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DEPARTMENT OF FISH AND WILDLIFE

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November 27, 2024

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RE: European Green Crab Quarterly Progress Report – Fall 2024 (July 1 to September 30, 2024)

Dear Chairs,

In 2021, the Washington Department of Fish and Wildlife (WDFW), tribal co-managers, and partners identified an exponential increase of invasive European green crabs (EGC), *Carcinus maenas*, in the Lummi Nation's Sea Pond within the Salish Sea, and in outer coastal areas including Makah Bay, Grays Harbor, and Willapa Bay.

On December 14, 2021, the WDFW Director submitted an emergency measures request under Revised Code of Washington (RCW) 77.135.090 for EGC response to Governor Jay Inslee. On Jan. 19, 2022, Governor Inslee issued an emergency proclamation (#22-02) to address the exponential increase in EGC populations across Washington's marine shorelines. The proclamation directed WDFW to eradicate, reduce, or contain EGC in Washington, and to increase coordination with partner agencies and Native American tribes.

The Washington State Legislature approved \$8,568,000 in emergency funding during the 2022 Supplemental Budget to facilitate increased EGC management efforts. In response to the legislative budget proviso directive, this report is the eighth in a series of ongoing quarterly progress reports (Q9). The Q9 report outlines the successes and challenges of ongoing EGC emergency response efforts in Washington state from July 1 to September 30, 2024.

Since January 1, 2022, approximately 1,323,219 green crab were removed from Washington state marine waters, with 1,233,157 removed from the Coast Branch, and 89,199 removed from the Salish Sea Branch. During the Q9 period, the collective effort of all organizations resulted in 515,567 green crab removed from Washington state waters, with 513,631 removed from the Coastal Branch and 1,936 removed from the Salish Sea Branch.

The number of green crab removed in Q9 greatly exceeded the previous quarter (Q8) and, in general, was a dramatic increase compared to this time last year (Q5). An increase in green crab captures compared to last year was expected due to the El Niño Southern Oscillation (ENSO) event. Recruitment of green crabs in coastal locations such as Willapa Bay has historically peaked in years with ENSO events (1998, 2003, 2007, 2010, 2016), and a similar increase was expected for 2024. The recent increase in green crab populations in various regions of Washington State, likely driven by the ENSO recruitment event, could lead to the establishment of new populations or the growth of existing ones. To mitigate this, managers have intensified trapping efforts, in areas like Grays Harbor, Willapa Bay and North Puget Sound where a significant surge in green crab numbers has been observed.

WDFW, co-managers, tribes, and partners achieved significant progress in green crab management efforts. Since September 2023, WDFW and over 40 co-managers, tribes and partners worked to develop the European Green Crab 2025-2031 Management Plan for Washington. The plan was completed and submitted to the governor's office and the legislature on September 25, 2024, and can be found at <https://wdfw.wa.gov/publications/02537>.

The Green Crab Research Task Force continues to coordinate with green crab researchers across the Pacific coast of North America to advance research priorities to support green crab management efforts in Washington state and throughout the region.

Per RCW 77.135.090, the WDFW Director continues to evaluate the effects of the European Green Crab emergency measures, finds that the emergency continues to persist and advises that all emergency measures should be continued.

If you have any questions about this report or the WDFW efforts to address this emergency, please contact Melena Thompson, WDFW's Legislative Director, at (564) 250-2755.

Sincerely,



Justin D. Bush
WDFW European Green Crab Incident Commander

cc: Kelly Susewind, Director, WDFW
Kelly Cunningham, WDFW Fish Program Director
Ruth Musgrave, Senior Policy Advisor to Governor Jay Inslee

European Green Crab Quarterly Progress Report – Fall 2024 (July 1 to September 30, 2024)

Washington Department of Fish and Wildlife



European Green Crab Quarterly Progress Report – Fall 2024 (July 1 to September 30, 2024)

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Suggested citation

Turner BC. 2024. European Green Crab Quarterly Progress Report – Fall 2024. Olympia, WA: Washington Department of Fish and Wildlife.

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Acknowledging the Indigenous People of the Pacific Northwest

Since time immemorial, Indigenous People have lived in the Pacific Northwest and hunted, fished, and gathered natural resources, traditional foods, and medicinal plants to support their diverse cultures. They were the original occupants and stewards of this land that all Washingtonians enjoy today.

The very survival of the Pacific Northwest Tribes is a testament of resiliency of what they have endured and continue to endure throughout generations on this landscape. Through many historical encounters of massacre, renunciation of religious freedom, systemic racism, cultural assimilation of native children through institutional residential schools, and the fight for their inherent rights and liberties, they have prevailed. Throughout this painful history brought by colonization, abrogated treaties, infringement of civil rights, and the salmon protests of the 1960s, the Northwest Tribes and the Washington Department of Fish and Wildlife (WDFW) have founded a commitment of respect, unity, and alliance informed by the realities of the past.

Today, tribal governments and WDFW work collaboratively to conserve and manage aquatic and terrestrial resources statewide and practice sound science to guide management decisions. The Tribes and WDFW work together to ensure the sustainability of fish, wildlife, ecosystems, and culture for the next seven generations and beyond.

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Executive Summary

In response to the ESSB 5693 (2022 c 297) legislative budget proviso directive, this report has been authored as the ninth in a series of ongoing quarterly progress reports (Q9). This report will serve to outline the successes and challenges of ongoing European green crab (hereafter green crab) emergency response efforts in Washington state from July 1 to September 30, 2024. In addition, this report will put the work during Q9 in the context of the previous work completed (Q1-Q8).

The previous quarterly progress reports are available at: <https://wdfw.wa.gov/publications> and on WDFW's European green crab [webpage](#).

In 2021, the Washington Department of Fish and Wildlife (WDFW), co-managers, tribes, and partners identified an exponential increase of invasive European green crab, *Carcinus maenas*, in the Lummi Nation's Sea Pond within the Salish Sea, and in outer coastal areas including Grays Harbor, Makah Bay, and Willapa Bay. On Dec. 14, 2021, WDFW Director Susewind submitted an emergency measures request under RCW 77.135.090 for green crab response to Governor Jay Inslee. On January 19, 2022, Governor Jay Inslee issued an emergency proclamation (#22-02) to address the exponential increase in green crab populations across Washington's marine shorelines. The proclamation directed WDFW to eradicate, reduce, or contain green crab populations in Washington. The Washington State Legislature approved \$8,568,000 in emergency funding during the 2022 Supplemental Budget to facilitate increased green crab management efforts. In response to the legislative budget proviso directive, this report is the ninth in a series of ongoing quarterly progress reports (Q9). The Q9 report will outline the successes and challenges of ongoing green crab emergency response efforts in Washington state from July 1 to September 30, 2024.

An Incident Command System (ICS) was established to deal with the complexities of the green crab management effort. Support for and coordination with co-managers, tribes, and partners is essential, as the scale of the green crab emergency is such that no one entity could ever hope to implement successful statewide management strategies alone. Washington Sea Grant (WSG), the Lummi Nation, the Makah Tribe, the Shoalwater Bay Indian Tribe, shellfish growers and various other entities have continued their ongoing efforts managing green crab populations, closely coordinating with WDFW. The ICS also resulted in the creation and distribution of various updates including reports to the governor every 10 days and Situation Reports (SitReps) based on monthly operational periods to provide information on and ensure transparency regarding management actions taken, grant funding allocations, green crab catch numbers, trapping efforts, media outreach, and other relevant information. These Situation Reports were synthesized for the public, media, and other external audiences in bi-monthly [Green Crab Public Updates published](#) and distributed through WDFW's Green Crab Management Updates email list as well as Department webpages, communications, and social media channels.

Representatives from many entities participating in green crab management have joined the ICS Multi-Agency Coordination (MAC) Group. The MAC Group provides a forum for these representatives to share

information, establish a common operating picture, develop long-term priorities for the green crab emergency, and commit and allocate funding and other resources to enhance emergency measures responses.

During the Q9 period, the collective effort of all organizations resulted in 515,567 green crab removed from Washington state waters, with 513,631 removed from the Coastal Branch and 1,936 removed from the Salish Sea Branch. Since January 1, 2022, approximately 1,323,219 green crab were removed from Washington state marine waters, with 1,233,157 removed from the Coast Branch, and 89,199 removed from the Salish Sea Branch. In addition to active control trapping, Q9 trap deployment for early detection monitoring occurred in areas where green crab had not previously been detected. Green crab has not been detected in the Salish Sea Branch south of the northern Hood Canal. Data on green crab abundance, body size, sex ratios, and reproductive status were collected for future analysis, along with DNA and RNA samples to assess connectivity between green crab populations.

WDFW, WSG, co-managers, tribes, and partners achieved significant progress in green crab management efforts. The European Green Crab 2025-2031 Management Plan for Washington was completed and submitted to the governor's office and the legislature ahead of schedule on September 25, 2024. The Green Crab Research Task Force continues to coordinate with green crab researchers across the Pacific coast of North America to advance research priorities to support green crab management efforts in Washington state and throughout the region. Additional progress was also made on public education and community engagement to support green crab awareness, with WDFW representatives engaging individuals at public events and producing new outreach materials. While challenges remain (e.g., winding down the 2024 field season, planning for the 2025 field season), the continued efforts of all parties and the clear organizational structure set previously will allow for continued success through 2024.

Background

European green crab

The European green crab, *Carcinus maenas*, is a globally damaging invasive species that poses a threat to the ecological, economic, and cultural resources of Washington state. Native to Western Europe and Northwestern Africa, this hardy and voracious predator has since expanded its range throughout the globe (Carlton and Cohen 2003). Green crabs exploit a variety of different habitat types within intertidal and subtidal zones. Along the Pacific coast of North America, green crab inhabit protected shorelines in unstructured sandy and muddy bottoms, estuaries, saltmarshes and seagrass beds, as well as utilizing woody debris and rocky substrates (Kern et al. 2002). Green crab have wide tolerances for salinity (1.4-54 ppt) and temperature (0-35 °C) and can even survive air exposure for several days (Leignel et al. 2014).

