EARLY DETECTION MONITORING PROTOCOLS FOR EUROPEAN GREEN CRAB

Created by Pacific Salmon Foundation and Coastal Restoration Society for the Aquatic Invasive Species Fund, Department of Fisheries and Oceans Canada

PACIFIC SALMON FOUNDATION

Fisheries and Oceans Canada

Pêches et Océans Canada

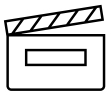
COASTAL RESTORATION SOCIETY

Table of Contents

Protocols have been compiled by Pacific Salmon Foundation (Maria Catanzaro) and Coastal Restoration Society (Crysta Stubbs and Tyranna Souque) and are adapted from: DFO EGC Early Detection and Monitoring Protocol v5, Boat Methods prepared by Coastal Restoration Society, methods used by Sea to Sky Invasive Species Council. Advice from Clare Greenberg (SSISC), Emily Grason (Marine Ecologist, Washington Sea Grant, Crab Team Program Lead), Chelsey Buffington (WDFW), Renny Talbot (DFO), Christine Spice (DFO), Allie Simpson (NWSC), Leah Robison (NWSC), and Dawson Little (Makah Tribe) was also incorporated. Updated February 2025.

Part A: Preparation for Early Detection Monitoring

Familiarize yourself with European green crab and take the ISCBC courses



1. Check out these videos:
   - European Green Crab by Coastal Restoration Society
   - Introduction to European Green Crab Early Detection Monitoring

2. Participate in the Invasive Species Council of BC courses:
   - Getting to Know European Green Crab
   - Trapping and Licencing; European Green Crab Program

If you have trouble accessing the courses, contact:
Nadine McCosker (nmccosker@bcinvasives.ca), Megan Blackmore (mblackmore@bcinvasives.ca) or info@bcinvasives.ca
250-305-1003 Toll-free: 1-888-933-3722

Colour variation of European green crab. Orange male (left) and brownish female (top) and yellow green female (right). Not all EGC are green. Photo credit: Allie Simpson.

If you are a non-Indigenous group determine permissions

Connect with local First Nations in your area for permission to monitor in their territory.

Obtain a scientific collection licence

A Section 52 Licence from the Department of Fisheries and Oceans Canada (DFO) is required to trap EGC in British Columbia. It can take up to 45 days for DFO to draft, review, approve, and issue a licence. https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/scientific-scientifique/licence-sci-permis-eng.html

- For renewals with no changes to licence conditions, email your local licensing officer to request a new licence for the season instead of submitting a new application.
- For guidance on filling out the application, see **Appendix A**.
- At least one individual who is listed on the licence must be present when trapping. Two people are required for sampling by foot, however, a team of three is preferable.

Submit your application to:

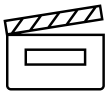
- DFO.SCA_SC_Licence_Applications-Applications_de_licence_SC_SCA.MPO@dfo-mpo.gc.ca, please also CC Christine.Spice@dfo-mpo.gc.ca on your submission.

Acquire Appropriate Gear and Clothing

Crews participating in early detection monitoring will be walking in intertidal muddy habitats and should have appropriate gear to work safely in these areas. The following list identifies gear and equipment that each participant should have.

- chest/hip waders, or hip high boots (worn by at least one crew member but ideally all)
- hunting backpacks or sled for carrying gear
- warm breathable layers and waterproof jacket
- hats/sunglasses/sunscreen
- protective gloves for handling crabs and bycatch
- extra set of dry clothes
- high vis vest and PFD if applicable

Site Selection - Consider possible sites



Watch this video on Site Selection

When performing early detection monitoring, it is integral that efforts are focused within microhabitats where EGC are most likely to be found during the early stages of invasion. EGC utilize intertidal sites, bottlenecks in streams/channels or coves, muddy/soft sediments, extensive tidal flats, pooling water that doesn't dry up at the lowest tides, lagoons, sloughs and meandering channels. EGC often prefer habitats with high availability of cover habitat (such as undercut mud banks, logs/root wads including areas with an accumulation of large woody debris, aquatic vegetation, and saltmarsh vegetation), absence of predators (including mammals such as: otters or mink), presence of prey (e.g., bivalves, small shore crabs, snails), and derelict structures that can provide microhabitats (docks and pilings).

