

Invasive European green crabs in Washington state



Aquatic Invasive Species Unit
Washington Department of Fish and Wildlife



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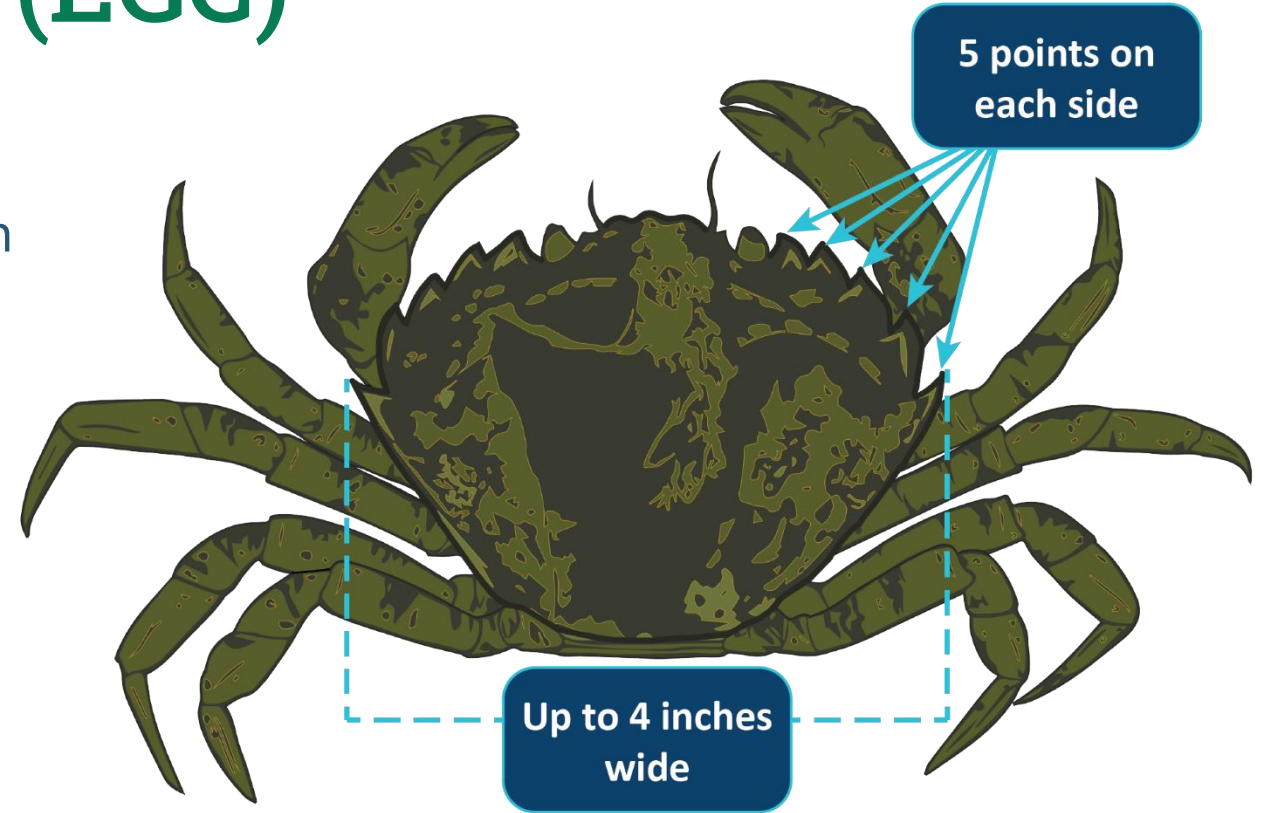




Identification

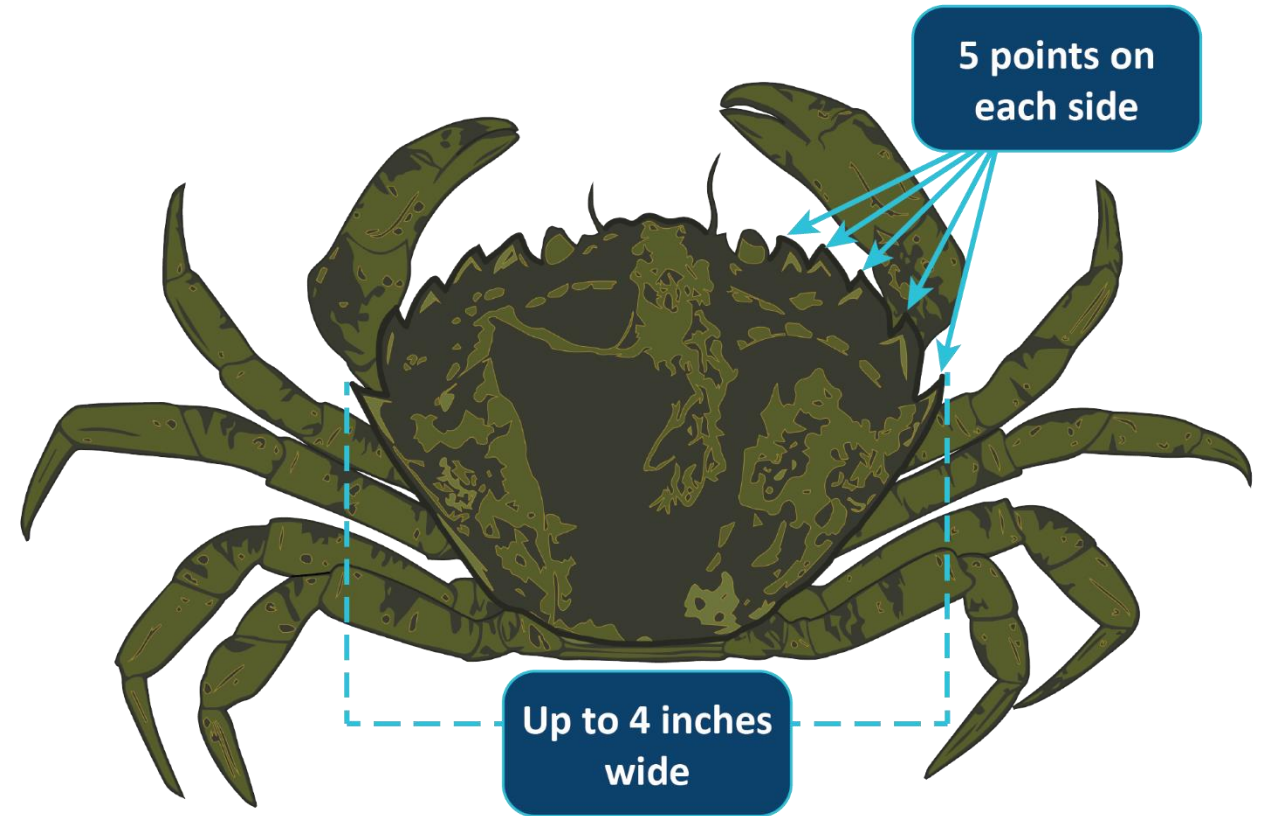
The best way to identify an European Green Crab (EGC)

- EGC have:
 - Five spines ("marginal teeth") on each side of their eyes.
 - Three lobes ("rostral bumps") between the eyes.
- This 5-3-5 pattern is unique to EGC on the Pacific coast!