In areas where green crab have been able to establish large populations for extended periods of time, they have the potential to negatively impact other species, particularly smaller crabs and bivalves

(Jamieson et al. 1998, McDonald et al. 2001). It is estimated that damages to commercial shellfisheries from green crab predation average \$22.6 million per year on the East coast of the United States (Lovell et al. 2007). Similar losses from green crab predation are possible for Salish Sea shellfish fisheries (Mach and Chan 2013) and Pacific Coast fisheries are also at risk. Predation on oysters by green crab could negatively impact oyster fisheries, as adult green crab can prey upon young oysters (Dare et al. 1983, Poirier et al. 2017) and have been observed cracking and consuming adult oysters in laboratory settings (Forster, personal communication). Lab work has shown that juvenile green crab outcompeted similar-sized Dungeness crabs for food and shelter and juvenile Dungeness may serve as prey for larger green crab, resulting in potential impacts to wild Dungeness populations (McDonald et al. 2001). Predation by green crab has led to declines in native bivalve and crab populations in invaded habitats (Grosholz et al. 2000). In addition, burrowing by green crab can have significant negative impacts on eelgrass, estuary, and marsh habitats (Malyshev and Quijón 2011, Matheson et al. 2016, Howard et al. 2019).

Given their history as a prolific invasive species, green crab is classified as a Prohibited Level 1 Invasive Species in Washington ([WAC 220-640-030; Appendix A](#)), meaning they may not be possessed, introduced on or into a water body or property, or trafficked (transported, bought, or sold), without department authorization, a permit, or as otherwise provided by rule ([RCW 77.135.040; Appendix A](#)). WDFW is currently not asking the public to kill suspected green crab, which may sound counterintuitive but is intended to protect native crabs from cases of mistaken identity (native crab species continue to be commonly misreported as green crab by the public; Flannery, personal communication). Green crab is most accurately identified by the 5 large spines, also called marginal teeth, on either side of their forward carapace, a unique pattern for crabs on the Pacific coast of North America (Figure 1). Despite their name, coloration of green crabs varies from bright green to dark orange, thus color is not a reliable feature to use when distinguishing green crab from native crab species.

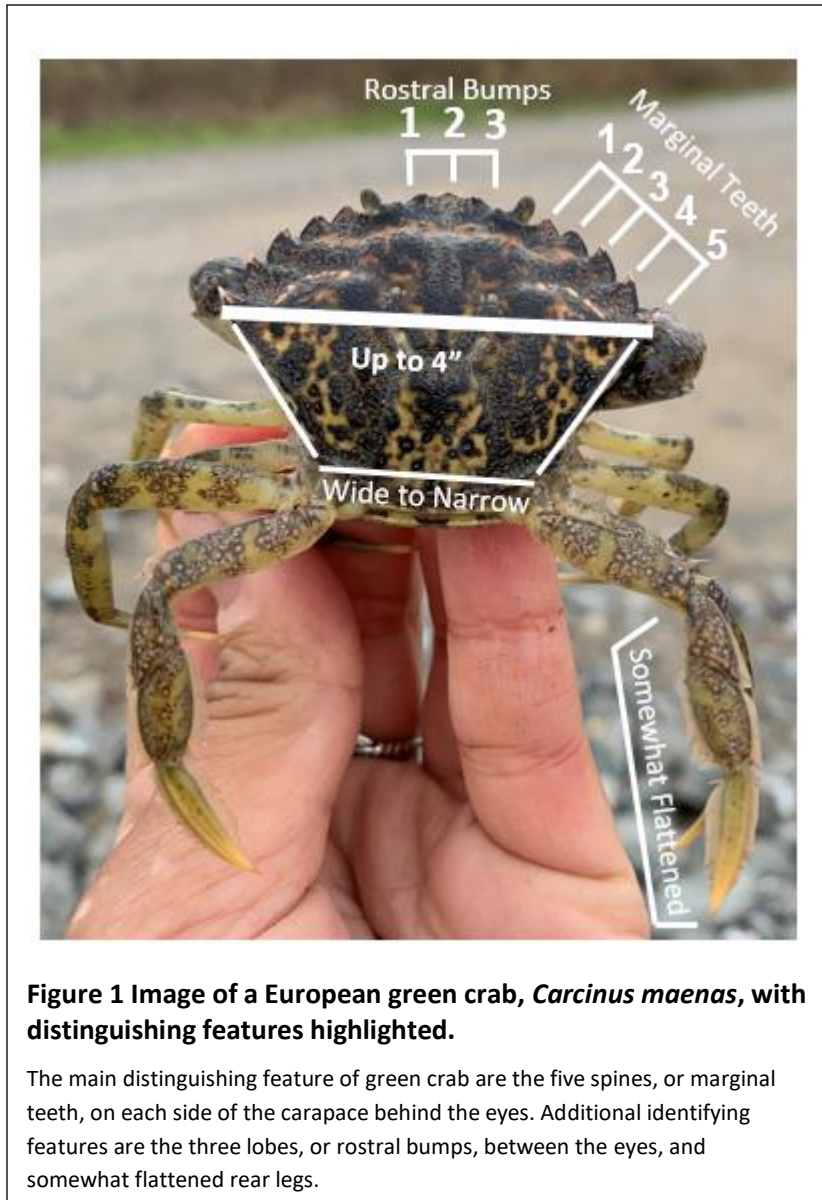


Figure 1 Image of a European green crab, *Carcinus maenas*, with distinguishing features highlighted.

The main distinguishing feature of green crab are the five spines, or marginal teeth, on each side of the carapace behind the eyes. Additional identifying features are the three lobes, or rostral bumps, between the eyes, and somewhat flattened rear legs.

History of the European green crab in Washington state

The first detection of European green crab in the waters of Washington was in 1998 in Willapa Bay and Grays Harbor (Carlton and Cohen 2003; Table 1; Figure 2). Initial emergency management responses took place but ended after a few years due to a lack of evidence of self-recruitment and fewer green crab captured. In 2015, the Washington Department of Fish and Wildlife (WDFW) learned that a population of green crab was discovered in 2012 in Sooke Basin, British Columbia, Canada (Gillespie et al. 2015). In response over concerns of new green crab introductions within the Washington portion of the Salish Sea, WDFW designated Washington Sea Grant (WSG) to lead an early detection monthly monitoring community science network, also known as the Crab Team. This also marked the beginning of increased communication and collaboration with the Department of Fisheries and Oceans Canada (DFO) to explore transboundary green crab management in the Salish Sea. The first detections of green

crab in the Washington region of the Salish Sea occurred in 2016 at Westcott Bay on San Juan Island by the WSG Crab Team and in Padilla Bay by staff at the Padilla Bay National Estuary Research Reserve (Grason et al. 2018). There were additional detections of green crab in 2017 in Makah Bay by the Makah Tribe and in Dungeness Spit within the Dungeness National Wildlife Refuge, which is managed by the US Fish and Wildlife Service. Since 2018, there have been increasing numbers of green crab detections in the Salish Sea and Pacific coastal regions of Washington. In response to continued green crab presence in the Salish Sea, the Salish Sea Transboundary Action Plan for Invasive European Green Crab was created and signed by representatives of WDFW, WSG, the Puget Sound Partnership, and the DFO in 2019 (Drinkwin et al. 2018).

Table 1 Yearly European green crab captures in Washington from 1998-2023.

Data is divided by green crab captured in the Washington State portion of the Salish Sea and green crab captured along the Pacific coast. Please note that these data only represent crabs captured, not the effort employed. Catch effort (number of traps deployed, number of locations trapped, frequency of trap recovery) varies greatly across years and location.

Year	Salish Sea	Pacific Coast	Total
1998	0	364	364
1999	0	507	507
2000	0	235	235
2001	0	142	142
2002	0	167	167
2003	0	24	24
2004	0	4	4
2005	0	115	115
2006 - 2014	0	68	68
2015	0	8	8
2016	5	19	24
2017	101	64	165
2018	77	1,115	1,192
2019	177	1,766	1,943
2020	2,858	3,971	6,829
2021	86,340	16,825	103,165
2022	81,009	204,274	285,283
2023	6,327	354,966	361,293

Emergency proclamation and supplemental funding

In 2021, WDFW, co-managers, tribes, and partners identified an exponential increase of invasive green crab in the Lummi Nation’s Sea Pond within the Salish Sea, and in coastal areas including Makah Bay, Grays Harbor, and Willapa Bay. It was concluded that this continuing increase in green crab distribution and abundance posed an imminent threat to Washington’s economic, environmental, and cultural resources. While \$2.3 million was appropriated by the State Legislature for green crab management in the 2021-23 biennium, it was determined to be insufficient to control these exploding populations.

On Dec. 14, 2021, Director Susewind submitted an emergency measures request under [RCW 77.135.090 \(Appendix A\)](#) for a green crab response to Governor Jay Inslee. While emergency funding was not immediately available, on Jan. 19, 2022, Gov. Inslee issued an emergency proclamation (#22-02) to address the exponential increase in the green crab population within the Lummi Nation’s Sea Pond and Pacific coastal areas. The proclamation directs WDFW to implement emergency measures as necessary to affect the eradication of or to prevent the permanent establishment and expansion of green crab in Washington. In addition, the Governor urged the Legislature to provide additional emergency funding as requested by the WDFW as soon as possible.

Working with the Governor’s office, the Office of Financial Management, co-managers, and tribes including the Lummi Nation, Makah Tribe, and others, along with Washington Sea Grant (WSG), WDFW requested \$8,568,000 from the State Legislature during the 2022 supplemental session to control increasing green crab populations. The Legislature fully-funded this request in the 2022 Supplemental Budget, which was signed by Governor Inslee on March 31, 2022.

In April 2023, the State Legislature and governor designated \$6,082,000 to be appropriated annually for green crab management in the 2023-25 Operating Budget. This amounts to a total of approximately \$13 million for the 2023-25 Biennial Budget. Previously, the Legislature had provided \$2.3 million per biennium ongoing for green crab control in 2021, but this amount was deemed insufficient to match the scale of this growing threat.