Additional Site Attributes to Consider

- Is there safe access?
- Do you require a boat or is the site accessible by foot?
- Is there public access (if Stewardship group)?
- Do you need permits for the region (e.g., Boundary Bay Wildlife Management Area)?
- Is it feasible to conduct repeat sampling at least once a month from April- September?
- What are some logistical constraints for these areas?
- How long does it take to reach each site?

Check out the interactive Site Selection Tool to help guide your site selection process.

Initial Site Visits – Confirming whether sites are suitable

- You can use the Site Characteristic Form (**Appendix B**) to help assess site suitability.
- Schedule a visit to the site just before the lowest tide (below 1.4m).
- Be sure to minimize disturbance to habitats (e.g., avoid anchoring in eelgrass, use the same paths for walking along salt marshes). If you're reaching a remote area by a landing craft, create an approach path to the site to avoid disturbing sensitive habitat where possible.
- Avoid areas with excessive desiccating vegetation. The lack of oxygen may cause stress to the species in the traps and result in mortalities.
- Predetermine areas to set six traps in a row within a site.
- Consider the timing and path of salmon migration and avoid disturbing these areas when applicable.
- Suitable habitat often yields the following species in your traps: hairy shore crab, staghorn or tidepool sculpin, graceful crab, juvenile Dungeness crab, hairy helmet crab, or hermit crab. If you are finding a lot of adult red rock crab, adult Dungeness crab, terrestrial mammals, or no crabs, then reconsider the site/location of your traps. In the early spring there may be very few active species so if you aren't finding species on the beach or in your traps try again when it warms up.

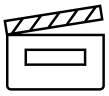
Determine priority sites and create a monitoring schedule

Select your priority sites and create a monitoring schedule to trap once a month at each site, if possible, from April to September (6 events, 12 days total). You will want to sample during a low tide to prevent the traps from coming out of the water accidentally. In some cases when the temperature has been consistently hot (for several days in a row), you can deploy traps deeper after the low tide and retrieve them prior to the next low tide to reduce the risk of mortalities. Alternatively, you can deploy traps during a week with solely mid tides if the location is still accessible which allows traps to remain deeper and cooler during the 24-hour soak.

If you are interested in posting educational European green crab signage in your community, fill out the form in **Appendix C** and submit it to Christine.spice@dfo-mpo.gc.ca.

Part B: Early Detection Monitoring Protocols

Preparing for Day 1



Check out this video on How to Set Yourself Up for Day 1 (Safety Plans and Gear Overview)

Check out **Appendix G** for the Short Field Guide

Notify the First Nations on whose territory you are trapping

- Develop a communications plan

Notify the Department of Fisheries and Oceans

- The Aquatic Invasive Species Program would like to receive notifications for early detection monitoring prior to trapping (at least 24 hours in advance). See **Appendix D**.

Safety Plan and Meeting

- Discuss safety concerns prior to heading out to deploy traps and create a site-specific safety plan. Let a team member not in the field know your plan for the day (arrival on site, arrival home, etc.), so they know when to expect your return.

Tips for walking in muddy conditions: shorter, steady pace, slightly relaxed/knees bent to cope with any sudden slips, more weight on toes. Narrow fitting boots if not using wader boots.

Prepare Traps

- Add tags/labels to your traps with your group name, number and 'EGC Research'.
- Attach rot cord to traps (1 on minnow traps and ~4 on the folding prawn traps). The rot cord prevents ghost fishing if any traps get displaced. Tying a simple but secure bow allows for easier opening when you are retrieving your traps and ease of reusing the same cord over time, until they are in need of replacement (possibly each new trapping season). Adding small knots at the end of each rot cord helps prevent it from unravelling (shown at 0:40 – 2:25).
- In cases where there is the concern of terrestrial species entering your folding prawn traps, secure zap straps in an X shape to the openings to reduce the entrance size, demonstrated here (~2:25). Alternatively, some folding prawn traps can be purchased with smaller entrances.
- Adjust minnow trap openings to be 2" (if not already that size), as the smaller entrances do not appear to catch juvenile green crab (~2:57). Use tin snips to cut the entrances in

four places and either cut those extra pieces off or bend/fold the pieces down – ensure it is not poking out so it won't cause injury to fish that may swim through. Alternatively, you can make four cuts and add a washer to the opening before folding the snipped pieces down to secure in place.