Other characteristics

- Back pair of legs somewhat flattened.
- Carapace (back/body) is wider than it is long.
- Head is no more than 4 inches across.



Growth

- Grow to no more than 4 inches across
- EGC live up to 6 years
- EGC molt their exoskeletons as they grow



Don't use color to ID EGC

EGC color is variable, from green to yellow to red to orange.



Male vs female EGC

Male



thinner

Female



wider



gravid (eggs)



Habitat – where to find EGC

- Shallow, sheltered waters (<25 ft)
- Includes:
 - Beaches
 - Intertidal zone
 - Estuaries
 - Mudflats





Successful invaders because...

EGC can get to new places easily.

- Their larvae floats on the currents, bringing them to new locations.
- They can also be brought to new locations in the ballast water of ships and in aquaculture.

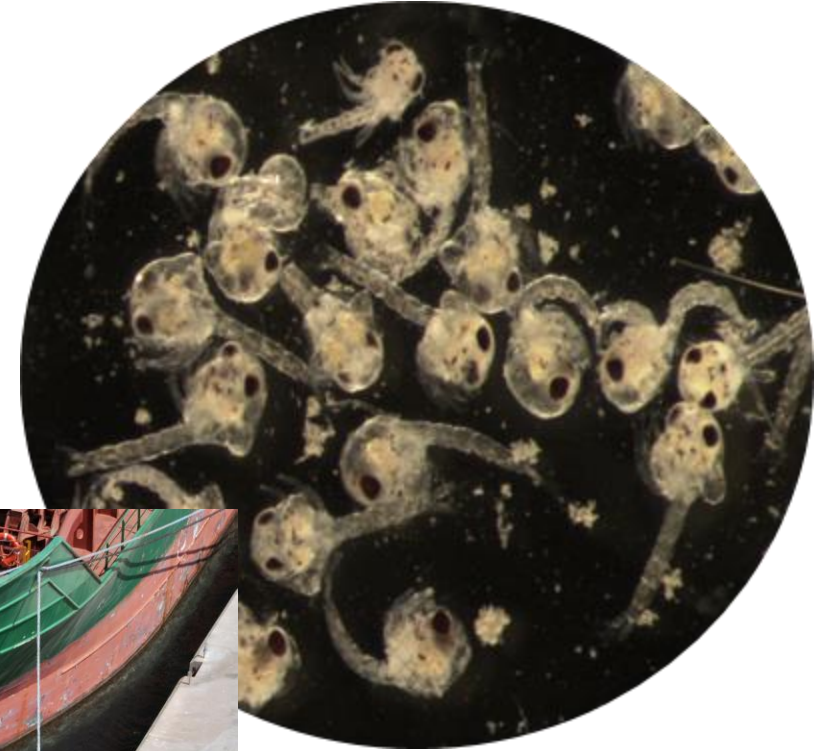


Photo credit: Chris Bentley



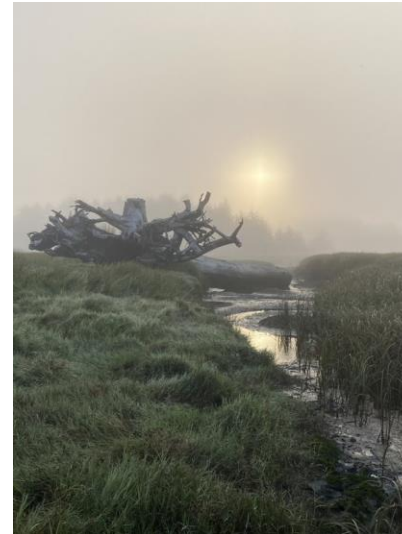
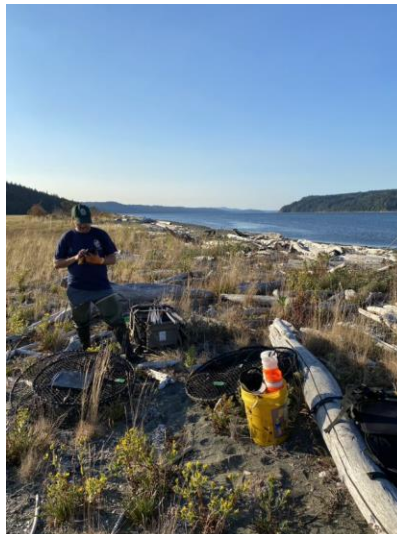
EGC can have thousands of young

- Males find females before she molts by pheromones.
- Sometimes the male carries the female around until she molts (pro-copulatory guarding).
- Females produce ~75,000 eggs in a clutch
- Females produce eggs usually once a year, sometimes twice
- Eggs hatch and emerge as free-floating larva that get carried by the currents.



EGC are TOUGH

- Can tolerate a wide range of **temperatures: 32 – 95 °F**
 - Dungeness can only tolerate 37 – 64 °F
- Can tolerate **very salty and not so salty water: 5 – 35 PPT**
 - Dungeness can only tolerate 31 – 34 PPT



EGC are not picky eaters

EGC eat:

- Oysters
- Cockles
- Snails
- Mussels
- Small crabs
- Scallops
- Polychaete worms
- Clams
- Barnacles
- Small fish
- Dead animals
- Seaweed
- Eelgrass
- Themselves...
- Pretty much anything. . .