Governor Proclamation 22-02 Directives

The following text, taken from “Emergency Proclamation by the Governor 22-02 Green Crab Infestation”, outlines the primary directives to WDFW and other state agencies by Governor Jay Inslee regarding green crab management:

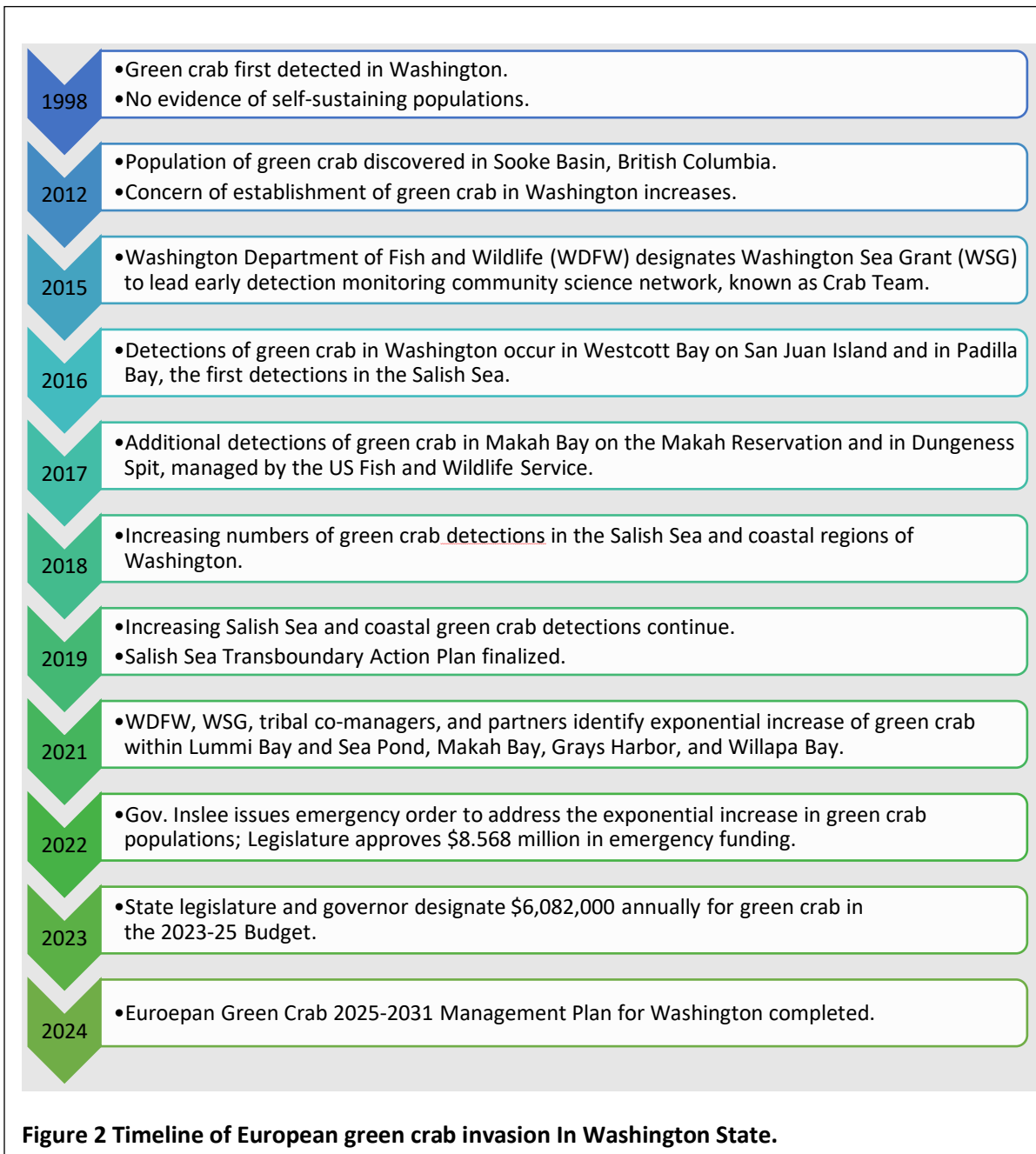
“NOW THEREFORE, I, Jay Inslee, Governor of the state of Washington, by virtue of the authority vested in me under RCW 43.06.010(14), as a result of the above-noted situation, and in accordance with RCW 77.135.090, do hereby order the Department of Fish and Wildlife to begin implementation of emergency measures as necessary to effect the eradication of or to prevent the permanent establishment and expansion of European green crab.

FURTHERMORE, I direct the Department of Ecology, and I ask the Department of Natural Resources and the State Parks and Recreation Commission to identify European green crab management as a high priority on their respective state-owned aquatic lands and to facilitate implementing the emergency measures described herein.”

Legislative Proviso

The following text, taken from “ESSB 5693 - Making 2021-2023 fiscal biennium supplemental operating appropriations”, Section 308 (Page 552, Line 16) - outlines the primary directives to WDFW by the Washington State Legislature regarding green crab management:

“Implement eradication and control measures on European green crabs through coordination and grants with partner organizations. Provide quarterly progress reports on the success and challenges of the measures to the appropriate committees of the legislature.”



Successes of European green crab management measures

The following is an overview of the major successes related to European green crab management actions for the ninth quarter of the emergency, from July 1 to September 30, 2024 (Q9). The success of Q1-Q8 (March 1, 2022 – June 30, 2024) may also be discussed and included for context. A complete list of green crab management actions of Q9 can be found in [Appendix A](#) of this report.

Incident Command System implementation

The Washington State Emergency Management Division assigned mission #22-1085 on April 18, 2022, for the green crab emergency response. After meeting with other state and federal agencies, the Washington Department of Fish and Wildlife (WDFW) Director Kelly Susewind formally implemented an Incident Command System (ICS) on May 5, 2022, in delegating authority to WDFW's Aquatic Invasive Species (AIS) Policy Coordinator to serve as Incident Commander (Figure 3). This approach provides a clear command structure, as well as standardizing communications and management action implementation across the state. In addition, ICS provides support to federal and tribal participants across the state while they retain their autonomy in green crab management decisions and actions. During Q9, successes of the green crab ICS have included:

- Ensuring that ongoing management actions are guided by the five Incident Objectives developed in Q1:
 - A. Facilitate WDFW implementing Governor's Emergency Proclamation for statewide emergency measures with respect for tribal sovereignty and federal jurisdictions.
 - B. Health and safety of all participants.
 - C. Reduce or contain green crab populations below levels that result in environmental, economic, and cultural resource harm.
 - D. Collaborative and transparent emergency management.
 - E. Post-emergency transition to long-term green crab management by local co-managers, tribes, and partners with WDFW oversight.
- Meetings with co-managers and tribal entities to discuss ICS structure and solicit recommendations on how co-managers and tribes would like to engage on policy and technical levels.
- Regular reports to the governor every 10 days per RCW 77.135.090 on the effects of emergency measures and advising the governor if all or some emergency measures should be discontinued.
- Creation of ICS Situation Reports (SitReps) based on a monthly operational period summarizing the status of Washington state green crab emergency measures including actions taken, funding allocations, green crab catch numbers, trapping efforts, and other relevant information for dissemination among green crab emergency measure co-managers, tribes, and partners.

- Creation of bi-monthly (e.g., January/February) green crab Public Updates that included information about Washington state Green Crab Emergency measures, highlighting the efforts of co-managers, tribes, and partners, and sharing stories from the field for dissemination to the public and media.
- Continued WDFW internal policy coordination meetings.

An important aspect of the green crab ICS structure is the Multi-Agency Coordination (MAC) Group. The MAC Group consists of representatives from various co-managers, tribes, and partners, including state and federal agencies, and shellfish growers (Table 2). The MAC Group provides a forum for these representatives to share information, establish a common operating picture, and recommend common long-term priorities for the green crab emergency. In addition, the group is tasked with making recommendations to WDFW for emergency funding and may commit and allocate additional or in-kind funding and other resources to enhance emergency measures response. Since its formation on June 8, 2022, the MAC Group has convened forty-five times (five times in Q9). During Q9, green crab MAC Group successes have included:

- Completion of RCO Green Crab Emergency Measures Fund contracts, which includes:
 - \$91,316 U.S. National Oceanographic and Atmospheric Administration
 - \$402,220 State of Washington Department of Natural Resources
 - \$99,312 Pacific County Vegetation Management
 - \$75,154 State of Washington Department of Ecology
 - \$30,000 Grays Harbor Conservation District
 - \$90,000 Pacific Conservation District
 - \$70,517 Washington State University (WSU)/Washington Sea Grant (WSG)
 - \$100,000 Lummi Indian Business Council
 - \$32,897 US Fish & Wildlife Service (USFWS) Dungeness National Wildlife Refuge
 - \$110,240 USFWS Willapa National Wildlife Refuge
 - See previous green crab Legislative Reports for more details.
- Reviewing updates from previously approved RCO European Green Crab Emergency Measures Fund requests, which includes:
 - \$110,240 USFWS Willapa National Wildlife Refuge (NWR)
 - Progress Report Due – 10/10/2024
 - \$729,965 Pacific Conservation District
 - Progress Report Due – 10/10/2024
 - Grays Harbor Conservation District
 - Progress Report Due – 10/10/2024
 - See previous European Green Crab Legislative Reports for more details.
- Recommending the allocation of RCO European Green Crab Emergency Measures Funds for projects, which include:
 - \$59,828 University of Washington Ruesink Lab
 - Funding supports research on post-larval settlement patterns of green crabs.
 - This funding is pending awaiting a signature from the sponsor.

- \$133,142 National Oceanographic and Atmospheric Administration (NOAA) Fisheries
 - Funding would support research on the movements of green crab at habitats surrounding shellfish farming infrastructure during summer.
 - This proposal is under consideration for funding by WDFW.
- \$334,230 Quinault Indian Nation
 - Funding would support green crab control and coastal monitoring efforts.
 - This proposal is under consideration for funding by WDFW.

Table 2 List of European green crab Multi-Agency Coordination Group member organizations.

Representatives of these organizations share information, establish a common operating picture, and develop common long-term priorities for the green crab emergency.

Multi-Agency Coordination group member organizations	
Pacific Coast Shellfish Growers Association	Washington Emergency Management Division
Lummi Nation Business Council	Washington Sea Grant
Makah Tribe	Washington State Department of Agriculture
Puget Sound Partnership	Washington State Department of Fish and Wildlife
Quinault Indian Nation	Washington State Department of Natural Resources
Shoalwater Bay Indian Tribe	Washington State Parks and Recreation Commission
U.S. Bureau of Indian Affairs	Washington State Recreation and Conservation Office
U.S. Environmental Protection Agency	Washington State University Extension
U.S. Fish and Wildlife Service	Willapa-Grays Harbor Oyster Growers' Association
U.S. Geological Survey	Washington State Department of Ecology
U.S. National Oceanographic and Atmospheric Administration	

Coordination with co-managers, tribes, and partners

Perhaps the greatest success of green crab management in Washington are the efforts, both independent and collaborative, of the many co-managers, tribes, and partners within the state (Table 3). The scope of the green crab emergency is such that no one organization can hope to curtail it alone. For years, co-managers, tribes, and partners such as WSG, shellfish growers, and local, state, and federal agencies have worked with WDFW to implement short- and long-term management actions to support statewide efforts in green crab management. The contributions of all entities involved in green crab control cannot be overvalued. Under normal circumstances, MAC Group member organizations are invited to submit addendums each quarter to outline their specific actions and successes in their own words. Completing the 6-year Green Crab Management Plan during Q9 initiated discussions of the format and intent of these addendums. While MAC Group members were invited to submit addendums

for the Q9 report, the consensus was to postpone until the October-December 2024 Quarterly Report (Q10) when the process has been revised.

