

EUROPEAN GREEN CRAB

An Invasive Species On The West Coast Of Canada

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Indigenous Internship Program with Clear Seas



WHAT IS AN INVASIVE SPECIES?

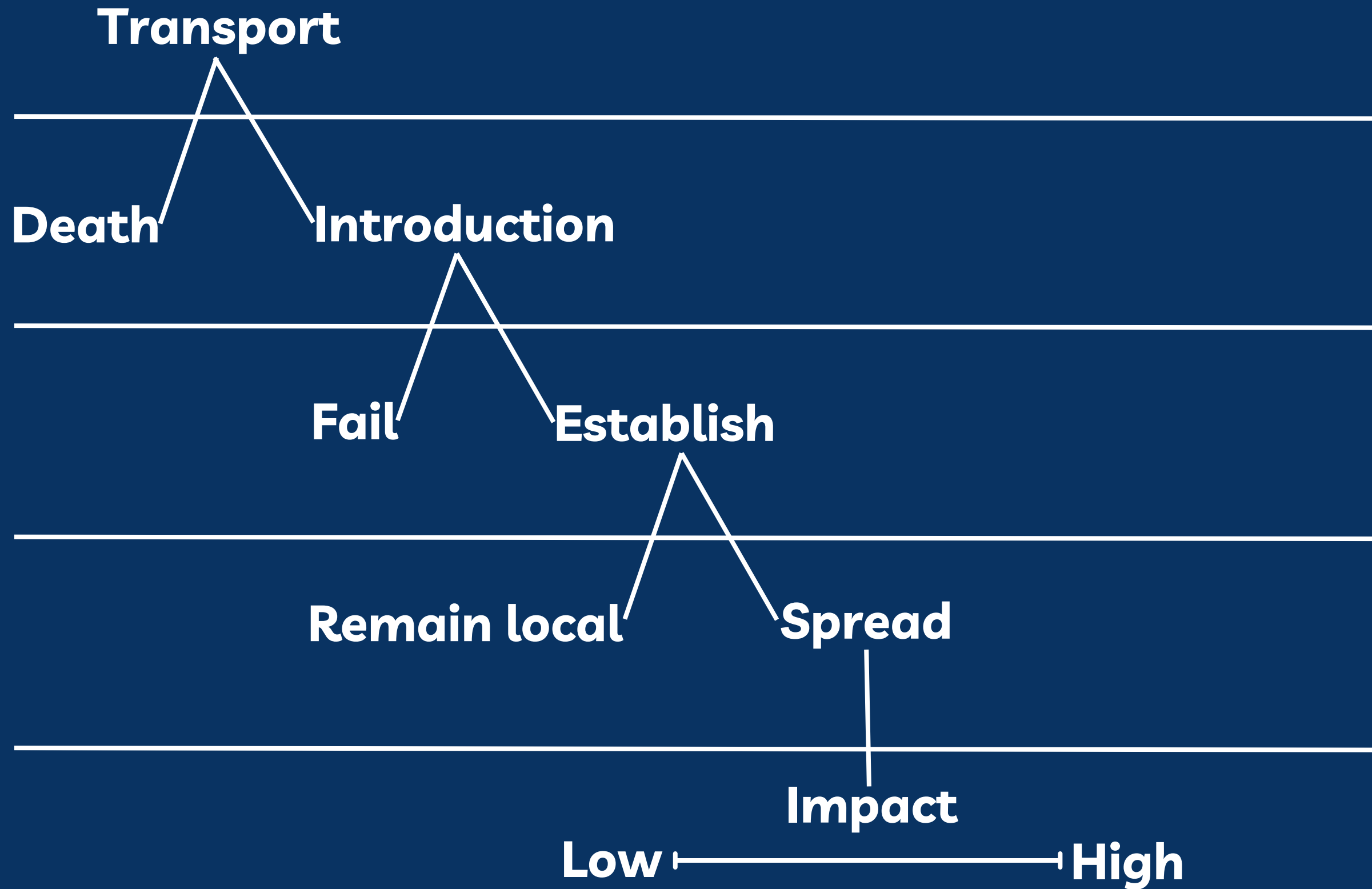
An invasive species is an organism that is not indigenous to a particular area and causes significant environmental and economical harm to the new area.

Not all non-indigenous species cause environmental or economical harm. Not all non-indigenous species are invasive.

To be invasive, the species has to adapt quickly to a new area, reproduce quickly, and harm the economy or the native plants and animals of the area.