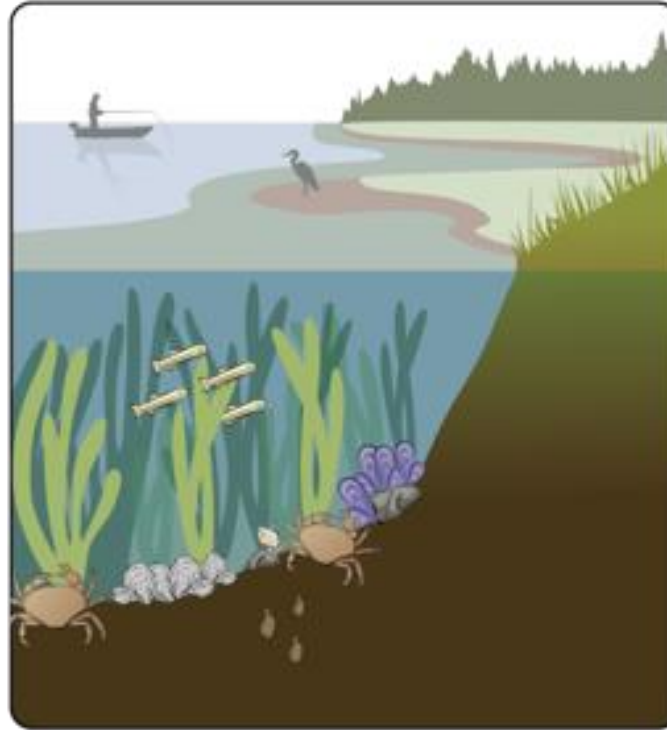




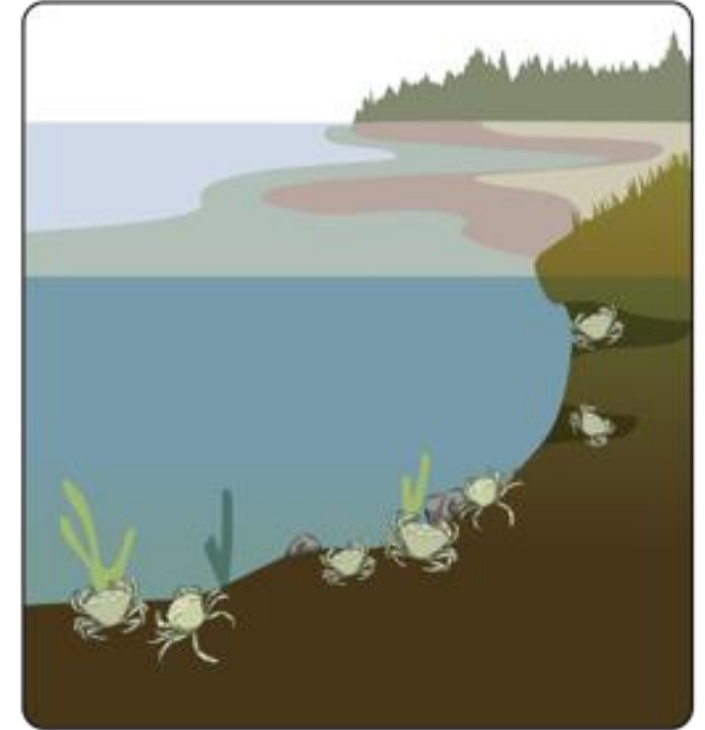
Concerns

Environmental Concerns

- EGC eat **native clams, mussels, and other shellfish** – putting pressure on already stressed species
 - They can even eat 40 small clams a day!
- While digging for their next meal, green crabs can also **destroy habitats** that salmon rely on, such as eelgrass beds.



Healthy Habitat



Possible EGC Impacts



Economic Concerns

- EGC blamed for collapse of Maine's soft-shell clam industry.
- EGC now threaten Washington shellfish farms and aquaculture industries.

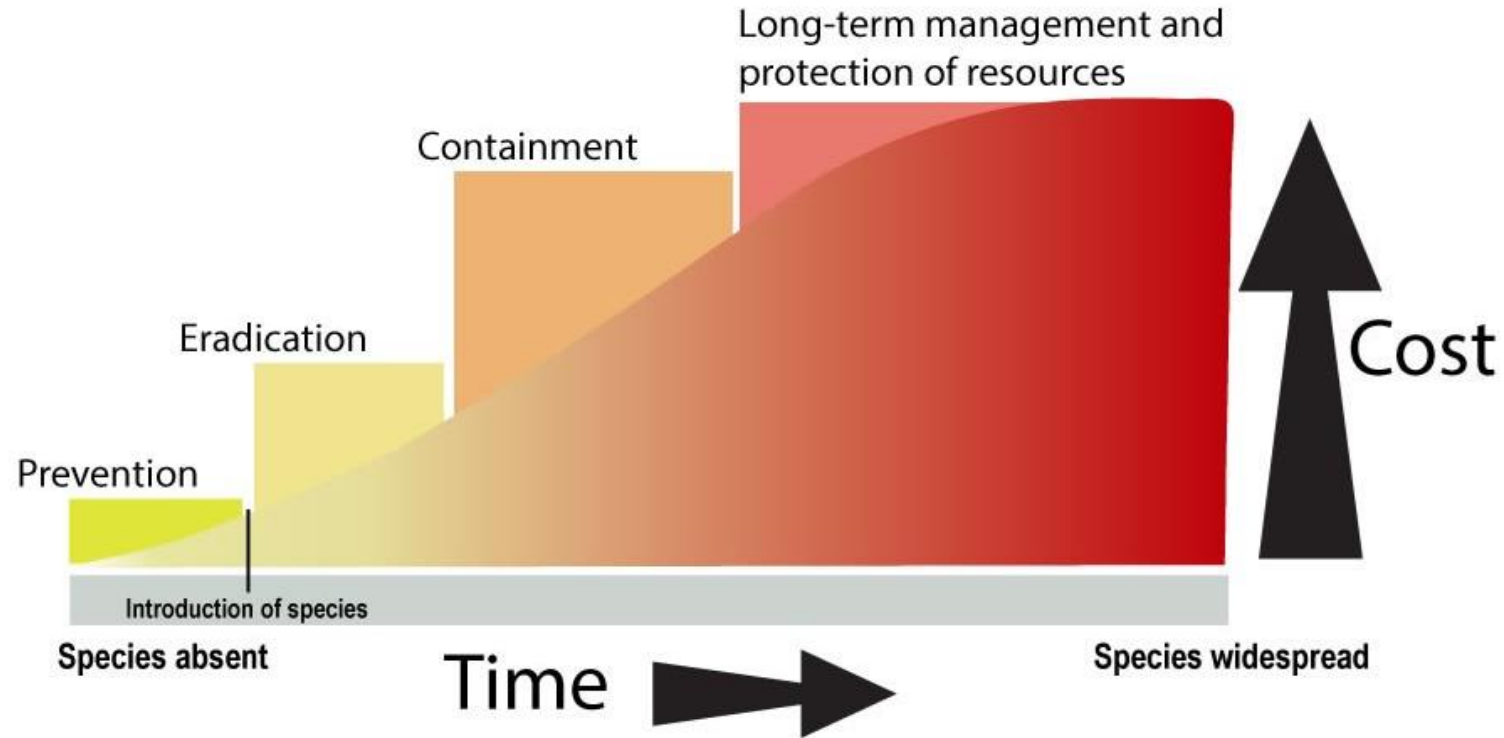


Cultural Concerns

- By destroying native shellfish populations, EGC would take away culturally significant foods.
- By destroying eelgrass beds, EGC threaten the organisms that rely on this habitat, including salmon and herring.
- Native shellfish and fish are important culturally and as a food source to many Washington Tribes.



Cost of Inaction



If an invasive species is not detected and removed early, expensive and long-term management may be unavoidable.





How EGC got to Washington

EGC originally from North Africa and Europe

Green crabs were introduced to the USA East Coast in the 1800s through the ballast water of ships.