Since green crab extend beyond jurisdictional boundaries, management responses require action, collaboration, and coordination between various groups. It is important to note that green crab management is very complex with multiple jurisdictions, varying management priorities, different management types, complex operations, and different resource capacities. Additionally, each organization can have differing goals for sensitive habitats, species protections and aquaculture operation protections. SitReps were disseminated monthly based on ICS operational periods to support meeting the collaboration and transparent emergency management objective. These SitReps included information on management actions taken, grant funding allocations, green crab catch numbers, trapping efforts, media outreach and other relevant information. The first SitRep was disseminated on June 16, 2022, and thirty-eight have been completed as of the end of Q9.

Regional Coordination Groups increase communication and collaboration among regional co-managers, tribes, and partners. Regional Coordination Groups exist for Willapa Bay, Gray’s Harbor, and North Puget Sound management Areas (Figure 4). Some Coordination Groups combine geographically adjacent Management Areas with common co-managers, tribes, and partners and consist of North/North Central Coast and Western Strait/Eastern Strait & Admiralty Inlet Management Areas. These groups meet on a regular schedule to share progress on ongoing management actions, discuss trends, and identify opportunities for collaborative efforts.

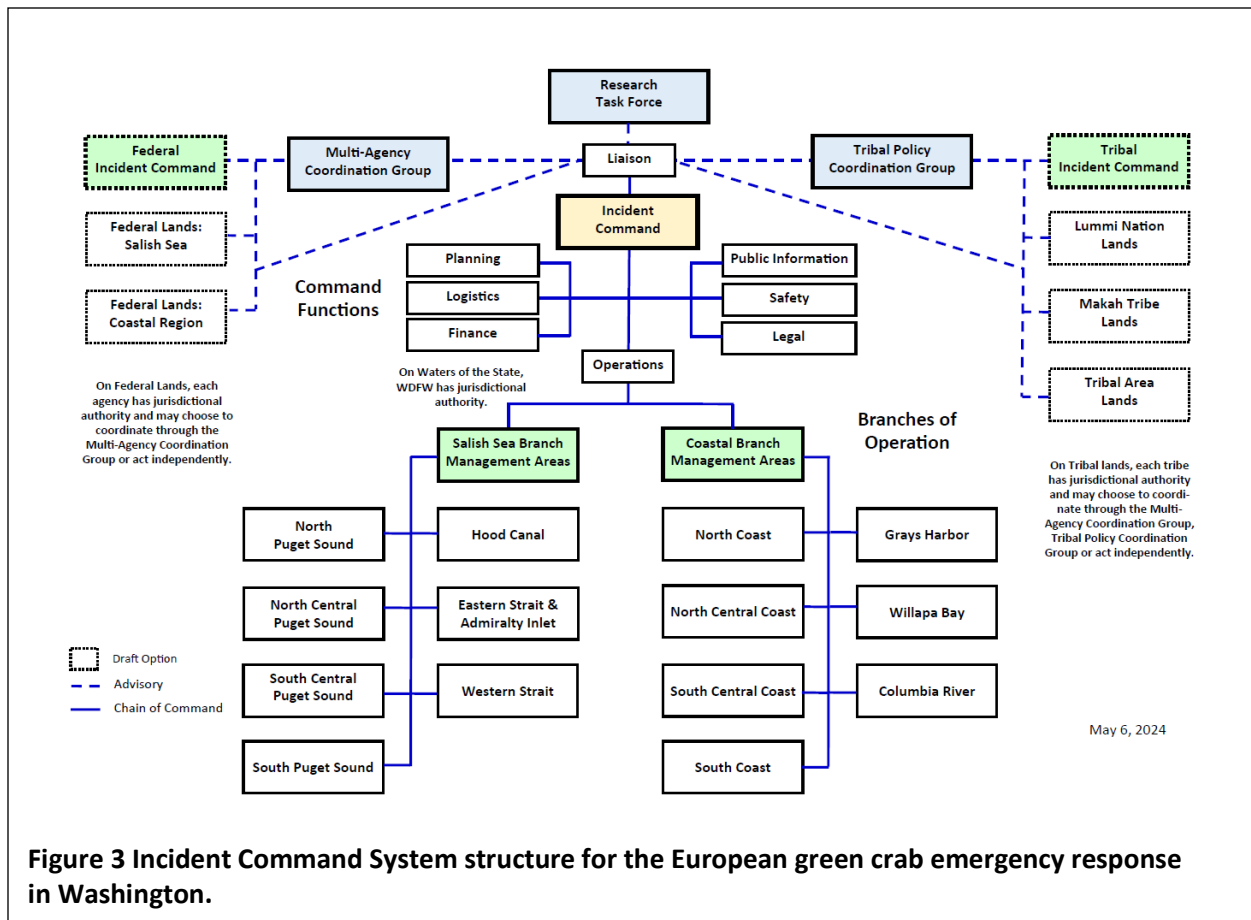


Figure 3 Incident Command System structure for the European green crab emergency response in Washington.

Table 3 List of co-managers, tribes, and partner organizations working with WDFW on control and management efforts of the European green crab in Washington.

Participants implement short- and long-term management actions to support statewide efforts in green crab control, including independent and WDFW collaborative trapping, outreach and education, field support, and monitoring. These actions are an essential component of the green crab management in Washington.

Co-managers, Tribes, and Partners	
Baywater Shellfish Company	Quinault Indian Nation
Chuckanut Shellfish	Quileute Tribe
Drayton Harbor Oysters	Samish Indian Nation
Grays Harbor Conservation District	Shoalwater Bay Indian Tribe
Hama Hama Oyster Company	Skokomish Tribe
Hoh Tribe	Squaxin Island Tribe
Jamestown S'Klallam Tribe	Stillaguamish Tribe
Lower Elwha Klallam Tribe	Suquamish Tribe
Lummi Nation	Swinomish Indian Tribal Community
Makah Tribe	Taylor Shellfish
Marine Life Center	Tulalip Tribes
Muckleshoot Indian Tribe	United States Fish and Wildlife Service
Nisqually Tribe	United States Geological Survey Western Fisheries Research Center
Nooksack Tribe	United States Navy
Northwest Straits Commission (Washington State Department of Ecology)	Upper Skagit Tribe
Pacific Conservation District	Washington Sea Grant
Pacific County Invasive Species Management	Washington State Department of Natural Resources
Pacific Seafoods	Washington State Parks and Recreation Commission
Padilla Bay National Estuarine Research Reserve (Washington State Department of Ecology)	Washington State Recreation and Conservation Office
Penn Cove Shellfish	Washington State University Extension
Port Gamble S'Klallam Tribe	Washington State Department of Fish and Wildlife
Puget Sound Partnership	Willapa-Grays Harbor Oyster Growers' Association
Puyallup Tribe	

Budget allocation

The \$482,229 in funds provided for this reporting period allowed for the continuation of our management efforts.

- Staff (Salaries + Benefits): \$323,981
 - Funds spent on staff. At the end of Q8, the current active green crab staff to the European Green Crab Project includes a Lead Biologist 4, a Field Ops Biologist 3, three Regional Biologist 2s, a Research Scientist 1, a Communications and Outreach Specialist 3, and 15 Scientific Technician 2s (1 permanent, 14 seasonal).
- Goods & Services: \$8,976
 - Funds spent on general field supplies and gear such as bait and traps.
- Equipment: \$447
 - Funds spent on high value equipment.
- Travel: \$3,925
 - Funds spent on motor pool vehicles, per diem and lodging. Aside from trapping efforts, travel funds allowed staff to present at and attend conferences and perform outreach for various stakeholder groups.
- Agency Indirect: \$144,900
 - Funds spent on agency-wide, general administration costs.

European green crab monitoring and removal

The state is divided into Coastal and Salish Sea Branches to facilitate effective European green crab ICS communications and management (Figure 4). These branches are then further divided into fourteen Management Areas based on WDFW recreational fishing marine areas, with Management Areas further divided into Coordination Areas, Sites, and Sub-Sites.

Trapping efforts across the state were undertaken by WDFW, WSG, co-managers, tribes, and partners. The catch numbers presented for Q9 represent the collective effort of all organizations, and those efforts must be recognized.

In total, 515,567 green crab were removed in Q9 from Washington state waters, with 513,631 removed from the Coastal Branch and 1,936 removed from the Salish Sea Branch (Table 4). In the Salish Sea Branch, green crab were captured and removed from the following Management Areas: North Puget Sound (1,716), followed by Eastern Strait & Admiralty Inlet (171), Hood Canal (41), North Central Puget Sound (5), and Western Strait (3). In the Coastal Branch, green crab were captured and removed from the following Management Areas: Willapa Bay (468,042), followed by Grays Harbor (40,633), North Coast (4,845), North Central Coast (47), South Central Coast (35), and Columbia River (29). Although trapping occurred, no green crabs were caught in South Central Puget Sound and South Puget Sound. No trapping occurred in South Coast Management Area. To date, green crab have not been detected in the Salish Sea Branch south of northern Hood Canal Management Area, though early-detection monitoring continues across the southerly management areas. Data on green crab abundance, body size, sex ratios,

and reproductive status were collected for future analysis, along with DNA and RNA samples to assess connectivity between green crab populations. Removed green crab were euthanized following humane best practices.

WDFW is partnered with Tidal Grow Agriscience (TGA), an organic fertilizer manufacturer based in Raymond, WA. TGA generously accepts fish waste (i.e., green crab and used bait) from WDFW and participating co-managers, tribes, and partners for processing into a liquid fertilizer (Pacific Gro) free of charge. This partnership allows organic material that would otherwise be dumped in landfills to be put to productive use as outlined in HB 1799 (2022). Green crab collected by the Shoalwater Bay Indian Tribe, are utilized directly as fertilizer in their tribal community garden (Pfleeger-Ritzman, personal communication).

The number of green crab removed in Q9 greatly exceeded the previous quarter (Q8) and, in general, was a dramatic increase compared to this time last year (Q5). An increase in green crab captures compared to last year was, to some extent, expected due to the El Niño Southern Oscillation (ENSO) event. Recruitment of green crabs in coastal locations such as Willapa Bay has peaked in years with ENSO events (1998, 2003, 2007, 2010, 2016), and a similar increase was expected for 2024. Many green crabs recruited earlier this year have grown to sizes large enough to be captured in traps (> 20 mm CW), and likely account for a substantial proportion of increased catch.

