

THE SPREAD OF AQUATIC INVASIVE SPECIES



Prince Edward Island AQUACULTURE ALLIANCE

NEVER THROW IT BACK!

Do not take shells, seaweed, bait or driftwood and throw back into the water. They may now carry nuisance species that can harm our waters and industries. Aquatic Invasive Species (AIS) are non-native animal or plant species outside their traditional range that have the ability to survive and establish a lasting population with an undesirable result. AIS show rapid population growth in the absence of natural predators and soon become established to the point where eradication is impossible.

Aquatic disease refers to any disease that can affect fish, shellfish or aquatic plants. They can be caused by viruses, bacteria or parasites. These diseases can be carried by AIS and affect native populations.

Aquatic invasive species and aquatic diseases can be introduced through human activities, attached to boat hulls, in ballast waters or through deliberate introductions such as the incorrect disposal of live bait, aquariums or food waste.

The best approach for protecting our waters from these invaders is to keep them out in the first place, and to do this, everybody's cooperation is essential.

These various invaders pose threats to the ecology and the economy of PEI. While regulators, scientists, and members of the aquaculture and fishing industries are the most concerned, the problem affects everyone enjoying our waters and the delicious seafood they produce.

The species highlighted in this brochure are considered invasive and should not be confused with the various native tunicates and crab species.

Aquatic Invasive Species are not only a marine issue. Many of the guidelines for boaters, divers and other water users mentioned here also apply to fresh water environments. Contact your local watershed group or authority for information on invasive species to watch out for in your area.

Everyone can help prevent the introduction and spread of invasive species

Learn about these species and how to recognize them using the identification guides in this booklet and at www.aquaticintruders.com

- · Never move any aquatic organisms from one area to another
- Never put any shellfish you buy or shells, seaweed and driftwood collected from the beach back into the ocean
- Never release live bait, aquarium fish, shellfish or plants into open water or sewer

Before moving a boat from one area to another inspect it thoroughly and complete the following check list:

- Drain water from your motor, bilge, and wells. If possible let equipment dry completely
- Remove any plants or animals. Dispose of on land as per normal compost
- Wash boat, anchor, trailer and other equipment with fresh water and/or spray with undiluted vinegar (take proper safety precautions)
- Use an environment friendly anti-fouling product to reduce settlement on the hull. Remember to maintain as per manufacturers' instructions



Shellfish harvesting

- · Clean shellfish where they were collected
- Move as little water as possible with the shellfish
- Spread any leftover water on the lawn
- "De-sand" shellfish in the original water or in a bucket with water that will be thrown onto the lawn
- Dispose of waste shells on land as per compostable waste, do not throw back into the water

Diving and other water sports

- Rinse equipment with fresh water after every trip
- Let equipment dry completely, a good way to kill AIS is to leave them out of the water for a day or two

What should I do if I find suspected AIS?

- 1. Check to see if you can identify the animal / plant
- 2. If you can, try and take a picture
- 3. Record the date and location where you saw it
- 4. Record in what environment you found it, for example on a buoy, on the beach, on a rope, on a rock
- 5. If possible, record the GPS coordinates of the location or mark the site (e.g. with a buoy) to identify the area
- 6. Report to one of the numbers or e-mails below

Department of Fisheries and Oceans

1-866-759-6600 invaders.glf@dfo-mpo.gc.ca

PEI Aquaculture Alliance

902-368-2757 aisreport@aquaculturepei.com **Tunicates**, or **sea squirts**, are small marine animals that spend most of their lives attached to an underwater substrate, typically in sheltered areas, such as to rocks, eelgrass, seaweeds, other animals or on man-made structures such as boat hulls, buoys, ropes, anchors, floating docks, aquaculture gear and wharfs. Several invasive species of tunicates threaten our waters.

Solitary Tunicates develop individually but can form dense clumps.

VASE TUNICATE (Ciona intestinalis)

- Soft semi-translucent body up to 15cm
- Light greenish yellow, often with a red area inside
- Grows alone but can form jelly-like mass

Currently present in isolated areas of eastern PEI, the vase tunicate fouling has had a high impact on shellfish aquaculture operations, with increased gear weight causing higher operating costs.





CLUBBED TUNICATE (Styela clava)

- Tough, bumpy and wrinkly body up to 15cm
- Mottled brown beige colour
- Attached on a thin stalk

Currently present in isolated areas of eastern and northern PEI, the club tunicate fouling has had a high impact on shellfish aquaculture operations, with increased gear weight causing higher operating costs.





