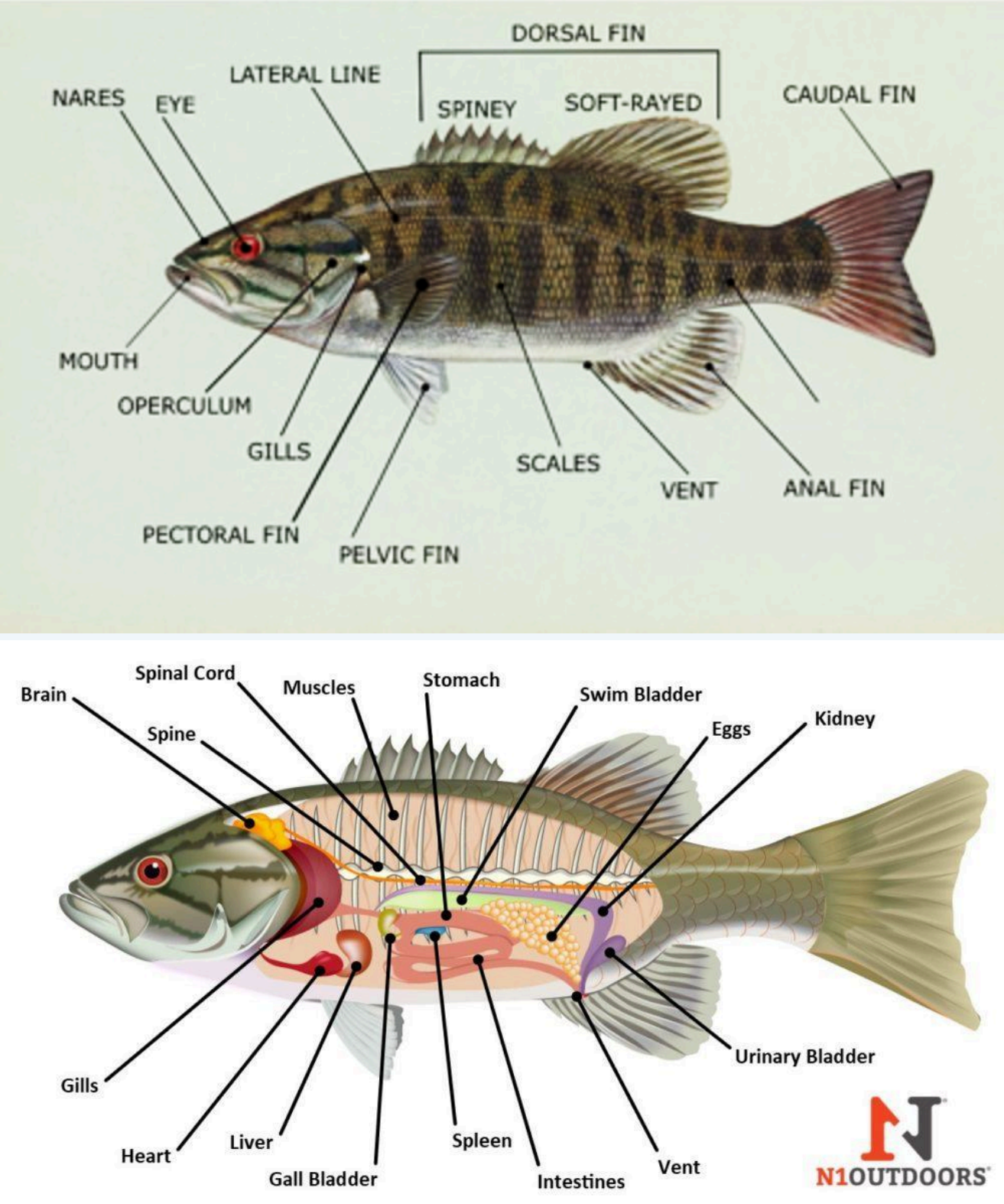
6. Fish monitoring methods

Field monitoring of fish populations requires a scientific licence to handle species at risk.

Method		How it works and when it's used
Electrofishing (backpack)		Direct current passed between cathode and anode stuns nearby fish, which are scooped with dip nets, identified, measured, and released. Most common method for assessing salmonid populations. Requires certification. Preferred for fish abundance and biodiversity surveys.
Seine fishing		A net deployed across a stream or shoreline captures fish which are identified and released. Less effective than electrofishing but preferred when species are vulnerable to additional stress from electrofishing (e.g., parasites).
Smolt wheel (rotary screw trap)		Catches a portion of juvenile Atlantic salmon (smolts) migrating seaward in spring. Fish are tagged, measured, and released.
Trap net monitoring		A net structure spanning the stream captures fish without electricity, then fish are identified and released to resume migration.
eDNA (environmental DNA)		Water samples are tested for genetic material shed by fish, allowing detection of presence/absence without catching the animal.

7. Key anatomical terms for fish identification

The Envirothon station test may require you to use or interpret anatomical descriptions. These are the terms most commonly used in the NB species descriptions and flashcard guides.