- Add your contact details to any buoys being used.

Prepare Bait

- Remove bait (herring) from the freezer approximately 24 hours before departure or pre-cut herring into three chunks and freeze beforehand, which will allow teams to remove bait only a couple of hours before trapping.

Gear for Day 1 Deploying Traps (for 2 monitoring sites)	**Gear for Day 2 Retrieving Traps** *All equipment from Day 1* in addition to the following:
Copy of your Section 52 licence	Daily task list
Datasheets & pencil, or data collection device	Device with camera for pictures
Extra rot cord and gangen string (for trap repair and general use)	Two sorting bins (one to empty trap contents and one counting bucket)
Small knife (for trap repairs)	Species ID sheet (crabs, fish, etc.)
Pliers (for adjusting backpack strap height)	Calipers
Traps: 6 minnow traps, 6 prawn traps with contact tags (group name, phone number, 'EGC Research')	Ziploc bags if carrying out old bait and to hold any EGC if found
GPS device	
Spare clips for traps	
12 bait jars (one per trap)	
Prepared bait for 12 bait jars (1 herring broken into 2-3 pieces per trap)	
Bright-coloured flagging tape or buoys to identify traps	
Trap stakes- 12 stainless rods (1 m), or two 70 m ropes with buoys on either end, or a roll of gangen for tying traps to objects on shore	
Salinity meter	
Safety equipment: • site specific safety plan with emergency contact information • bear spray • high visibility vest • first aid kit (Level 1 or Level 3 in remote locations) • cell phone • PFDs If you access the site by boat: VHF radio, PFDs for each person on board, flares, and a horn	

Day 1 of Monitoring

Check out this video on How to Prepare and Deploy Traps on Day One

Step 1: Load Bait

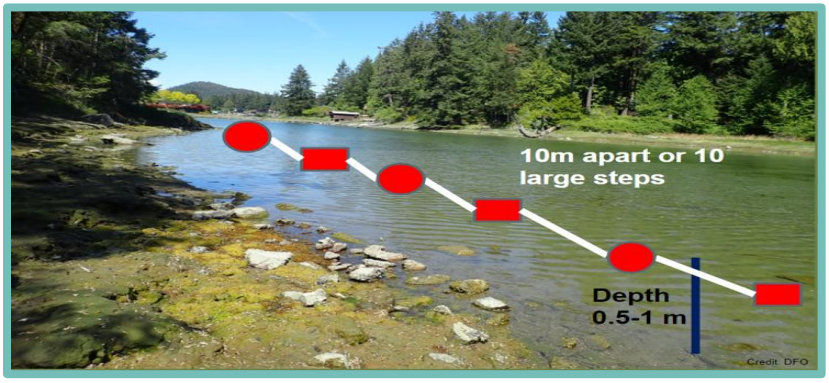
Place 1 herring (broken into two or three pieces) into a bait jar and place in each trap. If the herring is small, add extra.

Gee-Minnow Trap

Folding prawn trap

Step 2: Deploy Traps

- Set traps 10 m apart, alternating between minnow and folding prawn traps, with six per site (below).



- Secure traps in place with the following methods:
  - Stainless rod with L shape: drive the rod on an angle through the top of the minnow traps and straight down for the prawn traps to the sediment below until the handle portion of the rod is snug along the top of the trap when possible.
  - Tie traps individually to objects on shore (root wads, secure branches).

    - If there is a strong current or high flow at your site: attach the traps to a groundline (leaded line) secured on either end by weights or stable objects (e.g., tree, log), this will help ensure the traps don't get washed away.
- Place traps at the same tidal height when possible.
- Avoid putting a line (i.e., groundline/rope) in vegetated areas as the line may scour and damage the habitat during wave action.
- If there is floating vegetation, place trap openings in the opposite direction to avoid algae floating into the traps.
- Set the traps at the low tide and retrieve them approximately 24 hours later when the ebbing tide first drops low enough to reach your traps. Plan to arrive with ample time to prepare the traps on shore and enough time to walk to the depth you want.
- In some cases when the temperature has been consistently warm (for several days in a row), we recommend rescheduling trapping. Alternatively, consider deploying traps after the low tide and retrieving them prior to the next low tide to reduce the risk of mortalities. This is not applicable during weeks of mid tides that would allow traps to remain deeper at all times.
- Take precautions to limit stress and bycatch mortality posed on native species by placing traps in areas that will remain underwater (set with enough space to not dewater between low tides). For example, pools or channels that hold water throughout low tides. Depth should be approximately 0.5 m to 1.0 m during the low tide period.
- Avoid areas with desiccating vegetation, as this can cause stress due to the lack of oxygen.
- Attach flagging tape to the traps or add buoys to the ends of the groundline when necessary to help your team locate the traps and ensure others who may be operating vessels or using the area recreationally can see where traps and stakes are placed. If using buoys, ensure there is enough slack on either end of the leaded line to allow the buoys to float on the surface with the rising tide.