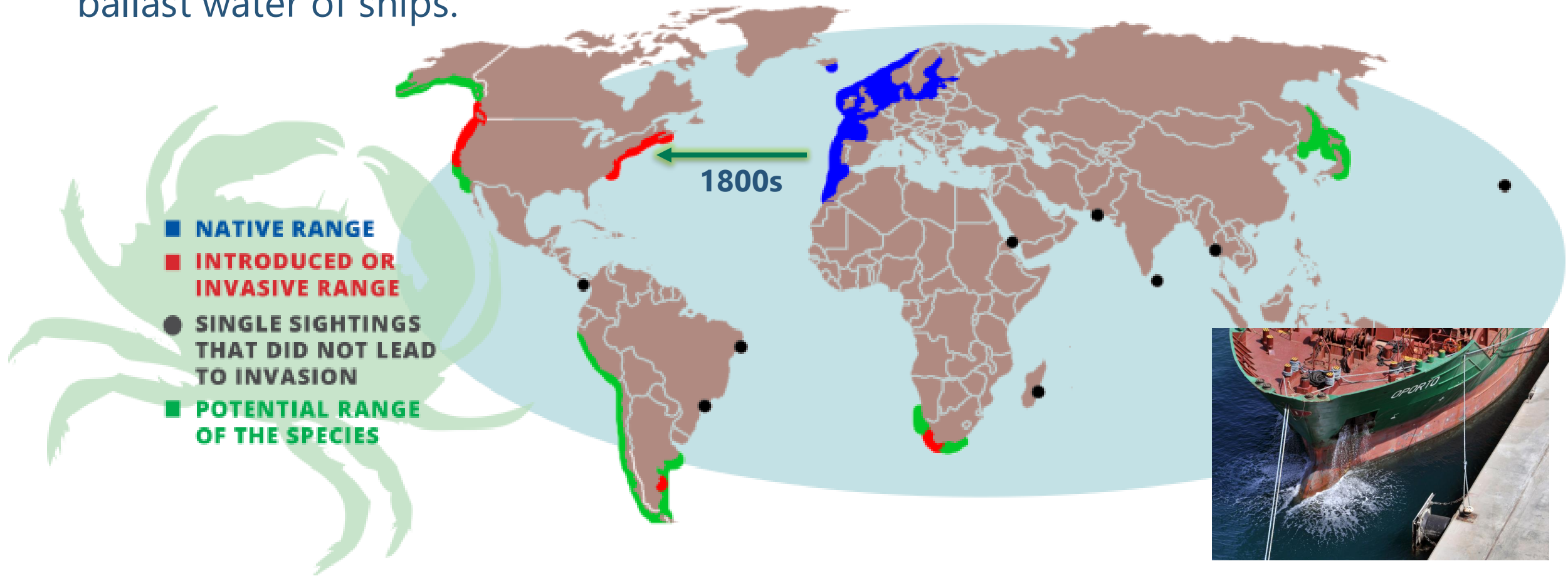
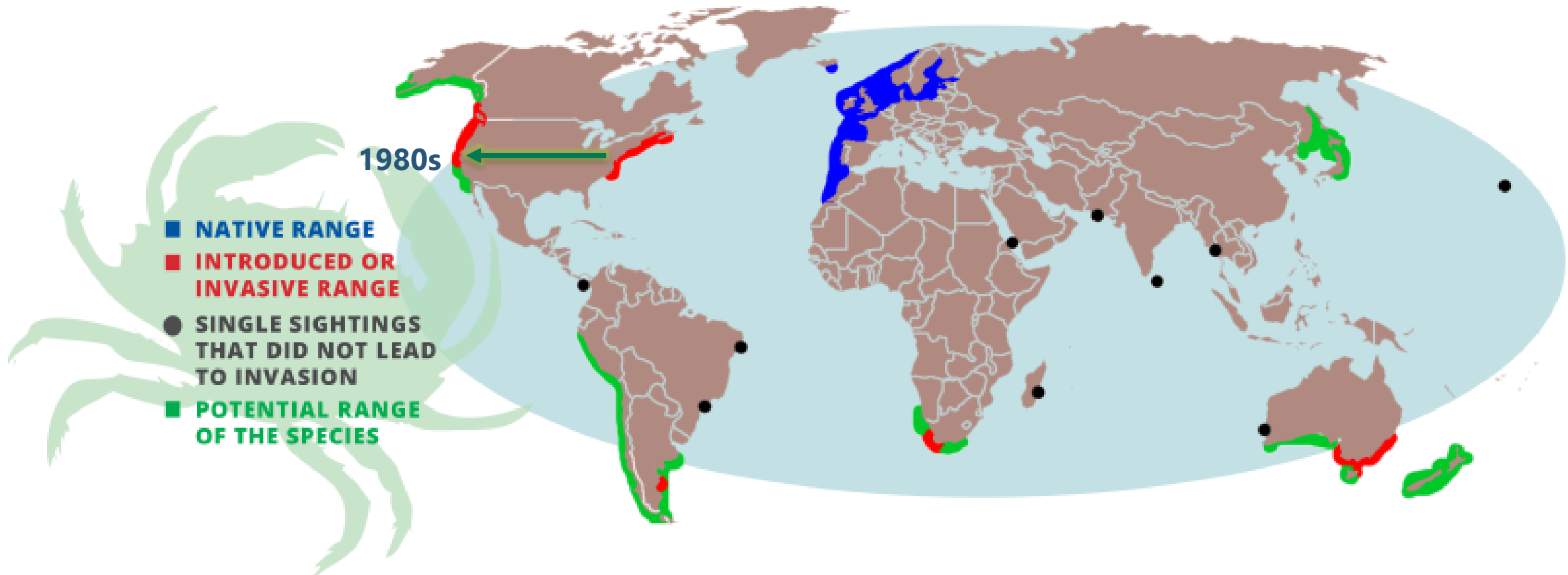


Image credit: NOAA Alaska Region Fisheries

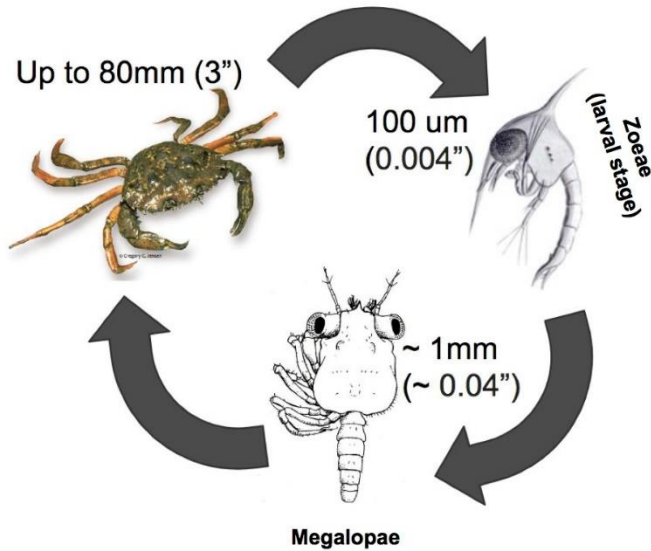


EGC introduced to San Francisco Bay in 1980s

They were likely introduced through the transport of live bait or aquaculture.



Up the coast to Washington



- EGC eggs hatch into free-floating larvae.
- The larvae likely floated with ocean currents up the West Coast.
- EGC first found in Washington in 1998, but at low numbers.