The increased numbers of green crabs in areas of historically low green crab catch numbers, (e.g., North Puget Sound, Hood Canal, Eastern Strait & Admiralty Inlet, North Central Coast, South Central Coast, and Columbia River Management Areas) resulting from the ENSO recruitment event could facilitate the establishment of new local populations or supplement small existing populations. Local co-managers, tribes, and partners have increased trapping activities, where possible, to mitigate these increases.

Grays Harbor and Willapa Bay Management Areas showed dramatic increases, removing more green crabs in Q9 compared to any previous quarter (40,633 crabs in Gray's Harbor and 468,042 in Willapa Bay). Even if the ENSO recruitment event primarily drives the increase in catch numbers, this could substantially increase green crab populations over the long term. Close attention must be paid to catch numbers in 2025 to determine if catch numbers remain abnormally high and what actions should be taken in response.

This quarter marks the first detection of green crabs in the North Central Puget Sound Management Area since the beginning of the green crab emergency in March 2022. However, green crabs were detected in 2018 (1 crab) and 2021 (2 crabs). While green crab numbers remain very low, this newest detection in the North Central Puget Sound Management Area is noteworthy and increased monitoring efforts should be implemented.

South Coast remains the only Management Area where no green crab management activities have occurred. South Coast consists of the western coastline of Long Beach Peninsula, which borders the Pacific Ocean. Most of South Coast is sandy shoreline, except for the rocky shoreline at the southern end around North Head, and the entire area is subject to high wave action. As a result, South Coast is

deemed a poor habitat for green crab. WDFW will communicate with interested co-managers, tribes, and partners to discuss if management actions are necessary for the South Coast.

While reporting the number of green crab removed by Management Area is informative, there is a need to present more nuance and context of the ongoing green crab emergency. This is particularly true following the high recruitment observed in Q9. In collaboration with the MAC group and green crab researchers, is creating a new standardized reporting approach. The goal is to incorporate additional information (e.g., effort, enhanced geographic resolution) to allow these reports to accurately represent current and past management efforts and allow for improved assessment of changes over time.

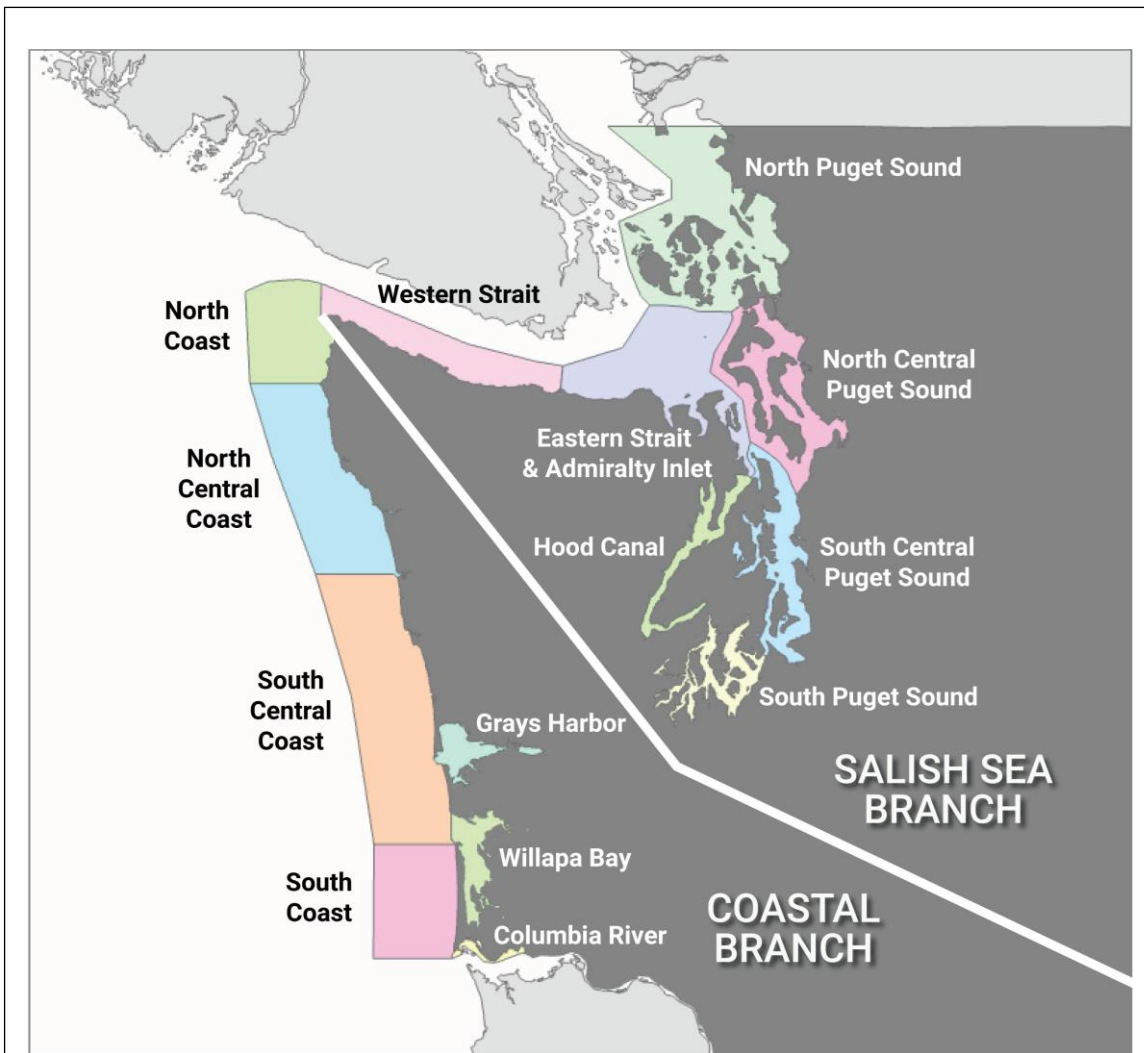


Figure 4 Map of Washington state European green crab management locations.

The state has been split into two Management Branches (Coastal and Salish Sea) and fourteen Management Areas (North Puget Sound, North Central Puget Sound, South Central Puget Sound, South Puget Sound, Hood Canal, Eastern Strait & Admiralty Inlet, Western Strait, North Coast, North Central Coast, South Central Coast, South Coast, Grays Harbor, Willapa Bay, Columbia River).

Table 4. European green crab (EGC) capture totals.

Totals for 1-9/2022 (Months/Year; Q1), 10-12/2022 (Q2), 1-3/2023 (Q3), 4-6/2023 (Q4), 7-9/2023 (Q5), 10-12/2023 (Q6), 1-3/2024 (Q7), 4-6/2024 (Q8), 7-9/2024 (Q9) and All (the duration of the green crab emergency) based on SitRep reported catch and trapping effort. These numbers are presented for each Management Branch (Coastal and Salish Sea) and Management Area. These totals include not only removal efforts by Washington Department of Fish and Wildlife, but co-managers, tribes, and partners such as the Washington Sea Grant Crab Team, the Lummi Nation, the Makah Tribe, the Shoalwater Bay Tribe, and participating shellfish growers. * = No trapping occurred in these Management Areas. Please note that these data only represent crabs captured, not the effort employed. Catch effort (number of traps deployed, number of locations trapped, frequency of trap recovery) varies greatly across time and location.

Branch	Management Area	1-9/2022 EGC Captured	10-12/2022 EGC Captured	1-3/2023 EGC Captured	4-6/2023 EGC Captured	7-9/2023 EGC Captured	10-12/2023 EGC Captured	1-3/2024 EGC Captured	4-6/2024 EGC Captured	7-9/2024 EGC Captured	All EGC Captured
Salish Sea	North Puget Sound	75,774	5,126	1,687	2,262	1,422	680	84	448	1,716	89,199
Salish Sea	North Central Puget Sound	0	*	*	0	0	*	*	0	5	5
Salish Sea	South Central Puget Sound	0	*	*	0	0	*	*	0	0	0
Salish Sea	South Puget Sound	0	*	*	0	0	*	*	0	0	0
Salish Sea	Hood Canal	16	0	0	27	67	19	*	2	41	172
Salish Sea	Eastern Strait & Admiralty Inlet	75	18	2	122	102	44	*	104	171	638
Salish Sea	Western Strait	0	0	0	0	0	18	1	26	3	48
Salish Sea	All	75,865	5,144	1,689	2,411	1,591	761	85	580	1,936	90,062
Coastal	North Coast	20,786	4,323	577	3,234	4,622	978	254	1,721	4,845	41,340
Coastal	North Central Coast	0	0	*	0	0	*	*	0	47	47
Coastal	South Central Coast	34	*	*	4	0	*	*	7	35	80
Coastal	South Coast	*	*	*	*	*	*	*	*	*	0
Coastal	Grays Harbor	6,402	17,862	21,479	12,708	25,901	25,476	10,980	25,289	40,633	186,730
Coastal	Willapa Bay	87,266	67,558	13,413	46,613	99,370	100,589	19,706	102,362	468,042	1,004,919
Coastal	Columbia River	5	*	*	1	1	*	*	5	29	41
Coastal	All	114,493	89,743	35,469	62,560	129,894	127,043	30,940	129,384	513,631	1,233,157
All	All	190,358	94,887	37,158	64,971	131,485	127,804	31,025	129,964	515,567	1,323,219

Research activity

Effective invasive species management requires a robust understanding of the invader and its impacts. As a prolific global invader, a wealth of research exists regarding green crab. However, many fundamental questions about green crab, particularly regarding their detection, abundance, impacts, and movements in Washington, have yet to be answered.

The Green Crab Research Task Force (RTF) continued to meet every other month in Q9 to accommodate increased field operations during the field season (April – October 2024). Meetings regarding individual tasks were postponed to October 2024 due to prioritized activities at the end of the field season.