Step 3: Collect Initial Data

Record the following metrics on your paper data sheet (**Appendix E**):

- site name
- GPS location (in decimal degrees)
- date and time of traps set (this helps the data manager calculate total soak time and catch per unit effort of each trap)
- sampler names

If using the Survey123 app (**Appendix F**), record the site name and drop date and time in the notes on your device for input into the survey the following day.

Step 4: Clean Equipment

Clean boots, waders, and other equipment to **avoid the transfer of invasive species** from one site to another.

- Remove mud, algae, plants and animals from all gear at your site prior to departing.
- Once you're back at your field station, rinse all gear with freshwater.
- Allow items to dry for 24 hours, preferably in sunlight.
- If you travel by boat: thoroughly rinse the vessel and bilge prior to leaving your trapping site.

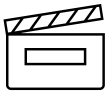
For more information: www.bcinvasives.ca/play-your-part/play-clean-go/

Step 5: Organize Data

Take a moment once you return, to ensure all fields are filled out before syncing or typing up your data from the day. It's a good idea to look over the data while the day is fresh in your memory and make any necessary corrections.

Day 2 of Monitoring

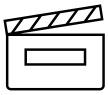
Step 1: Data Collection



Watch this video on How to Collect Data on Day Two

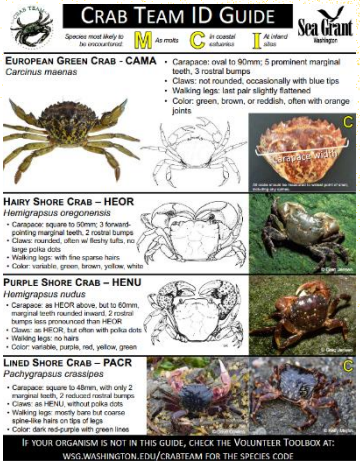
Record the following metrics on your paper data sheet (**Appendix E**) or in the Survey123 app (**Appendix F**):

- site name
- GPS location
- date and time of trap set and retrieval
- sampler names
- observations such as weather, vegetation, animal tracks, issues with traps
- set number
- trap number – the first trap pulled on a set is considered 'Trap 1'
- record water temperature (°C) and salinity (ppt)



Check out this video on How to Measure Salinity and Water Temperature

Count and identify species captured



- Release the contents of one trap into a small shallow basin (in some water to help reduce stress). White basins are best to see all contents in the trap.
- Identify, count, and record all non-crab species.
- Return fish species first followed by the remaining native species.
- Do not count anything sitting on top of the trap.
- The data sheet will have a column to record trap usability – whether the data is usable if the trap was fishing normally. Usability is a 'no' if the trap is upside down, open, has a hole, has been damaged, or if the bait cup is not secured.
- When identifying bycatch, use the species ID - Crab Team ID Guide to help. If you are uncertain of the species, take a photo, enter "unknown species", and make a note to enter in the correct species name upon returning from the field. For this, participants may consult field guides, other experts for advice and utilize iNaturalist.
- Count and sex all crabs before releasing them. Measure the first 10 male, 10 female and 10 berried individuals for each crab species prior to releasing them. Release all native species as soon as possible to the same area they were found. Retain all EGC. Photograph the various species the first time you come across them, or if you are unable to identify them. Write in the notes if there is a photo and add general species description if more than one per trap.

Trapping technician collecting the point-to-point carapace width of an adult EGC using Vernier calipers.

- Measure the carapace width (mm) (point to point) (across the widest part of the carapace including the spines) for all crabs captured.

Check out these videos: Commonly Found Bycatch & How to Identify European Green Crab

Male EGC (lighthouse).