EUROPEAN SEA SQUIRT (Ascidiella aspersa)

- Egg shaped, semi-translucent body with a firm slightly bumpy surface; up to 5cm
- Grey colour with a pinkish hue
- Solitary but can develop dense clumps

Introduced to the New England area in the 1980s, the Europpean sea squirt can be found most commonly in the Gulf of Maine. First detected on the south shore of Nova Scotia in 2012, this species is not yet detected in PEI waters.



Colonial Tunicates form gelatinous mats that can cover almost anything underwater. Fragments can re-settle and grow when mats are broken up.

GOLDEN STAR TUNICATE (Botryllus schlosseri) and VIOLET TUNICATE (Botrylloides violaceus)

- Grows in a 1-3cm thick mat, limited in size only by its growth area
- Small pieces can re-grow if they settle

Currently present in most bays and estuaries of PEI, these two colonial tunicate species have had a serious impact on shellfish aquaculture operations due to heavy fouling.





Golden Star Tunicate

Typically dark in colour with a lighter star/flower shaped pattern





Violet Tunicate Several different colours from grey/tan to bright orange

LIGHT-BULB TUNICATE (Clavelina lepadiformis)

- A colonial tunicate with loosely attached individuals reaching 20mm in length and 5mm in diameter
- Clear with white, yellow, or pink bands giving the species its light-bulb appearance
- Transparent body makes it easy to observe its internal structures

Native to the eastern Atlantic, the Mediterranean and the Adriatic. During the 1990s, spread to the Azores then later to South Africa. In 2009, found in Connecticut.



PANCAKE BATTER TUNICATE (Didemnum vexillum)

- Can form extensive mats with irregular lobes reaching up to a metre in length or long, ropey beard-like colonies that hang from a hard substrate
- Can be white, cream, yellow or light brown

Because it rapidly fouls and overgrows both structures and

shellfish it has great potential to become a significant aquaculture pest, particularly for the cultivation of mussels.

Is currently found off the eastern US seaboard, especially around George's Banks. Was found in Nova Scotia waters in 2013, in the upper Bay of Fundy area (Minas Basin).



COMPOUND SEA SQUIRT (Diplosoma listerianum)

- Forms thin (less than 2mm thick) flat, soft, jelly-like sheets
- Milky, transparent appearance with scattered grey or brown pigmented cells



Other Types of AIS

OYSTER DRILL (Urosalpinx cinerea)

- · Conical shell up to 2" high with a sharp pointed tip
- Has 7-8 rounded whorls with obvious ridges and ribs





GREEN CRAB (Carcinus maenas)

- Dark green mottled colour
- Distinctive points on the front edge of shell
- Row of yellow dots along the dorsal side



OYSTER THIEF (Codium fragile tomentosoides)

- · Fast growing green sea plant that can reach lengths of 60cm
- Several erect branches from a broad disk at its base
- Branches are as thick as a pencil or finger, float in the water when covered and hang down when the tide is out

Heavy growth can smother oyster beds, weaken shellfish and increase the cost of harvesting. When it attaches to oysters the buoyancy of the plant can cause the oyster to float away. Also displaces native kelp species, a preferred habitat used by many species.





MITTEN CRAB (Eriocheir sinensis)

- Claws equal in size with white tips and "hair"
- · Carapace up to 4 inches wide
- Light brown to olive green in colour
- No swimming legs, eight sharp-tipped walking legs

Native to East Asia, this crab is a potentially harmful invasive species that has caused economic damage in Europe and on the West Coast of the US and is a potential threat to native invertebrates and to the ecological structure of freshwater and brackish estuarine communities.



CALCAREOUS TUBE WORMS (Hydroides dianthus)

- Hard, calcareous whitish/beige coloured tube
- Tubeworm has a crown of feathery branchiae which may protrude out when underwater

Commonly found attached to submerged rocks, shells, and even boats in many coastal areas around the world.

Fouled gear air-dried for five days to kill worms inside tubes. These can be removed mechanically (e.g. 15 min. spin in tumbler), filing off remaining tube base using rasps. Tubeworm is a gregarious settler which means that the larvae are attracted to settle on adults or pieces of the shell. So if a site is fouled it is imperative to remove all of the fouling material or it will attract the next generation of tubeworms.





Photos and content courtesy of:

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