INVASION PROCESS:

Chart is sourced from Invasive Species Council of British Columbia

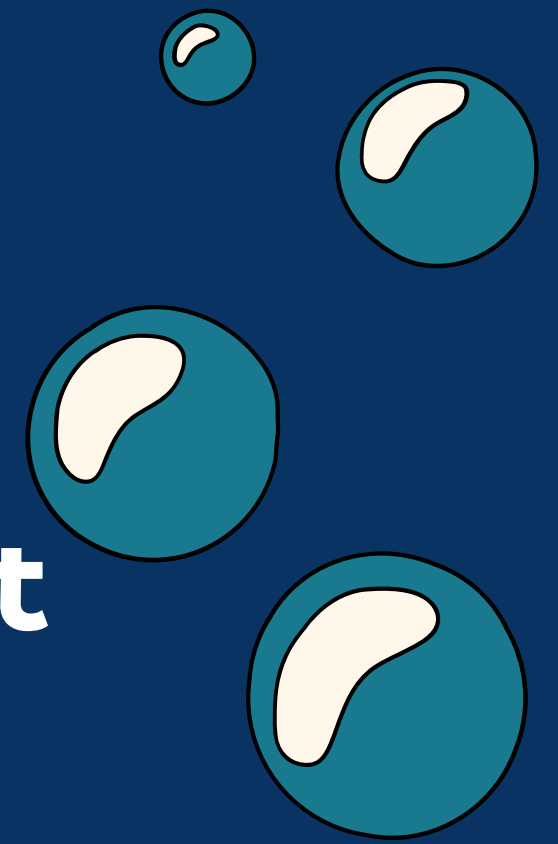


Transport

Establishment

Spread

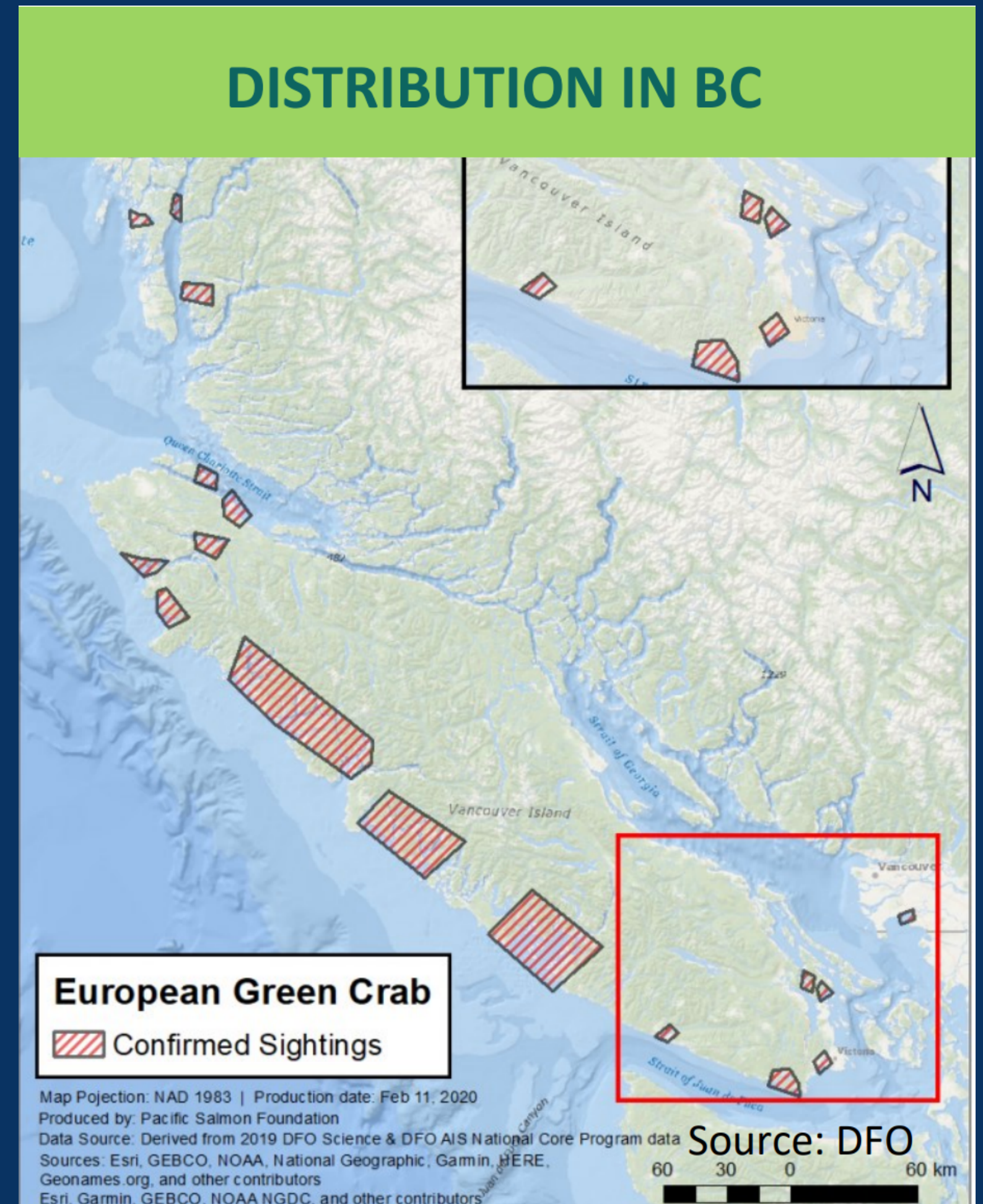
Impacts



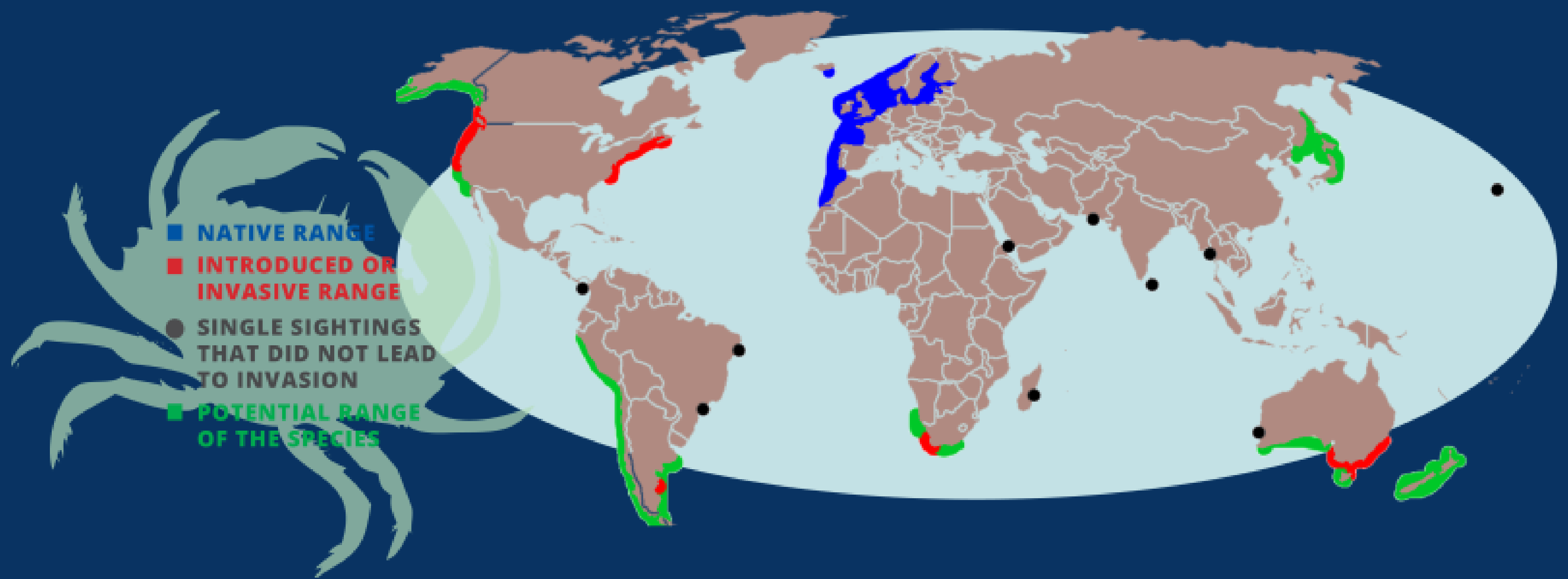
WHAT IS A EUROPEAN GREEN CRAB:

The European Green Crab (*Carcinus maenas*), is a crustacean found in coastal regions, native to Europe and Northern Africa. It was first identified in British Columbia during the late 1990s.

Unfortunately, European Green Crab populations continue to expand rapidly along Canada's West Coast. These crabs, being aggressive predators, pose a threat to local marshes by burrowing into the banks and destroying eelgrass habitats. As there are no natural predators, their populations are left unchecked. They feed similarly to native shore crabs and have been observed outcompeting them, particularly when feeding on bivalves such as clams, oysters, and mussels.