Public communications and outreach efforts

Public education, involvement, and support are essential for effective invasive species management. No matter the effort of government agencies and managers, they will be limited in their ability to monitor and report on the species spread. Public awareness and reporting can complement professional monitoring and allow for earlier detection of species spread. Public awareness, media and external relations also supports effective policymaking and collaboration with local communities, stakeholders, and partners. Highlights for Q9 have included:

Focused/Local communication

- WDFW’s Regional Communications Specialist, Bridget Mire, and European Green Crab Outreach Specialist, Mitch Furr, coordinated outreach at the annual Grays Harbor County Fair on August 2 and 3, speaking with more than five hundred attendees. Consistent with other recent coastal outreach events, the WDFW booth prominently featured European green crab materials, stickers, and resources for identification. Many attendees were somewhat familiar with this invasive species through media coverage, online communications, or previous outreach efforts in coastal regions. This is a positive sign that communications and outreach efforts are working.
- WDFW European Green Crab Outreach Specialist Mitch Furr accompanied WDFW trapping crews in Grays Harbor on July 8-10 for hands on exposure to green crab trapping. Photos and videos from this outing will be used in coming months to develop a short identification video, or “reel”, which was published on [YouTube](#), [Facebook](#) and [Instagram](#), receiving more than 50,000 views across these platforms.
- On July 11, Washington Sea Grant and WDFW conducted a European Green Crab Partner Trapping workshop at WDFW’s North Puget Sound regional headquarters in Mill Creek. Diving into the intricacies of green crab trapping included lessons in trap selection, trap placement, methodology, bait selection, tidal recommendations and data collection, as well as public engagement and outreach. Coordinating the efforts of Co-managers, Tribe, and Partners is critical for effective green crab trapping and management efforts. Not only does it ensure that trapping is effective, but it also gives all parties a place in the green crab emergency as respective members of the scientific, management, and response effort. This allows our goals to

extend beyond removal, towards a better overall understanding of green crab population dynamics, as well as to engage the public and coastal communities.

- WDFW staff supported several other community outreach opportunities where European green crab materials were present, including the diversity-focused Refuge Outdoors Festival in Carnation, Fidalgo Bay Day in Anacortes , and a booth at National Hunting and Fishing Day in Castle Rock on Saturday, Sept. 28, where more than 150 people were in attendance. European Green Crab Outreach Specialist Mitch Furr and other staff had many positive conversations with attendees about green crab and other AIS.
- The European green crabs in resin and giveaway green crab ID and reporting stickers and ID cards continue to be popular outreach items.
- WDFW Communications and Public Engagement staff planned and coordinated for the Sept. 30 green crab Open House in South Bend, working closely with other WDFW staff and local partners. The event was a success with more than 30 people in attendance and constructive discussions about green crab trapping, status in coastal bays, and the long-term management plan.
- WDFW staff distributed updated green crab outreach kits to staff and partners throughout the state. WDFW is also developing new green crab encased in resin for durable outreach items and giveaways to partners and volunteers. The first batch is expected in October.
- Co-managers, tribes, and partners conducted green crab outreach at numerous other public events and community forums.
- All additional communication and outreach efforts are listed in [Appendix A](#), as well as online at: <https://wdfw.wa.gov/species-habitats/invasive/carcinus-maenas#conservation>.

General public communication

- WDFW Public Information Officer and communications manager Chase Gunnell, European Green Crab Outreach Specialist Mitch Furr, Coastal Region Communications Specialist Bridget Mire, responded to numerous media inquiries on green crab, including notable coverage in [Washington State Standard](#), Salish Current, Peninsula Daily News, and other outlets.
- WDFW communications staff worked with green crab field and IT staff to publish a new interactive map showing where green crab have been *confirmed by WDFW trapping crews*, [now on the European Green Crab Online Hub](#).
- WDFW continued advertisements supporting green crab identification, awareness, and reporting in select fishing, boating, and outdoor publications as well as rack cards on Washington State Ferries, following up on widespread print and poster ads and rack cards that ran in 2023. In July, ads ran in Northwest Sportsman Magazine and The Reel News. Ads will run through September 2024, followed by a planned pause until April 2025.
- Media relations and other external affairs activities continued. Current green crab management efforts have been reported in numerous local and national media outlets ([Appendix A](#)).
- Print and online advertisements supporting green crab identification and reporting continued to run in regional fishing, boating, and other outdoor publications and social media channels.

Green Crab 6-Year Management Plan

Since September 2023, WDFW facilitated the development of the European Green Crab 2025-2031 Management Plan for Washington. The plan was completed and submitted to the governor's office and the legislature ahead of schedule on September 25, 2024. The creation of the plan was a collaborative undertaking with > 40 co-managers, tribes, and partners involved in its development. The plan covers a wide range of topics including:

- Guidance for new and current participants in green crab management (e.g., history, protocols).
- Outline of statewide and regional objectives planned by co-managers, tribes, and partners.
- State and federal recommendations for funding and support for green crab management activities.

The plan is now publicly available and can be found at <https://wdfw.wa.gov/publications/02537>. WDFW would like to thank all those who contributed to the creation of the plan.

Program challenges

WDFW, co-managers, tribes, and partners have achieved significant progress toward the five Incident Objectives in a short timeframe. However, as we continue to progress through the green crab emergency, there are several challenges we must address. These challenges include:

- Focus on adaptive management. The increased number of green crabs captured during Q9 highlighted the ever-changing nature of green crab management in Washington. Many co-managers, tribes, and partners contacted WDFW and WSG for advice on best next steps and when they should change management actions in response to changing conditions. WDFW will work with co-managers, tribes, and partners on this issue.
- Reevaluation of the nature of the quarterly report. With the completion of the European Green Crab 2025-2031 Management Plan for Washington, the objectives of co-managers, tribes, and partners (including WDFW) are more clearly defined. The quarterly reports on the green crab emergency should directly address progress on both statewide and regional objectives. WDFW, with input from other co-managers, tribes, and partners, will review and update the format and content of the quarterly reports.
- Developing procedures for more nuanced and informative assessment of catch data. As the green crab emergency continues, sufficient data is being collected to assess inter and intra-annual trends. Future quarterly reports and SitReps require a more nuanced yet approachable examinations of catch data.
- Finding and retaining green crab field staff. WDFW, as well as co-managers, tribes, and partners, continue to experience challenges finding personnel to fill field positions relating to green crab management activities. In particular, the lack of affordable housing in coastal areas has proven a significant challenge. Discussions are ongoing for options to remove barriers to finding sustainable long-term workforces.

- Increasing communication and coordination of ongoing activities. The increasing number of co-managers, tribes, and partners actively involved in green crab management activities and the expanding scope of those activities necessitates more effective communication and coordination to avoid potential interference and redundancies. Regional coordination groups have been established to facilitate coordination and communication and show early signs of success.

Next Steps

- The green crab emergency management priority actions for next quarter (Q10: October 1 – December 31, 2024) include:
- Completion of the 2024 field season at the end of October 2024.
- Begin preparations for the 2025 field season. WDFW plans an earlier start for seasonal staff (March instead of April) to ensure a strong start.
- Compilation and analysis of green crab data from 2024. The Q10 quarterly report will contain an in-depth analysis of these data.
- Begin preparation for the 2025 Green Crab Managers Symposium, which will occur in February 2025.
- Develop procedures for a new grant program for EGC partners, funded by a \$1.5 million non-competitive award from NOAA to WDFW anticipated in 2025.

Glossary

AIS – Aquatic Invasive Species
DFO – Department of Fisheries and Oceans Canada
DNR – Department of Natural Resources
Ecology – Department of Ecology
EDRR – Early Detection Rapid Response
EGC – European green crab (*Carcinus maenas*)
ENSO – El Niño Southern Oscillation
FY – Fiscal Year
ICS – Incident Command System
MAC Group – Multi-Agency Coordination Group
NGO – Non-governmental organizations
NOAA – National Oceanographic and Atmospheric Administration
NWR – National Wildlife Refuge
PCSGA – Pacific Coast Shellfish Growers Association
Q1 – First quarterly phase of green crab emergency response (March 1 – Sep. 30, 2022)
Q2 – Second quarterly phase of green crab emergency response (Oct. 1 – Dec. 31, 2022)
Q3 – Third quarterly phase of green crab emergency response (Jan. 1 – March 31, 2023)
Q4 – Fourth quarterly phase of green crab emergency response (April 1 – June 30, 2023)
Q5 – Fifth quarterly phase of green crab emergency response (July 1 – Sep. 30, 2023)
Q6 – Sixth quarterly phase of green crab emergency response (Oct. 1 – Dec. 31, 2023)
Q7 – Seventh quarterly phase of green crab emergency response (Jan. 1 – March 31, 2024)
Q8 – Eighth quarterly phase of green crab emergency response (April 1 – June 30, 2024)
Q9 – Ninth quarterly phase of green crab emergency response (July 1 – September 30, 2024)
RCO – Recreation and Conversation Office
RTF – Research Task Force
SitReps – ICS Situation Reports
WDFW – Washington Department of Fish and Wildlife
WGHOGA – Willapa-Grays Harbor Oyster Growers Association
WSG – Washington Sea Grant
WSU – Washington State University

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Appendix A

WAC [220-640-030](#) - Prohibited level 1 species.

The following species are classified as prohibited level 1 species:

- (1) Molluscs: Family Dreissenidae: Zebra and quagga mussels: *Dreissena polymorpha* and *Dreissena rostriformis bugensis*.
- (2) Crustaceans:
 - (a) Family Grapsidae: Mitten crabs: All members of the genus *Eriocheir*.
 - (b) Family Portunidae: European green crab, *Carcinus maenas*.
- (3) Fish:
 - (a) Family Channidae: China fish, snakeheads: All members of the genus *Channa*.
 - (b) Family Clariidae: All members of the walking catfish family.
 - (c) Family Cyprinidae:
 - (i) Carp, Bighead, *Hypophthalmichthys nobilis*.
 - (ii) Carp, Black, *Mylopharyngodon piceus*.
 - (iii) Carp, Silver, *Hypophthalmichthys molitrix*.
 - (iv) Carp, Largescale Silver, *Hypophthalmichthys harmandi*.
 - (d) Family Esocidae: Northern pike, *Esox lucius*.

RCW [77.135.040](#) - Prohibited and regulated species – Required authorization

- (1) Prohibited level 1, level 2, and level 3 species may not be possessed, introduced on or into a water body or property, or trafficked, without department authorization, a permit, or as otherwise provided by rule.
- (2) Regulated type A, type B, and type C species may not be introduced on or into a water body or property without department authorization, a permit, or as otherwise provided by rule.
- (3) Regulated type B species, when being actively used for commercial purposes, must be readily and clearly identified in writing by taxonomic species name or subspecies name to distinguish the subspecies from another prohibited species or a regulated type A species. Nothing in this section precludes using additional descriptive language or trade names to describe regulated type B species as long as the labeling requirements of this section are met.