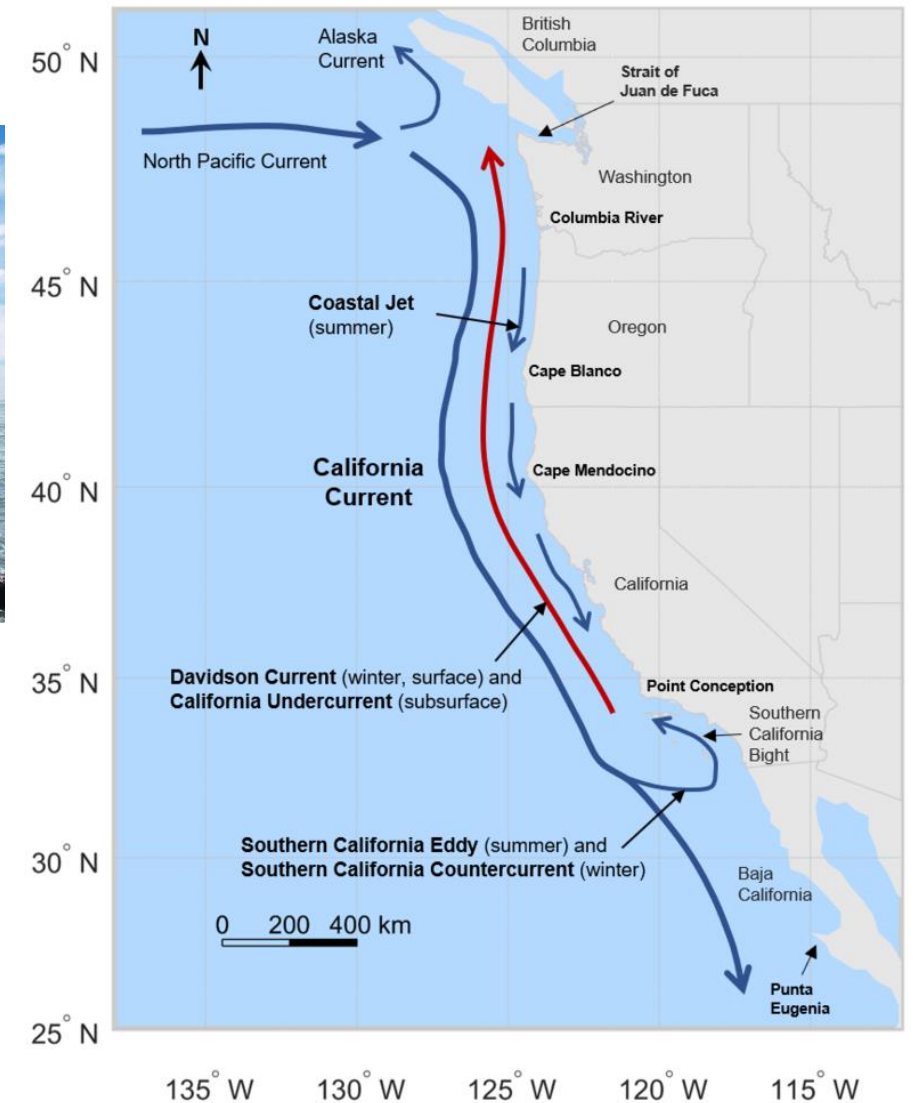


Image credit: Washington Sea Grant, Cormorant24





EGC in Washington

New EGC detections in Washington

1998 – Coastal detection – Willapa Bay/Grays Harbor

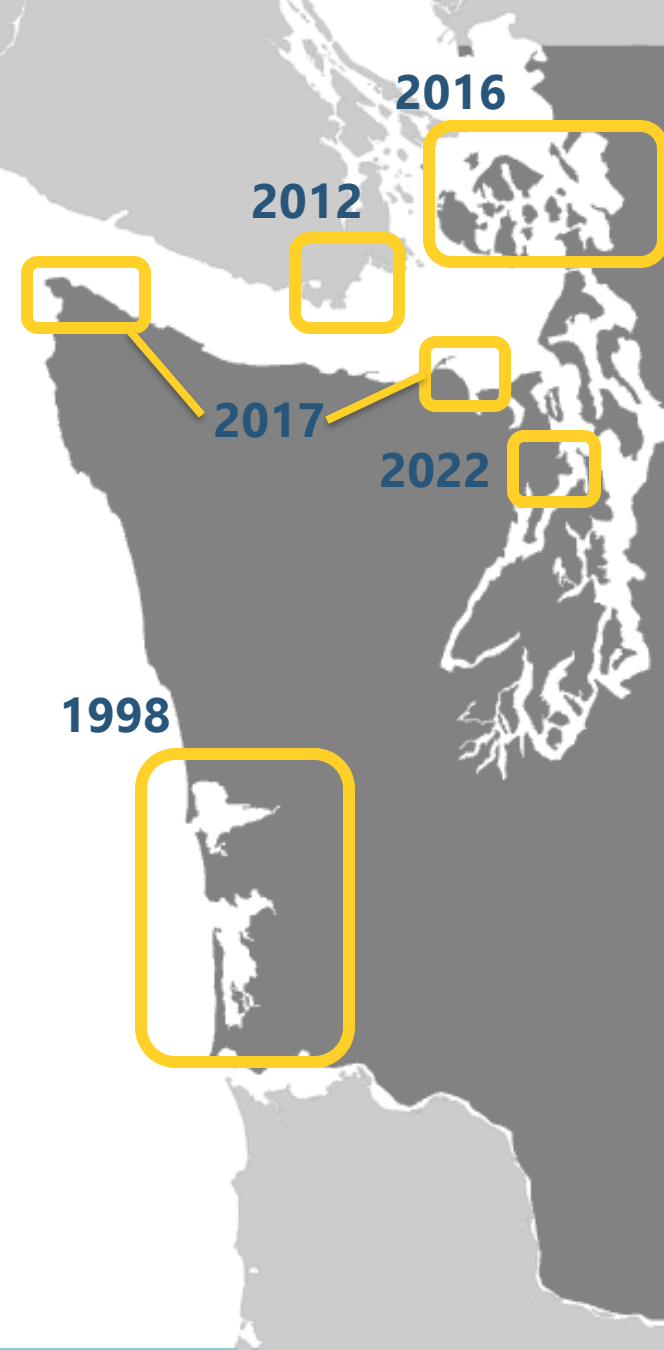
2012 – Sooke Basin detection in British Columbia

2016 – Salish Sea detection – San Juan/Padilla Bay

2017 – Makah Bay/Dungeness Spit detections

2018 – Increasing Salish Sea and coastal EGC detections

2022 – Hood Canal detection



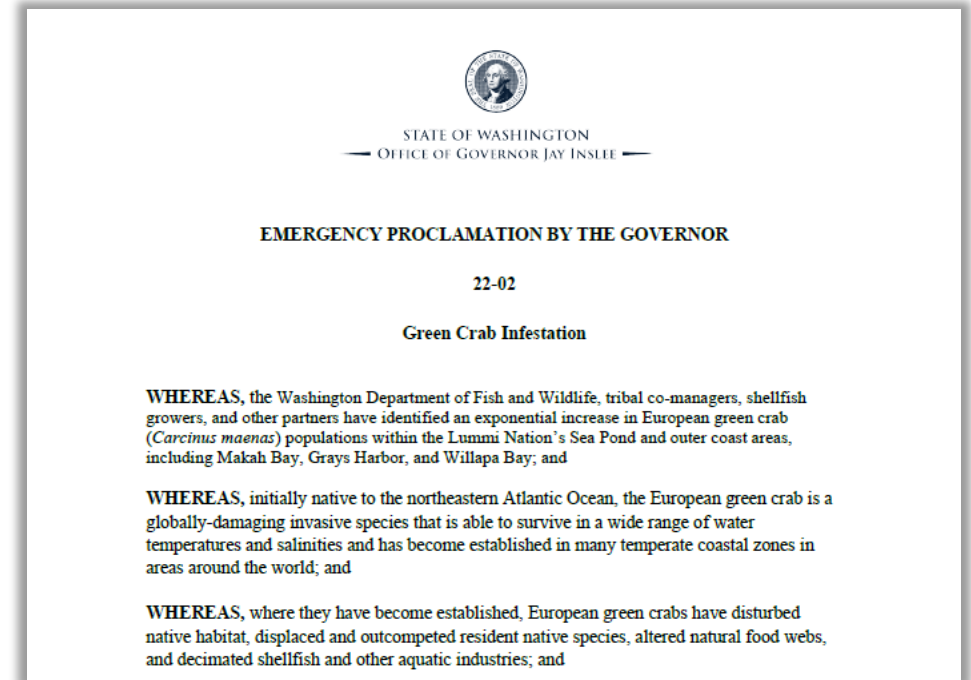
Year	Total
1998	364
1999	507
2000	235
2001	142
2002	167
2003	24
2004	4
2005	115
2006-14	68
2015	8
2016	24
2017	165
2018*	1,192
2019*	1,943
2020*	6,829
2021*	103,295