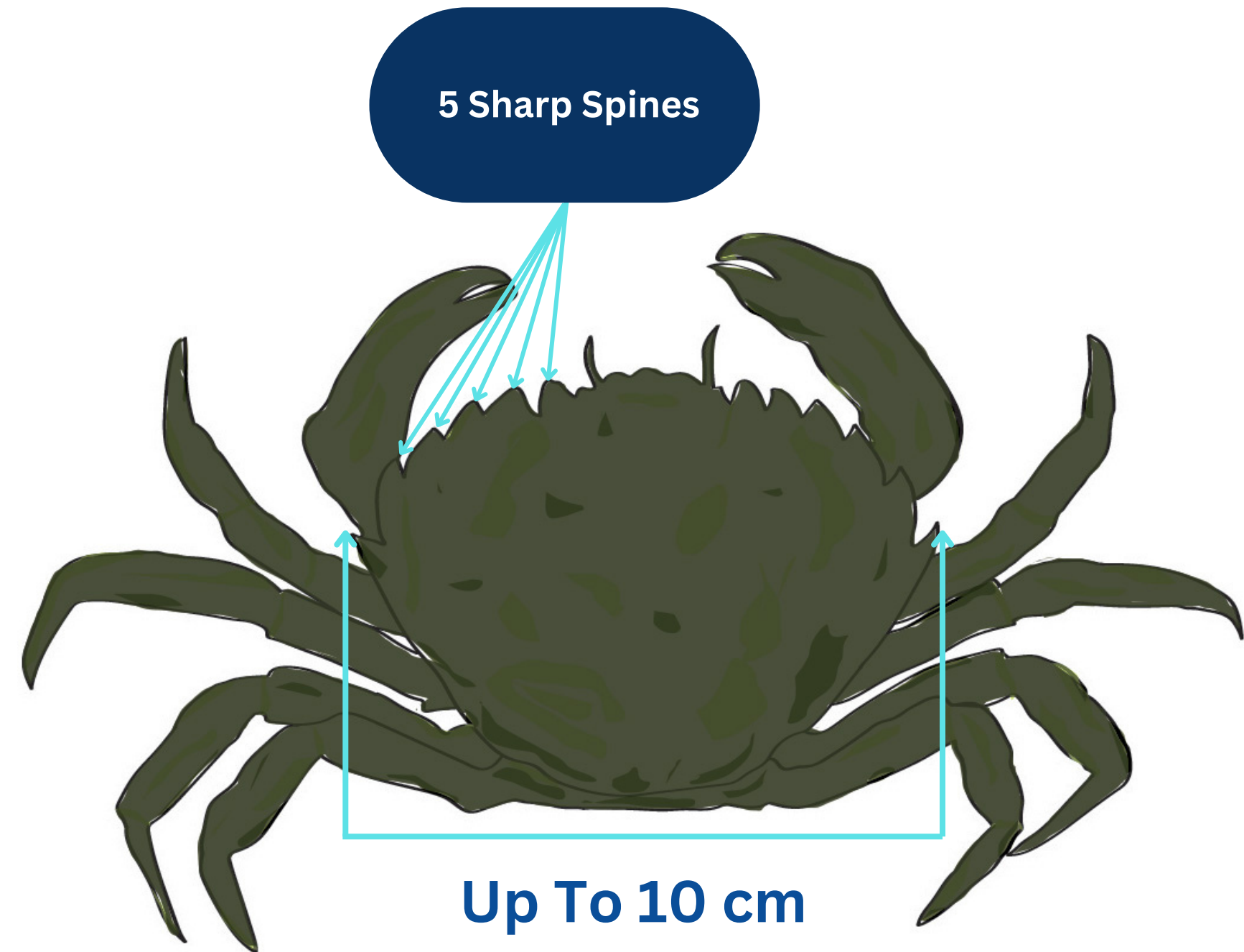


RANGE MAP OF INVASIVE CRAB (CARCINUS MAENAS). SOURCE: NOAA ALASKA REGION FISHERIES



IDENTIFYING FEATURES:

- A shell that is serrated and shaped like a pentagon - It has 5 sharp spines on the side of each eye and 3 rounded lobes beneath the eyes
- Back leg tips are hairy, pointed and slightly flattened
- Different sized front claws
- Size can be up to 10cm
- Colour can vary from green to red to yellow
- Temperament - territorial and aggressive
- Lifespan 4 to 7 years



WHEN DID THEY ARRIVE IN CANADA:

Eastern Canada is home to several populations of the European Green Crab. The initial group arrived in the early 1950s from the eastern North Atlantic seaboard and is not tolerant of cold temperatures. Later in the 1980s and 1990s, another group arrived in northern Nova Scotia, originating from northern Europe, which is more adaptive to colder climates. Subsequently, a third population emerged, speculated to have resulted from the hybridization of the initial two groups, exhibiting cold tolerance and rapidly encroaching on Atlantic Canada. These European Green Crab populations have since been discovered in British Columbian waters on the West Coast of Canada.

In Canada, the European Green Crab were first spotted in:

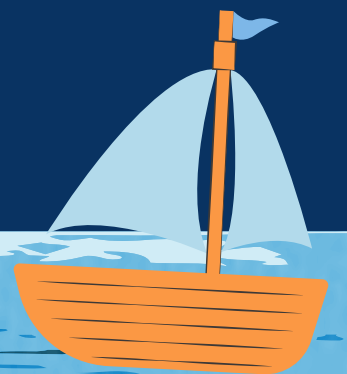
- New Brunswick in 1951
- Nova Scotia in 1953
- The Gulf of St. Lawrence in 1994
- Prince Edward Island in 1997
- British Columbia in 1998
- The Magdalen Islands, Quebec in 2004
- Newfoundland and Labrador in 2007



HOW DID THEY ARRIVE IN CANADA:

European Green Crabs were most likely transported to the West Coast of Canada in ship ballast water. They could also have been transported by hitchhiking on boats, equipment, or packing materials in marine operations. The spread of these crabs occurs mainly during their larval stage through ballast water transfers or ocean currents.