Female EGC (beehive).

Berried female EGC (beehive) with orange or brown eggs.

- Record any conditions that would interfere with data collection and trapping results and observations such as EGC behaviour, changes at the trapping site or issues with trapping.
  - Behavioural observations include agonistic behaviour around traps, eelgrass clippings, feeding pits, or targeting of native fish species.
  - Habitat information includes unexpected physical characteristics such as abnormal turbidity or unusual disturbances by wildlife or boats.
- Record any evidence of fish or terrestrial mortality and report to DFO.
  - If terrestrial bycatch is found, this may be a result of traps being placed too shallow within the intertidal zone, consider re-assessing the tides and positioning of the traps.
- Unless the local jurisdiction has expressed concerns, it is permissible to empty the contents of the bait jars (herring) into the water. Some jurisdictions (e.g., wildlife management areas) may request that you do not toss the used bait back into the water after sampling.

Check out this video about What to do if you find European green crab

- Do not release EGC back into the water.
- Euthanize the crabs by freezing for a minimum of 3 days and then dispose of in the landfill unless otherwise stated in the conditions of licence.

- DFO may wish to collect a DNA sample if there are >10 crabs captured (kept alive in a cooler or Ziploc bag). Contact Christine Spice (250) 740-5736, Christine.Spice@dfo-mpo.gc.ca. Photograph and note the date, location, sex, size, and time captured.
- If you are finding large numbers of EGC, then a new protocol for response trapping may be necessary.

Step 2: Clean Equipment

- Ensure all boots, buckets, traps, waders, and other equipment are cleaned thoroughly before being used elsewhere (e.g., separate water bodies or bays). This can help avoid the transfer of invasive species from one site to another.
    - Remove mud, algae, plants & animals from all sample gear prior to leaving your site.
    - Rinse all gear with freshwater once you're back at the field station.
    - Allow items to dry for 24 hours, preferably in sunlight.
- Thoroughly rinse the vessel and bilge if traveling by boat prior to leaving trapping site.
- Rinse knife in saltwater and then again in freshwater when you return.
- Wash bait jars regularly, with dish soap in a large tote away from any freshwater, marine or riparian areas. Then rinse with freshwater.

Step 3: Data Sharing

Type your data into an excel spreadsheet provided by DFO or submit your Survey123 data to DFO at your earliest convenience. Download this form (DFO data collection format) and send the excel file to DFO.

Appendices:

Appendix A – Guide for Scientific Licence Application

Guidance on filling out the section 52 scientific collection licence application

1. You will be targeting one species, but you will be catching native species as well. You may catch European green crab (EGC) at multiple life stages depending on the time of the year and the locations you are trapping. When filling out this part of the form, you only need to fill out the following:

Species Common Name	Species Scientific Name	Life Stage	Number
European green crab	*Carcinus maenas*	All	All captured

2. **Gear types to be used**: minnow and folding prawn traps
3. **Location description**: If possible, include a screenshot of a map with points over your sites.
4. **Purpose**: Include all crew names who will be conducting the monitoring, including their birth dates. A summary like the one below can be used:

The aim of our work is to conduct European green crab early detection monitoring. Trapping will occur in the intertidal zone, primarily in estuaries, saltwater marsh channels, and other freshwater influenced beach habitats. Traps will be set with enough space to not dewater between low tides. Traps will be deployed and retrieved within a 24-hour period. Protocols from the Pacific Salmon Foundation and the Coastal Restoration Society (adapted from the DFO, WA Fish and Wildlife, CRS, SSISC) will be utilized. All native species will be released promptly after data are collected in the same location they were found. Data will be collected on all species captured. The aim is to visit the site(s) once monthly (2 days total) from April to September (six traps per site). Health and safety will be discussed for each trip. Traps will be secured along a line, individually staked with metal stakes in the substrate or individually tied to objects (like branches) nearby. Rot cord will be attached to all traps. Labels will be tied to the traps to indicate our contact information and be labelled 'EGC Research'. The EGC, if found, will be euthanized by freezing for a minimum of 3 days and disposed of upland. DFO will be notified immediately.