2022 – EGC Emergency Proclamation

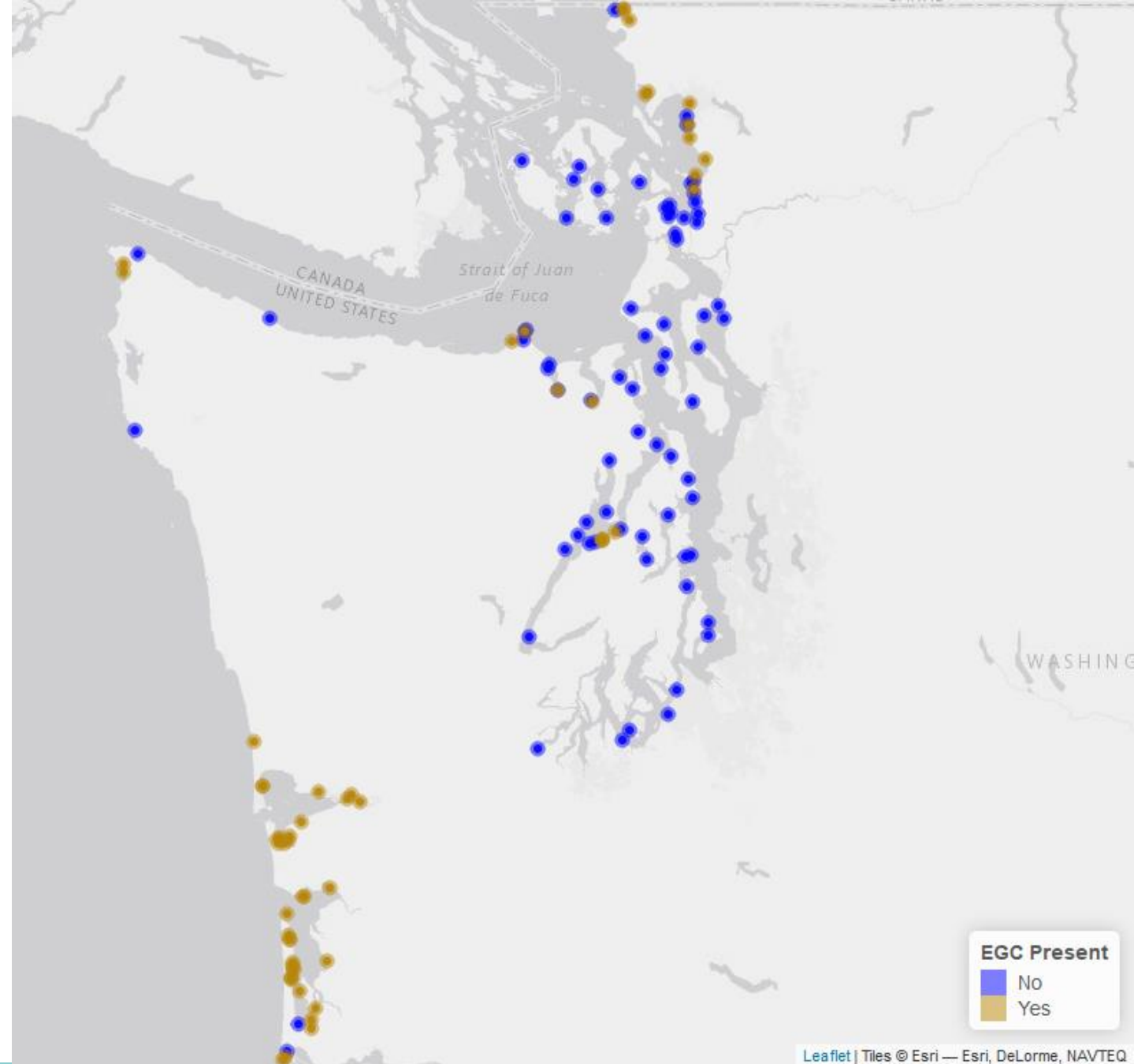
"I...do hereby order the Department of Fish and Wildlife to begin implementation of **emergency measures** as necessary to effect the eradication of or to prevent the permanent establishment and expansion of European green crab."