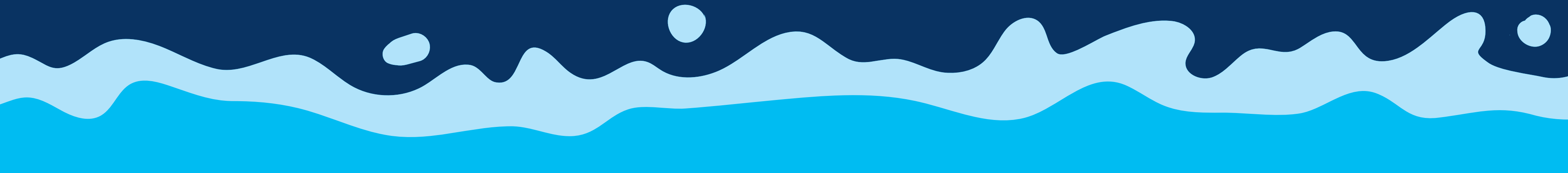
It's worth noting that adult European Green Crabs can survive outside the aquatic environment for several days, while the larvae can thrive in standing water for extended periods. The success of these invasive crabs in infiltrating our local coastal ecosystems can be attributed to their adaptability, durability, competitiveness, and high reproductive rates.



WHAT IS BALLAST WATER?

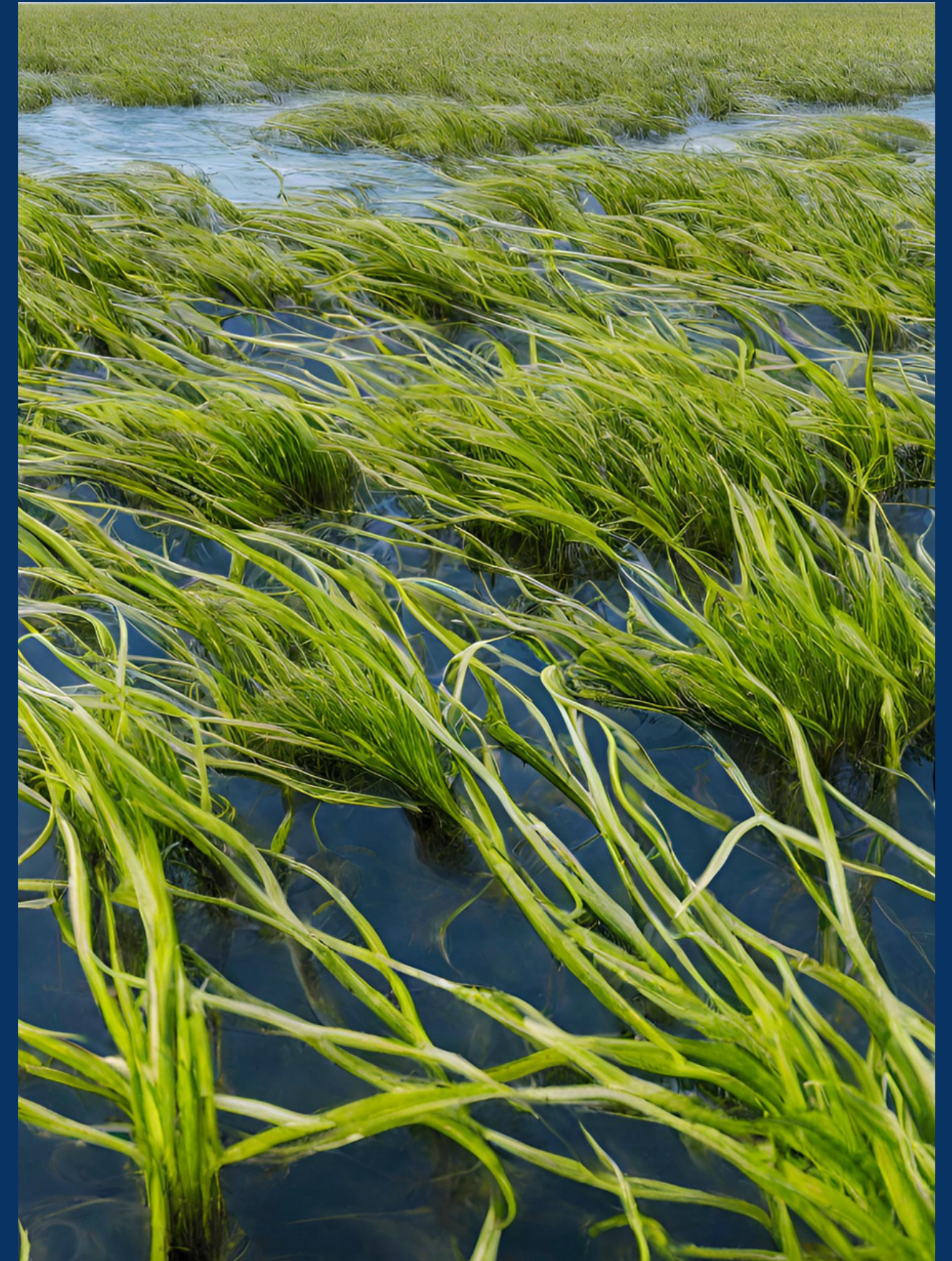
Ballast water plays a critical role in the spread of non-indigenous marine species. This water is stored in a ship's ballast tanks and cargo holds. Its main purpose is to provide stability during a ship's voyage when the ship lacks cargo, is carrying insufficient weight or during rough seas. Adding more ballast water puts the ship deeper in the water, allowing it to pass under bridges. Offloading ballast water will raise the ship higher in the water.