Appendix B – Site Characteristic Form

EUROPEAN GREEN CRAB SITE CHARACTERISTIC FORM

General location description:	Site Name: Latitude (DD): Longitude (DD): Date:

Does the site have many of the following attributes? (check all that apply)

Habitat Features

- ☐ Intertidal sites
- ☐ Predominantly muddy/soft sediments
- ☐ Isolated water body (e.g., lagoon)
- ☐ Small isolated pools that don't dewater at low tide
- ☐ Extensive tide flat, sloughs or meandering tidal channels
- ☐ Availability of cover (undercut mud banks, logs/root wads, log debris accumulations, marsh vegetation, aquatic vegetation (eelgrass)
- ☐ Sheltered from high wave exposure
- ☐ Tidally influenced freshwater outlets (creeks, streams, rivers etc.)

Food Sources

- ☐ Presence of bivalves and/or snails
- ☐ Presence of small shore crabs

Predators

- ☐ Absence of predators (including mammals like otters/mink and large crabs like red rock/Dungeness)

Access & Feasibility (check all that apply)

- ☐ Public access to the site (if you're a non-Indigenous stewardship group)
- ☐ Safe access to the site
- ☐ Reasonable walking distance to vehicle
- ☐ Safe parking area nearby
- ☐ Not a protected area (Wildlife Conservation Area, Migratory Birds Sanctuary, etc.)
- ☐ No to low risk of getting stuck in mudflat
- ☐ Approx. 60 m linear area to set traps (not necessary but ideal)
- ☐ Possible to sample once/month April- September

Directions to site:

Additional notes

Is the site suitable for regular monitoring?

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

Appendix C – Application for European Green Crab Signage

Fisheries and Oceans Canada | Pêches et Océans Canada

Application for European Green Crab (EGC) Signage

The Pacific Salmon Foundation and Department of Fisheries and Oceans Canada, Aquatic Invasive Species Core Program have partnered to develop EGC Signs and education and outreach materials. If you would like to assist by placing the sign in an area to enhance awareness of this invasive species, please complete this application form. Applicants must be part of an Indigenous Government, agency, or stewardship group. Depending on your need, applicants can apply for more than one sign. Signs will be provided free of cost. Applications will not be accepted from individual applicants. Applicants proposing to place signs along the coastline of the Salish Sea will be prioritized, however other coastal areas will also be considered. DFO and PSF hold the rights to distribute the signs to locations deemed best for education purposes.

The signs are 20 x 24" and printed on vinyl with a clear protective laminate. Signs are mounted on 3 mm thick aluminum composite panel. Two holes are pre-drilled for easy installation.

If you have any questions, please contact Christine.Spice@dfo-mpo.gc.ca

Applicant/Contact Name: **Date of Application:**

Agency/Group Name: **Closest Municipality:**

Agency/Group Address, email and phone number:

Delivery Details: (example- Please deliver the sign to XXX between the hours of XXX)

Location of Sign (example: In the parking lot of the Lost Lagoon Boat Launch) * You will be required to collect and report to DFO the GPS Coordinates after signs are installed.	**Landowner Jurisdiction:** (example: Lost Lagoon Municipality)

Fisheries and Oceans Canada | Pêches et Océans Canada

Signs are available in 2 sizes: approximately 11x 17 (small) and 20 x 24 (large). Note: The larger signs display the best.

Please indicate what size you would prefer: _____

By ticking the following boxes, you agree to the following:

- ☐ I have permission of the landowner to install this sign (s)
- ☐ My agency will cover all installation costs
- ☐ My agency will ensure that the installation adheres to all rules and regulation of the site jurisdiction
- ☐ My agency will ensure the sign is inspected and maintained (e.g. graffiti removal, bolt tightening etc.)
- ☐ Once the sign is erected, my agency will supply the GPS Coordinates of the sign location within 5 business days to: Christine.Spice@dfo-mpo.gc.ca

Agency/Contact Signature:

_____

Please submit the completed form to: Christine.Spice@dfo-mpo.gc.ca

Thank you for your interest in helping to enhance awareness of the invasive European Green Crab.

Appendix D – Notification of Trapping Guide

The Aquatic Invasive Species Program (Department of Fisheries and Oceans) would like to receive notifications for early detection monitoring prior to trapping (at least 24 hours in advance), including:

Licence number:
Name on licence:
Names of people trapping:
Team lead contact:
Trapping area/location:
Types of fishing equipment being used: minnow, folding prawn traps, prawn traps
Date/time of trap deployment:
Date/time of trap retrieval:

An email can be sent to: DFO.AISPacific-AISPacifique.MPO@dfo-mpo.gc.ca and Conservation and Protection Officers in your region (below). Or you can reach DFO Radio (1-800-465-4336) outside of business hours.