RCW [77.135.090](#) - Emergency measures

(1) If the director finds that there exists an imminent danger of a prohibited level 1 or level 2 species detection that seriously endangers or threatens the environment, economy, human health, or well-being of the state of Washington, the director must ask the governor to order, under RCW [43.06.010](#)(14), emergency measures to prevent or abate the prohibited species. The director's findings must contain an evaluation of the effect of the emergency measures on environmental factors such as fish listed under the endangered species act, economic factors such as public and private access, human health factors such as water quality, or well-being factors such as cultural resources.

(2) If an emergency is declared pursuant to RCW [43.06.010](#)(14), the director may consult with the invasive species council to advise the governor on emergency measures necessary under RCW [43.06.010](#)(14) and this section, and make subsequent recommendations to the governor. The invasive species council must involve owners of the affected water body or property, state and local governments, federal agencies, tribes, public health interests, technical service providers, and environmental organizations, as appropriate.

(3) Upon the governor's approval of emergency measures, the director may implement these measures to prevent, contain, control, or eradicate invasive species that are the subject of the emergency order, notwithstanding the provisions of chapter [15.58](#) or [17.21](#) RCW or any other statute. These measures, after evaluation of all other alternatives, may include the surface and aerial application of pesticides.

(4) The director must continually evaluate the effects of the emergency measures and report these to the governor at intervals of not less than ten days. The director must immediately advise the governor if the director finds that the emergency no longer exists or if certain emergency measures should be discontinued.

ESSB 5693 (2022 c 297)- Making 2021-2023 fiscal biennium supplemental operating appropriations

Section 308. (Page 552, Line 16)

(67) \$2,472,000 of the general fund—state appropriation in fiscal year 2022 and \$6,096,000 of the general fund—state appropriation in fiscal year 2023 are provided solely for the department to implement eradication and control measures on European green crabs through coordination and grants with partner organizations. The department must provide quarterly progress reports on the success and challenges of the measures to the appropriate committees of the legislature by December 1, 2022.²³

Q1 (March 1 – September 30, 2022) Green Crab Report

The Q1 report is available at <https://wdfw.wa.gov/publications/02372> or via this link: [European Green Crab Quarterly Progress Report – Fall 2022](#)

Q1 Catch data clarification

Please note that European green crab catch numbers in the Q1 report included green crab caught from Jan. 1 – Feb. 28, 2022. These months fall outside the official duration of Q1 (March 1 – Sep. 30, 2022) but were included to 1) accurately represent green crab removals for 2022 and 2) the submission process for SitRep 1 included co-managers, tribes, and partners submitting catch data from January 1- June 11, 2022, as a single number.

Q2 (October 1 – December 31, 2022) Green Crab Report

The Q2 report is available at <https://wdfw.wa.gov/publications/02414> or via this link: [European Green Crab Quarterly Progress Report – Winter 2022](#)

Q3 (January 1 – March 31, 2023) Green Crab Report

The Q3 report is available at <https://wdfw.wa.gov/publications/02431> or via this link: [European Green Crab Quarterly Progress Report – Spring 2023](#)

Q4 (April 1 – June 30, 2023) Green Crab Report

The Q4 report is available at <https://wdfw.wa.gov/publications/02446> or via this link: [European Green Crab Quarterly Progress Report – Summer 2023](#)

Q5 (July 1 – September 30, 2023) Green Crab Report

The Q5 report is available at <https://wdfw.wa.gov/publications/02460> or via this link: [European Green Crab Quarterly Progress Report – Fall 2023](#)

Q6 (October 1 – December 31, 2023) Green Crab Report

The Q6 report is available at <https://wdfw.wa.gov/publications/02491> or via this link: [European Green Crab Quarterly Progress Report – Winter 2023](#)

Q7 (January 1 – March 31, 2024) Green Crab Report

The Q7 report is available at <https://wdfw.wa.gov/publications/02508> or via this link: [European Green Crab Quarterly Progress Report – Spring 2024](#)

Q8 (April 1 – June 30, 2024) Green Crab Report

The Q7 report is available at <https://wdfw.wa.gov/publications/02524> or via this link: [European Green Crab Quarterly Progress Report – Summer 2024](#)

Green Crab Management Definitions

Management action type definitions

Assessment means periodically checking positive detection green crab areas using trapping methods to assess presence, geographic scope, and numerical scale of a population, at a relatively comprehensive scale. Assessment trapping efforts can occur on the scale of a water body or site, depending on the purpose. The timing and implementation of assessment trapping efforts is generally opportunistic.

Control means field activities within a given infested area with the intent of reducing that area's green crab population size.

Early detection means field operations in areas that have no prior green crab detections or detections within the past 5 years and with the intent to detect green crab at their earliest point in the invasion process. This includes such activities as trapping and eDNA.

Emphasis response means planned management actions including assessment, prospecting, or control effort over a given Site or Coordination Area that brings in a significant increase of resources as would be normal for that situation. It is similar to a rapid response trapping effort except not expedited as a result of a new detection.

Monitoring means a systematic and designed sampling effort for information-gathering purposes that is implemented consistently and on a routine schedule. Monitoring protocols are well defined and are relatively stable to evaluate changes over space and time. The specific purpose and geographic scope of any individual monitoring effort might vary to suit the project but should remain internally consistent.

Prevention means activities that aim to reduce the arrival of green crabs, either as larvae or adults, resulting from the transport/transfer of green crabs from one location to another – regardless of whether green crabs are present at the receiving location.

Research means field, lab, or other scientific actions implemented to investigate an aspect of the green crab invasion and for which the activities do not fall into standard protocols of any of the above management types. Types of research may include improving efficiency/efficacy of priority management actions, increasing biological knowledge, and predicting/assessing green crab or other impacts.

Other definitions

Catch Per Unit Effort (CPUE) is an indirect metric of the abundance of green crab in relation to a defined geographic area and time scale. It is used to indicate the amount of effort undertaken to collect a given number of green crab. For green crab emergency management data consistency purposes, CPUE must be reported and qualified:

- Per 100 traps as calculated to nearest 0.10 CPUE;
- By aggregate or individual trap type; and
- By cumulative Trap set days or Trap check days over the operational period or other defined time span of interest.
 - Example 1 - 30 green crab caught in 200 shrimp traps and deployed for 1 overnight period then recovered (200 trap set days): $30 \div 200 = 0.15 \times 100 = 15.0$ CPUE.
 - Example 2 -30 green crab caught in 200 shrimp traps and deployed for 3 overnight periods then recovered (600 trap set days): $30 \div 600 = 0.05 \times 100 = 5.0$ CPUE.

Detection means the new discovery of a live, dead, molt or other remains of an green crab specimen as verified by an green crab expert at a specific geographic location. Life stage or remains of green crab may trigger different management response at different geographic scales. This includes finds at locations where green crab have not been found for more than three years.

Education/outreach means providing information on potential pathways of human mediated risk/spread, green crab identification, and green crab reporting to relevant audiences. Examples might include presentations, creating printed collateral/signage, or informal conversations. This category is different from Training in being broader and less targeted in practical applications.

Green Crab Management Scale means a hierarchy of geographically defined areas from largest to smallest scale. This system is used for consistency in communications, planning, operations, and other ICS functions including:

- Regional – this includes states and provinces of Canada along the Pacific coast.
- Statewide – this includes approximately 3,500 miles of coastal area encompassing marine and estuarine habitats where green crab could become established.
- Branch – Statewide operations are divided into Coastal and Salish Sea branches which corresponds to major differences in green crab management strategies due to significant propagule pressures from green crab larvae arriving in Washington State from coastal sources in California, Oregon, and British Columbia.
- Management Area – Branches are further divided into 14 Management Areas based on WDFW’s recreational fishing marine areas with seven Management Areas within the Salish Sea Branch and seven within the Coastal Branch.
- Coordination Area – Management Areas are further divided into Coordination Areas based on a place name that best describes a sub-Management Area or it may be based on the jurisdictional lead for that area. Delineation of Coordination Areas continues to evolve based on input from local Management Area co-managers and partners.
- Site – Coordination Areas may be further divided into Sites based on a geographic area of connected, similar habitat suitability, or access limitations and where green crab management actions can be expressed as representing the whole geographic area.
- Sub-Site – Sites can be divided into Sub-Sites in more complex situations based on similar habitat or where different operational actions are required.

Green crab trap means one of four types of enclosed spaces that permit entry and prevent exit by green crab. Types used for green crab trapping operations include:

- “Fukui” trap (Fukui, Promar, etc.) means a single piece trap designed for the capture of small fish. Consists of a vinyl covered steel frame (60 × 45 × 20 cm) covered with square, single-knotted, polyethylene mesh (12 mm bar length). There are entrances at either end, with the netting panels forming a “V” shape to allow organisms to enter through slits. The traps can be flattened (collapsed) for easier storage and transport.
- “Minnow” trap means a cylindrical two-piece trap designed for capture of smaller green crab. When both halves are connected, the trap is 50 cm long with a 23 cm diameter and two inverted funnel-entrance holes, one at either end of a rigid mesh cylinder. Those used in green crab

management efforts by default have holes 25 mm in diameter and mesh that is 6mm at the widest.

- “Shrimp” trap means a single piece trap for capture of shrimp. Consists of vinyl covered steel box 61 cm X 61 cm X 23 cm with a built-in bait box in the center. Mesh size is variable depending on the brand, though usually 25 mm or 50 mm. There are four rectangular entrances (one in the center of each side), lined by inverted funnels of rigid Vexar mesh.
- Other trap type means any other method utilized for the capture of live green crab. Common examples include pitfall traps (holes dug to allow green crab to fall into for collection) or experimental traps.

Established means a population of a green crab where that population is expected to have a sustained presence based on evidence (i.e., three years of capture of multiple age classes and with increasing or relatively stable abundance irrespective of trapping effort intensity).

Habitat structure means the composition and arrangement of material, be it natural or man-made, within a habitat (e.g., vegetation, docks, rocks, and woody debris). Most commonly, elements of three-dimensional (rising off the bottom) and complex (with crevices in which to hide) structure are favorable to green crab survival.

Habitat suitability means the relative ability of a habitat to support green crab. Characteristics that can be used to assess habitat suitability include physical attributes (e.g., exposure to wave energy, depth, and temperature), chemical attributes (e.g., salinity, pH, oxygen) and biotic attributes (e.g., vegetation, available prey, competitors, and predators).

Hot Spot means an area with a substantially greater relative abundance of green crab than surrounding areas. Hot spots can be defined at the site level (e.g., a creek mouth within a water body) or at the Coordination Area-level (e.g., Lummi Sea Pond), and can be spatially nested, sites of high density within Coordination Areas of high density.