Ships will also make changes to ballast water when taking on or offloading cargo, such that water taken up in one port can be discharged somewhere else in the world, along with any living organisms taken up with the water.



WHAT HABITATS ARE THEY INVADING:

European green crabs are known to invade a variety of habitats in the Pacific Northwest, including salt marshes, shellfish beds, estuaries, mudflats, and eelgrass beds. They can impact native species and disrupt local ecosystems by outcompeting native crab species and consuming juvenile shellfish.



EELGRASS - WHAT IS IT:

Eelgrass is an aquatic plant that forms dense underwater meadows. It plays a crucial role in coastal ecosystems by providing habitat for various marine species. Eelgrass is a type of submerged aquatic vegetation and grows in estuaries and shallow bays. There are two species of eelgrass in the Pacific Northwest: *Zostera marina* (native species) and *Zostera japonica* (exotic species). Eelgrass can grow by both vegetative growth and by seed germination, although, in the Pacific Northwest it is vegetative.



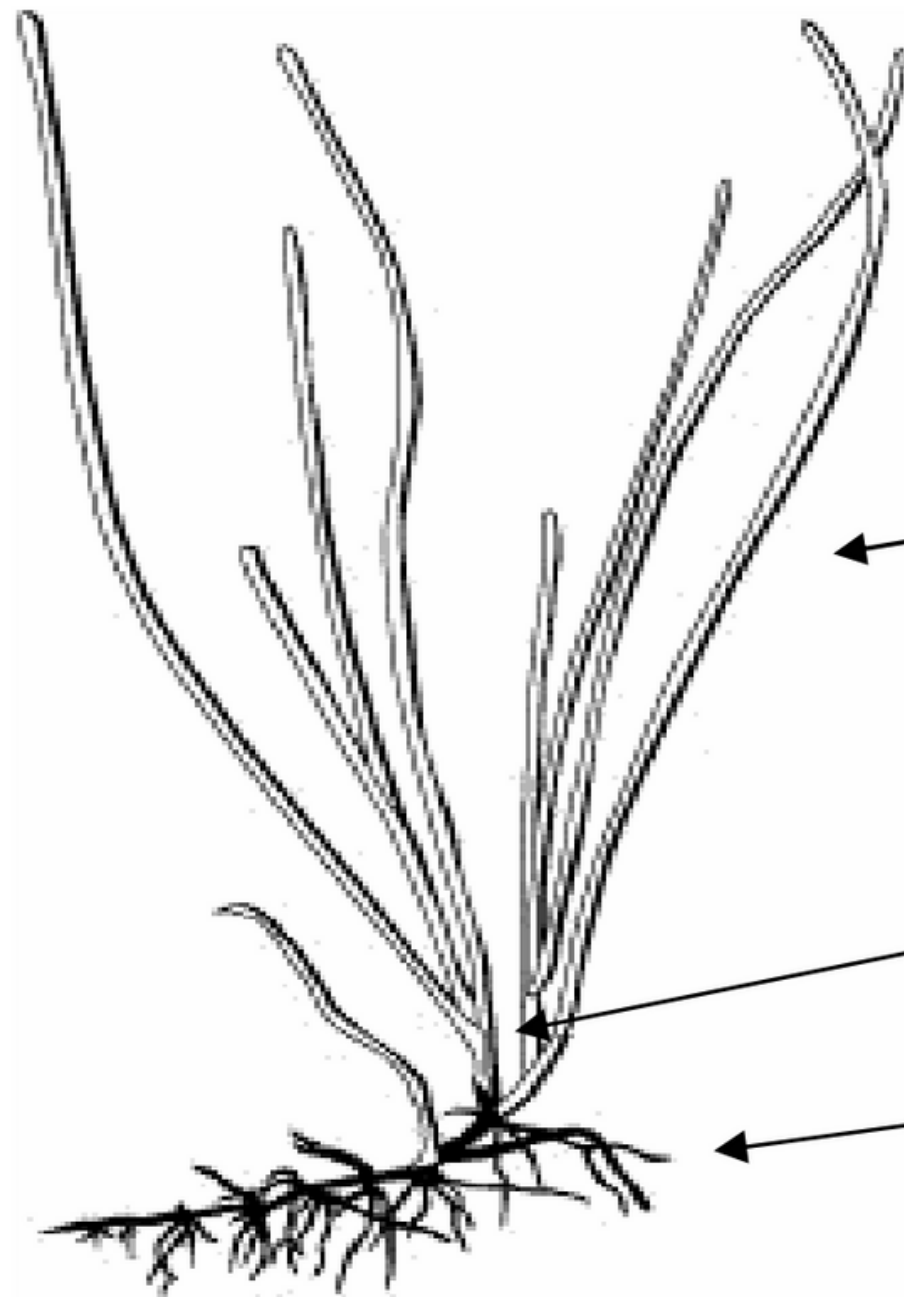


Figure 16-2. Eelgrass
(*Zostera marina*).

"ZOSTERA" comes from the Greek word ZOSTER meaning: A BELT, describing the ribbon-shaped leaves.

Blades/Shoots - The main vegetative components of eelgrass are the rich green shoots that extend upward from the sediment surface.

Sheath - The central stem of the plant from which the blades protrude.

Rhizomes - The fleshy roots of the plant. Rhizomes grow horizontally to the sediment surface and are the main means of plant propagation.

EELGRASS - WHAT ARE ITS BENEFITS FOR OUR LOCAL SPECIES:

Eelgrass provides shelter for juvenile fish, shelter for Pacific Herring to lay their eggs and a food source for migrating birds.

Eelgrass stabilizes the ocean floor, reducing erosion and acts as a filter by cleaning up polluted water and absorbing excess nutrients. It stores greenhouse gases like carbon dioxide.



WHAT IMPACT DO EGC HAVE ON EELGRASS?