If there are any fish mortalities when traps are retrieved, or if any traps are lost, send a follow up message to provide details.

Area	Office Detachment Supervisors and fisheries officers
Victoria, Esquimalt	Mandy.Ludlow@dfo-mpo.gc.ca, Mya.Cormie@dfo-mpo.gc.ca
Duncan, Gulf Island National Park Reserve, Southern Gulf Islands, Sidney, Cowichan	Mandy.Ludlow@dfo-mpo.gc.ca, Cam.Blacklock@dfo-mpo.gc.ca
Nanaimo, Chemainus, Ladysmith, Fanny Bay, Courtney, Comox	Monte.Bromley@dfo-mpo.gc.ca, Shaun.Tadei@dfo-mpo.gc.ca
Campbell River	Steve.Beckett@dfo-mpo.gc.ca, Greg.Askey@dfo-mpo.gc.ca
Port Hardy	Steve.Beckett@dfo-mpo.gc.ca, Natasha.Dickinson@dfo-mpo.gc.ca
Sunshine Coast, Sechelt, Powell River	Matthew.Conley@dfo-mpo.gc.ca, Ben.Rahier@dfo-mpo.gc.ca

Appendix E – Early Detection Monitoring Datasheet

European Green Crab Early Detection Monitoring
Datasheet

Organization: _____ DFO License Number: _____

Lat (DD): _____ Long (DD): _____

Site Name: _____ General Area: _____

Drop Date: _____ Time: _____ Pull Date: _____ Time: _____

Set 1 (circle one): groundline (rope) or individual traps? **Salinity (ppt):** _____ **Temp (°C):** _____

***If you find any European green crabs (EGC), put them in a Ziploc and contact DFO right away. if this is a NEW detection of multiple EGC, DFO may want live specimens for DNA analysis**

DFO.AISPacific-AISPacifique.MPO@dfo-mpo.gc.ca

Trap type (minnow or prawn)	Trap #	Species name	Sex (only crabs)	Size (mm) of first 10 male, 10 female, and 10 berried crabs (if not a crab write name and # only NO sex or size)										Total #	Comments
minnow	1	EGC	M	62	63	66	66	64	65	63				7	examples
minnow	1	EGC	F	61	60	88	53							4	examples
minnow	1	EGC	B	44										1	examples

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

European Green Crab Early Detection Monitoring
Datasheet

Lat (DD): _____ Long (DD): _____

Site Name: _____ General Area: _____

Drop Date: _____ Time: _____ Pull Date: _____ Time: _____

Set 2 (circle one): groundline (rope) or individual traps? **Salinity (ppt): _____ Temp (°C): _____**

***If you find any European green crabs (EGC), put them in a Ziploc and contact DFO right away. if this is a NEW detection of multiple EGC, DFO may want live specimens for DNA analysis**

DFO.AISPacific-AISPacifique.MPO@dfo-mpo.gc.ca

Trap type (minnow or prawn)	Trap #	Species name	Sex (only crabs)	Size (mm) of first 10 male, 10 female, and 10 berried crabs (if not a crab write name and # only NO sex or size)										Total #	Comments
prawn	1	Kelp crab	M	60	56									2	examples
minnow	2	Staghorn sculpin												2	examples

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

Appendix F – Survey123 Guide

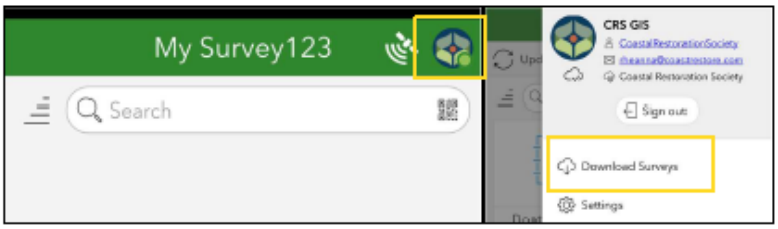
Guide for Data Collection with Survey123

<u>Before you enter the field, please do the following while connected to wifi:</u>

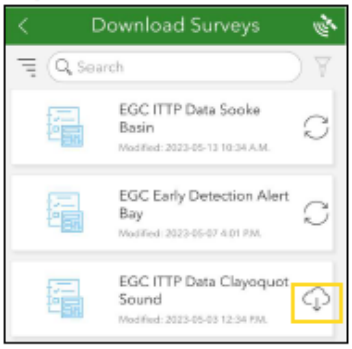
Download the ArcGIS "Survey123" app on your device

a) Sign in to Survey123 with your team's ArcGIS login.