– *Emergency Proclamation by the Governor, 22-02*



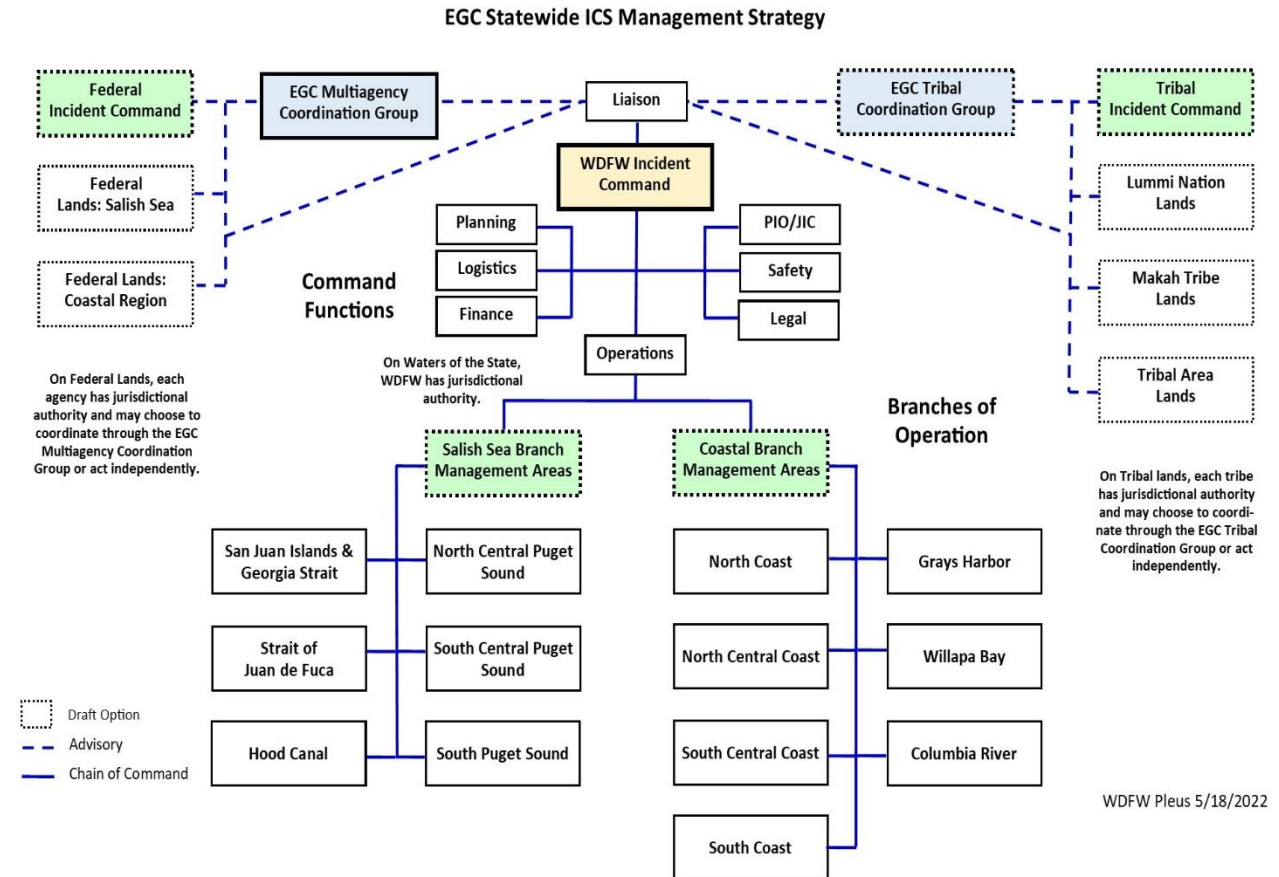
Where EGC were found in 2022

- Over 133 sites trapped
 - EGC detections at < 50%
- Coastal efforts focused on removal of crabs
- Salish Sea more early detection and monitoring
 - Removal in some locations



Incident Command System

- System for coordinating EGC response across co-managers, jurisdictions, and management partners.
- Establishes common language.
- Respects all jurisdictions.
- Ensures critical needs and issues are effectively addressed.
- Provides management transparency for jurisdictions, impacted entities, and the public.



EGC management

2015 – WDFW designates Washington Sea Grant to lead early detection monitoring

2018 – Increasing Salish Sea and coastal EGC detections

2020 – Legislature approves \$783,000 proviso

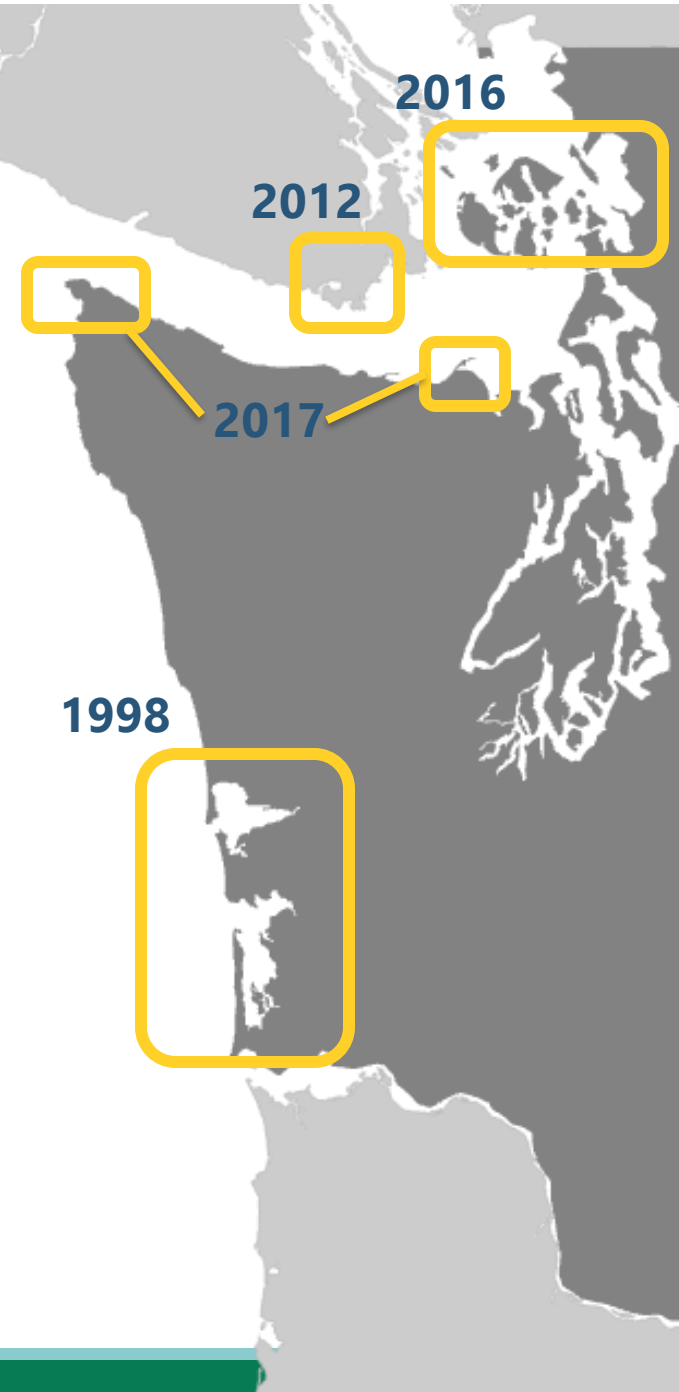
- \$411,000 passthrough funding to Lummi Nation, Makah Tribe & WSG

2021 – Legislature approves \$2.3 million ongoing funding

- \$1.2 million passthrough funding to Lummi Nation, Makah Tribe, WSG & NW Straits Commission

2022 – Gov. Inslee released an emergency proclamation for EGC.

- Legislature approves \$8.6 million ongoing funding
- \$3.2 million passthrough funding to Lummi Nation, Makah Tribe, WSG + \$1.5 million available in grants