European Green Crabs have a detrimental impact on eelgrass ecosystems. European Green Crabs are known to feed on eelgrass and destroy eelgrass beds. Eelgrass provides important habitat for various marine species. The decline of eelgrass can disrupt coastal ecosystems and affect marine species that rely on eelgrass beds for shelter and food. The feeding activities of European Green Crabs contribute to the degradation of eelgrass beds, which are crucial for overall health and biodiversity of coastal areas.

On the West Coast of Canada, eelgrass plays a crucial role in supporting diverse marine ecosystems. Several marine species depend on eelgrass beds in this region, including Pacific Herring, juvenile Salmon and Dungeness Crabs.



WHAT MARINE SPECIES RELY ON EELGRASS BEDS

On the West Coast, eelgrass plays a crucial role in supporting diverse marine ecosystems. Several marine species depend on eelgrass beds. Pacific Herring utilize eelgrass beds for spawning and nursery habitat. Juvenile herring find shelter and food in eelgrass beds, contributing to the overall health of herring populations. Juvenile Salmon use eelgrass beds as nursery grounds. Eelgrass beds offer protection & a food source for juvenile salmon before they migrate to the open ocean. Dungeness crabs use eelgrass beds for shelter. It provides a habitat for them to avoid predators and find food. While not directly reliant on eelgrass, sea otters in the region may indirectly benefit from the health of eelgrass ecosystems. Healthy eelgrass beds support a variety of prey species that contribute to the otters' diet. This shows the interconnectivity of marine ecosystems and that the health of eelgrass habitats influence the abundance and diversity of marine species on the West Coast of Canada.



WHAT DO EGC EAT?

European green crabs in the Pacific Northwest have a varied diet, including small crustaceans, mollusks, worms, and algae. They will eat anything that can fit in their mouths and can consume a wide range of prey, impacting native species and disrupting the balance of the local ecosystem.





REPRODUCTION OF EGC:

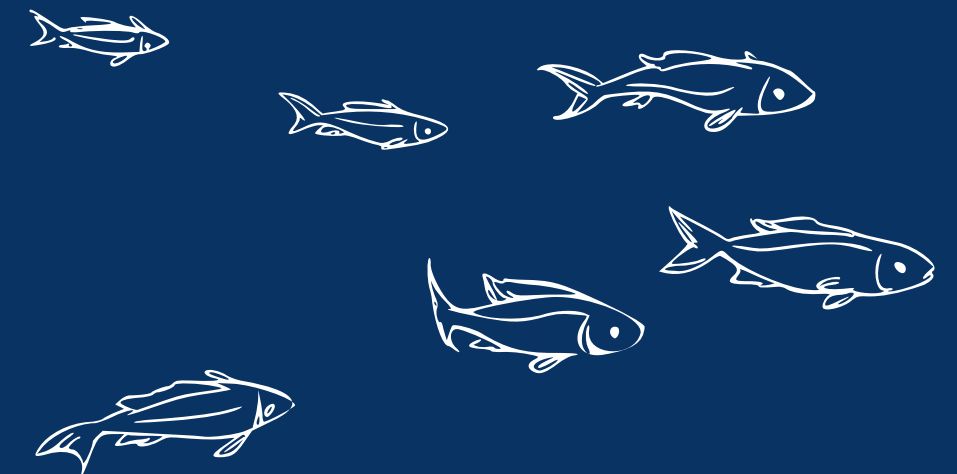
The European green crab life span can range from 4-7 years, with females reproducing up to twice a year and releasing up to 185,000 eggs per cycle. Seasonal timing of their life cycle varies by region, with mating occurring after females molt.