Fish anatomy diagram – external and internal.

https://n1outdoors.com/fish-anatomy

Term	Definition
Anadromous	Spawns in freshwater, matures in ocean; e.g. Atlantic salmon
Catadromous	Matures in freshwater, spawns in ocean; e.g. American eel
Parr marks	Dark vertical bars on juvenile salmonids; used to identify young-of-year salmon and trout
Alevin	Salmon or trout hatchling still carrying yolk sac; found in stream gravel
Smolt	Juvenile salmon undergoing physiological transformation to marine life; silvery
Kype	Hook-like development of the lower jaw in male spawning salmon
Adipose fin	Small fleshy fin between dorsal and caudal fin; characteristic of salmonids, smelt, and catfish
Operculum	Hard bony flap covering the gills
Opercular flap	Extension of the operculum; coloured spot helps ID sunfish (e.g. red spot = pumpkinseed)
Lateral line	Sensory canal running along side of fish; detects vibrations and pressure changes
Caudal peduncle	The tail stock — the narrow region between the body and caudal (tail) fin
Barbel	Sensory organ at the mouth (whisker-like); characteristic of catfish, sturgeon, burbot, and tomcod
Scutes	Hard bony plates along the body; characteristic of sturgeon
Forked / emarginate / rounded caudal	Tail fin shape: forked (salmon, trout), emarginate (slightly notched, bass), rounded (eel, bullhead)
Vermiculations	Wavy, worm-like markings on back and dorsal fin; diagnostic for brook trout
Glochidia	Parasitic larval stage of freshwater mussels; carried on gills of specific host fish

8. Key terms

anadromous Life history where fish spawns in freshwater but matures in the ocean. Examples: Atlantic salmon, striped bass, shad, sturgeon.	**catadromous** Matures in freshwater, spawns in ocean. American eel is NB's only example.
cold-water species Fish requiring water temperatures below ~18–20°C for survival; e.g. Atlantic salmon, brook trout. First affected by NPS warming.	**parr marks** Dark vertical bars on juvenile salmonids used for species identification.
alevin Salmonid hatchling still attached to yolk sac; found in spawning gravel.	**smolt** Juvenile salmon undergoing physiological transition from freshwater to marine life.
kype Hook-like projection on lower jaw of spawning male salmon.	**adipose fin** Small fleshy fin between dorsal and caudal fin; present in salmonids, smelt, and catfish.
vermiculations Wavy worm-like markings on brook trout's back and dorsal fin — the key diagnostic feature.	**scutes** Bony plate rows on sturgeon body — distinguish them from all other NB fish.
glochidia Parasitic mussel larvae; carried on specific host fish gills to complete development.	**electrofishing** Fish monitoring using electrical current to temporarily stun fish for identification and measurement. Requires certification.
smolt wheel Rotary screw trap used to monitor migrating juvenile salmon. Used by Fort Folly Habitat Recovery on the Petitcodiac.	**Live Gene Bank (LGB)** Conservation facility holding live individuals of endangered populations. Used for Inner Bay of Fundy Atlantic salmon.
invasive species Non-native species introduced outside its natural range that causes ecological harm. Chain pickerel, smallmouth bass, largemouth bass, muskellunge.	**eDNA** Environmental DNA — genetic material shed by organisms into water; used to detect species presence without physical capture.

9. Quick check

Test yourself on the fish content before competition day.

Quick Check — Review Questions

1. Classify each of these as cold-water, cool-water, or warm-water: Atlantic salmon, chain pickerel, pumpkinseed, brook trout, yellow perch, lake trout, largemouth bass.
2. What is the difference between an anadromous and a catadromous fish? Name one NB example of each.
3. Describe three key ID features that distinguish a brook trout from an Atlantic salmon parr.
4. How do you distinguish an American eel from a sea lamprey? List two differences.
5. Atlantic sturgeon and shortnose sturgeon are both present in NB. What anatomical feature is the fastest way to tell them apart?
6. Name three fish species that are suspected hosts for the Brook Floater mussel. Why is this host-fish relationship important for freshwater mussel conservation?
7. Chain pickerel, smallmouth bass, and largemouth bass are all invasive in NB. Which is considered the most ecologically damaging and why?
8. A survey of a NB stream finds: abundant brook trout, blacknose dace, and creek chub; no chain pickerel or smallmouth bass. What does this species composition suggest about the stream's ecological condition?
9. What is electrofishing and why does it require certification? Name an alternative method used when electrofishing is not appropriate.
10. BONUS: The Dwarf Wedgemussel became extirpated from the Petitcodiac River after 1968. Trace the chain of events connecting the causeway construction to the mussel's disappearance, naming all fish species involved.

10. Further resources

📚 **NBM Freshwater Fishes of Conservation Significance in Maritime Canada: A Flashcard Guide** McAlpine & Karstad, 2024. Free PDF from the New Brunswick Museum. The primary NB fish ID reference for Envirothon. *nbm-mnb.ca/wp-content/uploads/2025/08/NBM-Fish-ID-Flashcards-English-2021-RS.pdf*

🌐 **iNaturalist — Inland Fish of New Brunswick** 52-species guide with photos from the Canadian Rivers Institute (UNB); compiled by Sean Haughian, CC BY-SA. *inaturalist.org/guides/8148*

🌐 **Meduxnekeag River Association — Fish Species** 27 NB fish species profiles with appearance, food, habitat notes. Drawn from DFO and NB DNR survey data 1992–2004. *meduxnekeag.org/copy-of-birds*

🌐 **DFO — Aquatic Species at Risk** Species profiles, critical habitat maps, and recovery documents for all SARA-listed aquatic species including NB fish. *dfo-mpo.gc.ca/species-especes/sara-lep/index-eng.html*

🌐 **Fort Folly Habitat Recovery — Inner Bay of Fundy Salmon** Smolt wheel monitoring, Live Gene Bank, and habitat restoration work for Endangered Atlantic salmon. *fortfollyhabitatrecovery.ca*

🌐 **Petitcodiac Watershed Alliance — Fish Monitoring** Annual fish monitoring reports including electrofishing results, mussel surveys, and habitat restoration. *petitcodiacwatershed.org*

▶ **ACAP Saint John — Electrofishing video** Short video showing backpack electrofishing on a NB stream. Good preparation for the field skills station. *Available on ACAP Saint John YouTube channel*

← **Previous:** Module 4: Benthic Macroinvertebrates
→ **Next:** Module 6: Non-point Source Pollution