Incident Action Plan (IAP) means a concise planning document containing set goals and objectives that guide incident safety, logistics, operations, and other incident actions during a set operational period.

Incident Commander means the individual responsible for all green crab emergency measures activities, including the development of strategies and tactics and the ordering and release of resources. The Incident Commander has overall authority and responsibility for conducting green crab emergency measures operations.

Infested area means a geographic area that carries or contains green crab at a branch, management area, coordination area, or site scale.

Localized detection means green crab detection occurred in a coordination area or other location (ex. bay, lagoon, estuary, or tidelands) where European green crabs have not previously been confirmed, but is within a management area where green crab have been detected. Localized detections are anticipated during the invasion. WDFW will notify relevant agency staff, co-managers, tribes, partners, tidelands owners, and other community members. Depending on need, assessment trapping or rapid response may occur to prevent population becoming established and reduce risk of spread into new management areas.

Operational Period means the interval of time scheduled for execution of a given set of green crab management actions as specified by an Incident Commander.

Rapid response means expedited management actions based on new detections or the finding of a significantly increased population for the time-sensitive intent of determining scope of green crab invasion and containing or eradicating green crab before it spreads or becomes further established. (RCW 77.135.010(20)). Based on the outcome of rapid response actions, subsequent management action types may be implemented.

Training means providing information or instruction on prevention, early detection, rapid response or other green crab emergency management protocols. This category is distinct from Education/outreach in focusing on specific, practical applications.

Trap set days means when a trap is set intertidally or sub-tidally for the action of capturing green crab for a single overnight period. Overnight trap days are standard trapping protocols based on known green crab feeding activity patterns. If a trap is set and retrieved within a single calendar day, count it as a single trap day, but be aware that it may be later counted as a portion of a trap day for comparability with a standard overnight trap day.

- Total set trap days are counted from the day after a trap is set and includes the day the trap is removed. This metric is mostly a qualitative measure of effort during an operational period or season and may be used to estimate a gross level of potential green crab risk/density to help assess if additional support is needed.
 - Example 1 - 50 traps set on Monday, Aug 8, and retrieved Friday, Aug 12: $50 \times 4 = 200$ trap days.
 - Example 2 - 50 traps set on Monday, Aug 8, and retrieved Sunday, Aug 21: $50 \times 13 = 650$ trap days.
 - Example 3 - 50 traps set in a prior OP and to be retrieved in a future OP (example OP is 14 days): $50 \times 14 = 700$ trap days.

Trap check days means the number of days within an operational period that a trap is checked for green crab. This metric is mostly a qualitative measure of effort and may be used to estimate a gross level of potential green crab risk/density to help assess if additional support is needed in a given Coordination Area.

- Total trap check days means the cumulative number of traps checked every day the traps are deployed. If traps are checked every day, total trap check days will be the same as total trap days.
 - Example 1 - 50 traps set on Monday, Aug 8, and retrieved Friday, Aug 12, and checked every day: $50 \times 4 = 200$ trap check days.
 - Example 2 - 50 traps set Monday, Aug 8, and retrieved Sunday, Aug 21, and checked every day: $50 \times 13 = 650$ trap check days.
 - Example 3 - 50 traps set in a prior OP and to be retrieved in a future OP and checked every day: $50 \times 14 = 700$ trap check days.
 - Example 4 - 50 traps set Monday, Aug 8, and retrieved Friday, Aug 19, and checked every other day, excluding weekends (i.e., Monday, Wednesday, and Friday): $50 \times 5 = 250$ trap check days.

- Example 5 - 50 traps set Monday, Aug 8, and retrieved Sunday, Aug 21, and checked on Wednesdays only and the day the traps are retrieved: $50 \times 3 = 150$ trap check days.

Young of the Year (YOY) means green crab of any life stage that belong to the current-year recruitment cohort of green crab. The size and life stage of those individuals will depend on the time of capture and conditions for the year, locally and regionally. Generally, crabs that are captured in traps under 30mm are safely considered YOY regardless of time of year of capture, but YOY can reach up to ~50mm by the end (fall) of their first year.

List of Washington European green crab (EGC) management actions in chronological order for Q9 (July 1 – September 30, 2024) as provided in Situation Reports

Date	EGC Management Action
7/7/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
7/10/2024	European Green Crab Multi-Agency Coordination Group Meeting: Incident Situation Report Updates & Briefing, Budget Update, National Oceanic and Atmospheric Administration, “Movements of European green crab at habitats surrounding shellfish farming infrastructure during summer.” proposal review, federal and state updates.
7/17/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
7/24/2024	European Green Crab Multi-Agency Coordination Group Meeting: Situation report feedback, and allocation of 2025-2027 funding discussion.
7/27/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
7/29/2024	WDFW meeting with NOAA Fisheries, Office of Habitat Conservation, Restoration Center on Federal Fiscal Year 2024 programmatic funding for management, intervention, and mitigation of invasive European green crab.
8/5/2024	WDFW supported “bioblitz” survey in Quillayute River estuary near La Push in coordination with Quileute Tribe. WSG attended and helped conduct survey. WDFW AIS unit EGC staff attended and helped provide traps. WDFW also designed EGC trapping area signage to be printed and posted around the La Push area by Quileute Tribe to increase public awareness around EGC trapping activities as well as identification and reporting. 33 EGC were removed (24 male, 9 female) through August 8. This is the first time EGC have been verified in the North Central Coast Management Area. WDFW will work with Quileute Tribe on announcement of new EGC detection in this area.
8/6/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
8/15/2024	European Green Crab Multi-Agency Coordination Group Meeting: NOAA Fisheries Office of Habitat Conservation, Restoration Center Funding, Budget Overview, Quinault Indian Nation Funding Proposal, Communications Update, Situation Report Feedback Continued Discussion.
8/17/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
8/19/2024	WDFW and Quileute Tribe distributed a news release “European green crabs detected in Quillayute River estuary near La Push”

8/26/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
8/28/2024	European Green Crab Multi-Agency Coordination Group Meeting: Department of Ecology Conceptual Decision Package, Long-Term Management Plan Update & Recommendations.
9/1/2024	WDFW published the European Green Crab Quarterly Progress Report – Summer 2024 . These reports are also submitted to the Governor’s office and state legislators.
9/5/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
9/15/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
9/18/2024	European Green Crab Multi-Agency Coordination Group Meeting: Incident Situation Report, University of Washington European Green Crab Genetics Project, 2025 EGC Management Symposium, Long Term Management Plan Recommendations & Next Steps, and Joint Letter of Support for Senate Federal Fiscal Year 2025 European Green Crab Proposals.
9/23/2024	WDFW, co-managers, tribes, and partners submitted a letter of support to the State Congressional Delegation expressing support for Federal Fiscal Year 2025 appropriations to address EGC.
9/25/2024	WDFW submitted a 10-day emergency measures status update to the Governor’s Office and Office of Financial Management advising that all emergency measures should continue, as well as other priority EGC updates.
9/26/2024	WDFW published the European Green Crab 2025-2031 Management Plan for Washington and distributed a news release as well as short social media video on EGC identification and reporting on Facebook , YouTube , and Instagram . The plan was also submitted to the governor’s office, state legislators, and Office of Financial Management.

List of media reporting in chronological order related to Washington European green crab management for Q9 (July 1 – September 30, 2024) as provided in Situation Reports

Date	Outlet	Headline	URL
7/9/2024	The New Tribune	One of the worst invasive species threatens WA waters. Here’s what to do if you see it.	https://www.thenewstribune.com/news/local/community/gateway/g-news/article289851354.html
7/19/2024	South Whidbey Record	Citizen scientist training planned for European green crab.	https://www.southwhidbeyrecord.com/life/citizen-scientists-on-the-prowl-for-invasive-crab/
7/26/2024	KUOW	Claw for concern: The green crab epidemic threatening Washington clams.	https://www.kuow.org/stories/claws-for-concern-the-green-crab-epidemic-threatening-washington-clams

7/30/2024	My Northwest News	Invasive green crabs linked to decline of shrimp, clam populations.	https://mynorthwest.com/3971446/invasive-green-crabs-linked-decline-shrimp-clam-populations/
8/20/2024	My Clallam County	Invasive crab species found at La Push.	https://www.myclallamcounty.com/2024/08/20/invasive-crab-species-found-at-la-push/
8/20/2024	KIRO 7	Invasive crab spreading along Washington coast.	https://www.kiro7.com/news/local/invasive-crab-spreading-along-washington-coast/M7EZPSD5WFB3JMH2XKAA6GINEY/
8/21/2024	Peninsula Daily News	European green crabs detected in Quillayute River estuary.	https://www.peninsuladailynews.com/news/european-green-crabs-detected-in-quillayute-river-estuary/
8/21/2024	Oregon Coast Beach Connection	Invasive Green Crab Found at Washington Coast's La Push.	https://www.beachconnection.net/news/invasive-green-crab-found-washington-lapush.php
8/22/2024	NOAA	Coastal Habitat Restoration and Resilience Grants for Tribes and Underserved Communities Selected for Funding.	https://www.fisheries.noaa.gov/national/habitat-conservation/coastal-habitat-restoration-and-resilience-grants-tribes-and
8/28/2024	Port Townsend Leader	In first, invasive European green crab found in north Washington.	https://www.ptleader.com/stories/in-first-invasive-european-green-crab-found-in-north-washington,178414?
8/29/2024	The Cool Down	State officials scramble after discovering highly invasive species capable of wiping out major West Coast industry: 'Threatens our environment and coastal economies'.	https://www.thecooldown.com/outdoors/european-green-crab-in-washington-state/
9/3/2024	Salish Current	Lummi Nation battles invasive European green crab.	https://salish-current.org/2024/09/03/lummi-nation-battles-invasive-european-green-crab/
9/4/2024	Washington State Standard	No end in sight for Washington's battle against invasive green crabs.	https://washingtonstatestandard.com/2024/09/04/no-end-in-sight-for-washingtons-battle-against-invasive-green-crabs/
9/4/2024	The Spokesman Review	No end in sight for Washington's battle against invasive green crabs.	https://www.spokesman.com/stories/2024/sep/04/no-end-in-sight-for-washingtons-battle-against-inv/
9/5/2024	Newstalk KFLD 870	Invasive Green Crabs Here to Stay in WA, Say Experts—Battle Continues.	https://newstalk870.com/invasive-green-crabs-here-to-stay-in-wa-say-experts-battle-continue/