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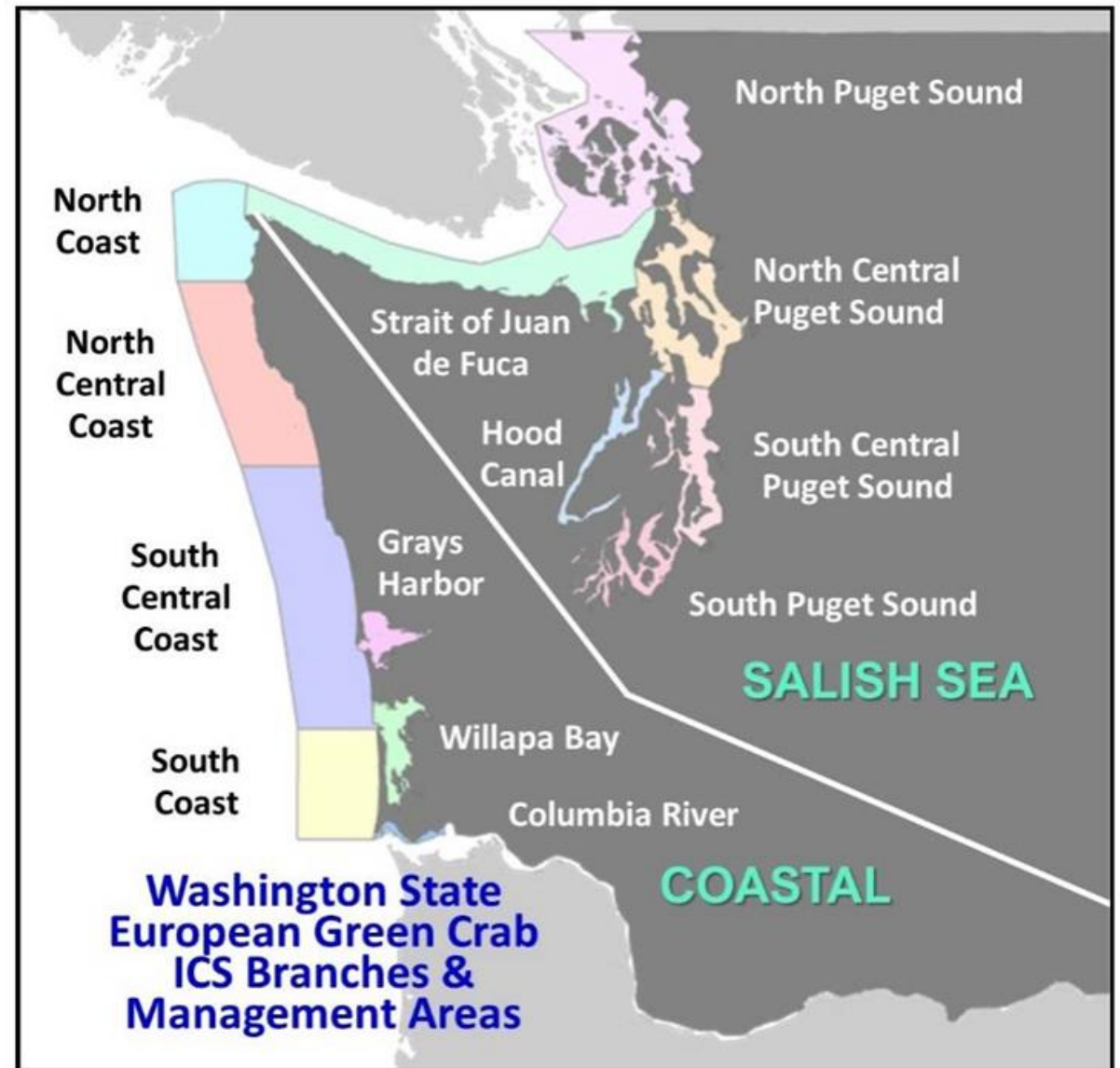
Emergency Response Objectives

1. Facilitate WDFW implementing Governor's Emergency Proclamation for statewide emergency measures with respect for tribal sovereignty and federal jurisdictions.
2. Health and safety of all participants.
3. Reduce EGC populations below harmful environmental, economic, and cultural resource harm.
4. Collaborative and transparent emergency management.
5. Post-emergency transition to long-term EGC management by local entities.



EGC Management Areas

- 2 management branches
(Coastal and Salish Sea)
- 13 management areas



EGC Emergency Response Coordination

- Many co-managers and partners
- Multiple jurisdictions
- Multiple management priorities
- Operational complexities
- Resource capacities



EGC Control

The main method for EGC control is trapping.



Early detection monitoring

- Washington Sea Grant leads a volunteer-based program for early detection of EGC.
- WDFW and tribes also conduct monitoring in certain areas.
- If EGC are found in new locations, WDFW and partners will respond with intensive trapping.



A collaborative effort

European green crab management tribal co-managers and partner organizations	
Bay Center Farms	Quinault Indian Nation
Brady's Oysters	Samish Indian Nation
Chuckanut Shellfish	Shoalwater Bay Tribe
Drayton Harbor Oyster Co.	Stillaguamish Tribe of Indians
Elkhorn Oyster Co.	Stillwaters Environmental Center
Goose Point Oysters	Suquamish Tribe
Grays Harbor National Wildlife Refuge	Swinomish Indian Tribal Community
Jamestown S'Klallam Tribe	Taylor Shellfish Farms
Lower Elwha Klallam Tribe	Twin Harbors Waterkeeper Alliance
Lummi Nation	United States Fish and Wildlife Service
Makah Tribe	United States Navy
Northwest Straits Commission	Veterans Corps
Pacific County Vegetation Management	Washington Department of Fish and Wildlife
Pacific Seafoods	Washington Sea Grant
Padilla Bay National Estuarine Research Reserve	Washington State Department of Natural Resources
Pacific States Marine Fisheries Commission	Washington State DNR Puget Sound Corps
Penn Cove Shellfish	Whatcom Community College
Port Gamble S'Klallam Tribe	Willapa Bay National Wildlife Refuge
Quileute Tribe	Willapa-Grays Harbor Oyster Growers' Association





Getting involved

Report suspected EGCs to WDFW

Members of the public can report suspected EGC to WDFW. To do so, please:

- Take detailed photos of the suspected EGC.
- Note the location of the crab.
- Report your sighting to WDFW:
 - Online at wdfw.wa.gov/greencrab
 - Via email at ais@dfw.wa.gov
 - Via phone at 1-888-WDFW-AIS



Get trapping!

- Washington Sea Grant is always looking for volunteers for their Crab Team!
 - The Crab Team monitors and traps for EGC in new locations.
 - Contact Washington Sea Grant to learn more.
- Support and permits may be available for trapping.



Spread the word!

Contact Outreach Specialist Jessica Ostfeld for outreach materials and support: jessica.ostfeld@dfw.wa.gov



Stickers

REPORT INVASIVE EUROPEAN GREEN CRAB

European green crabs may be present in this area

If you find a suspected European green crab or their shell, please photograph it, note the location, and report to the Washington Department of Fish and Wildlife:

wdfw.wa.gov/greencrab
Or contact us at:
Phone: 1-888-WDFW-AIS
Email: ais@dfw.wa.gov

European green crab (*Carcinus maenas*) are a damaging invasive species that pose a threat to economic, environmental, and cultural resources. Typically smaller than your fist and found in shallow intertidal areas, these shore crabs are not always green and may be orange, red, or yellow in color. WDFW, Tribes, and partners are working to trap and control infestations. As a Prohibited species, it is illegal to possess or transport live European green crab in Washington.

Native crab species commonly mistaken for European green crabs include:

WASHINGTON STATE RECREATION AND CONSERVATION OFFICE
Washington Invasive Species Council

INVASIVE SPECIES ALERT

Report Invasive European Green Crabs

Step 1: Identify

Carcinus maenas

Step 2: Report

Take a photo of any suspected European green crab and report it to the Washington Department of Fish and Wildlife:

Scan here to report!

Reporting link: wdfw.wa.gov/greencrab
Or contact us at:
Phone: 1-888-WDFW-AIS
Email: ais@dfw.wa.gov

Identification Signs

Public Reporting Signs



Invite us to your event!



WDFW staff at the Seattle Boat Show.



WDFW staff at Illuminight.

Contact Outreach Specialist Jessica Ostfeld for event support:
jessica.ostfeld@dfw.wa.gov





Frequently asked questions

Can you eat EGC?

Yes, people eat them in some places, BUT. . .

- They don't have much meat. Where eaten, they are mostly used in crab stock and soup.
- In Europe (Italy and Spain) there are some recipes that use the eggs (roe).
- They are a Prohibited 1 species, meaning you can't possess them without a permit.



Can EGC hurt you?

- They can pinch you, but that's it!
- To avoid getting pinched, hold them by their carapace, behind their claws.
- Holding them upside down also tends to disorient/calm them.



Questions?

Contact ais@dfw.wa.gov