The larvae of European green crabs, known as zoea, are often dispersed by water currents.

This dispersal mechanism aids in their wide distribution and colonization of new areas. Larvae are often transferred through ballast water or drifting in ocean currents until they undergo metamorphosis into juvenile crabs, settling in suitable habitats.

WHAT ARE THE SOCIO-ECONOMIC IMPACTS OF EGC?

The European green crab has had significant socio-economic impacts on the West Coast of Canada. This invasive species competes with native species for resources, impacting local fisheries and ecosystems. Reduced shellfish populations can affect the livelihoods of those dependent on these resources, leading to economic losses for communities relying on commercial and recreational fisheries. Moreover, the ecological changes caused by the green crab's presence can ripple through the marine ecosystem, affecting various species and disrupting the balance of local fisheries. Management efforts are crucial to mitigate these impacts and protect both the environment and the economic well-being of communities.



THE IMPACT OF EUROPEAN GREEN CRABS ON THE TSLEIL-WAUTUTH NATION IN THE PACIFIC NORTHWEST

The presence of the invasive European Green Crab can significantly affect the traditional food sources of the Tseil-Waututh Nation in the Pacific Northwest. This species can impact shellfish resources, cultural practices, and economic stability in the following ways:

Shellfish Resources: The European Green Crab has a reputation for preying on shellfish, including clams and mussels, which are crucial food sources for indigenous communities. A decrease in shellfish resources can impact the availability of culturally significant foods.



THE IMPACT OF EUROPEAN GREEN CRABS ON THE TSLEIL-WAUTUTH NATION IN THE PACIFIC NORTHWEST

Cultural Practices: The abundance of shellfish resources can be altered or disrupted due to the invasive crab, potentially affecting traditional harvesting and gathering practices. This can have a negative impact on cultural ceremonies, practices, and the passing down of traditional knowledge related to harvesting.

Economic Impacts: The decline in traditional food sources can have economic consequences for communities that rely on them for subsistence. This can lead to an increased dependence on alternative food sources, potentially impacting food security.

European Green Crabs are not currently a threat, but there is potential for this species to establish in TWN territory.

To maintain the ecological balance, preserve traditional food sources, and sustain cultural practices, it is crucial to manage and control the spread of European green crabs in the region.



Tsleil-Waututh Nation
PEOPLE OF THE INLET

IF YOU WOULD LIKE TO LEARN MORE ABOUT INVASIVE SPECIES OR EGC HERE ARE SOME RESOURCES:

Clear Seas

<https://clearseas.org/en/invasive-species/>

Fisheries and Oceans Canada (DFO)

<https://www.dfo-mpo.gc.ca/species-especes/profiles-profil/europeangreencrab-crabevert-eng.html>

Coastal Restoration Society

<https://www.coastrestore.com/>

<https://youtu.be/HvmS-QUm8Rg>

The Pacific Salmon Foundation - Marine Science Program

<https://www.marinescience.ca/invasive-species/european-green-crab/>

ABOUT CLEAR SEAS - INDIGENOUS INTERNSHIP PROGRAM

“The Indigenous Internship Program was developed and launched in 2021, as part of Clear Seas’ mandate to conduct inclusive maritime-related research that considers Traditional Knowledge and builds research capacity within Indigenous communities. The program aims to develop partnerships with Indigenous communities across Canada by collaborating on research projects of mutual interest. This initiative is conducted in collaboration with the British Columbia Institute of Technology (BCIT) and Mitacs – a not-for-profit organization that drives innovation through partnerships.”

For more information on the Clear Seas Indigenous Internship Program:

<https://clearseas.org/en/programs/indigenous-internship-program/>

https://www.youtube.com/watch?v=Auj_29YT2uw



<https://coastalfirstnations.ca/keeping-invasive-green-crab-out-of-coastal-waters/>

IF YOU SEE A EUROPEAN GREEN CRAB YOU SHOULD,

REMEMBER TO:

- Take photos
- Note: the exact location (GPS coordinates), observation date & it's identifying features

Contact to report:

British Columbia

Toll-free: 1-888-356-7525

Email: AISPACIFIC@dfo-mpo.gc.ca