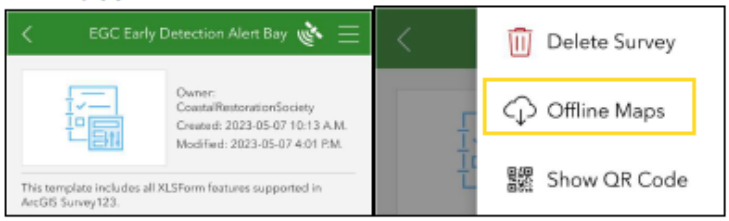
b) Click the logo in the top right corner, from the drop-down menu select "Download Surveys".



c) Choose the survey for your region "EGC Early Detection Location Name" (E.g. EGC Early Detection Sooke Basin). Hit the download button for the survey.



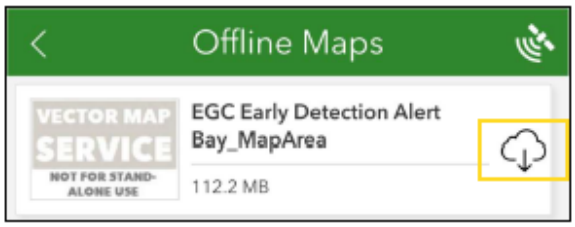
d) After the early detection survey is downloaded, click on the survey to open it. In the top right corner, click the three bars, then "Offline Maps". Click the download button on the right of the map(s).



PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

Guide for Data Collection with Survey123



Day one in the field (dropping traps):

1) Record the time each set was dropped on your paper datasheet or device in notes. Note Site if more than one.

Sooke Basin

	Set 1	Set 2
Feb 12, 2025	12:00	12:30

Day two (when you get to your traps):

In Survey123 open your downloaded EGC Survey (E.g. "EGC Early Detection Sooke Basin").

1) Fill out the **Site name**, **Salinity**, **Water Temperature**, and observational **Field Comments**.
2) Fill out the **drop time and date**, recorded in the device notes yesterday.

For each trap:

3) Fill out **Trap Number**.
4) Fill out the **pull time and date**, which is when traps were pulled up for data collection.
5) Fill out **trap usability**. This indicates whether the trap data should be excluded from analysis due to an issue, for example, holes, no bait, or open trap, or should be kept if it was simply empty.
6) Fill out the type of **gear** that was used such as a prawn or minnow trap.
7) Fill out bycatch **species** (all non-crabs), **number observed** and **number deceased** if any.
    a. Press the + sign for each species. See below.
8) Take photographs of any bycatch species that need to be identified and write "Other" in the species column. Write species descriptor and number to match photo, (e.g. yellow sculpin x2).
9) For crabs fill out **species**, **sex**, **number observed**, **number deceased** and **size**.
    a. Press the + sign next to **crab size** to add another size.
    b. Press the + sign below for another **species** or another **sex** (Male/Female/Berried).

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

10) Take photographs of any crab species that need to be identified and write "Other" in the species column. Write species descriptor and number to match photo, (e.g. yellow crab x3).
11) Hit the ✓ at the bottom (may be hidden by keyboard) then "Save in Outbox".

Notes:

- If you forget something or make a mistake, it can be fixed in the ArcGIS Server after being sent. Write the issue under "Notes" on the next trap if you remember right away. (E.g. hole in the last trap, lat/long incorrect trap #1 etc.). Otherwise, when reviewing the data in ArGIS online, look for any errors such as:
    - traps being misnumbered
    - drop and pull dates being the same when you did not pull them on the same day
    - drop and pull times outside of work hours
    - species you don't recall catching
    - high numbers caught that seem incorrect and were not found in any other trap, such as 122 EGC in trap 1 and 12 and 13 in traps 2 and 3
    - look for species that need to be identified and had photos attached

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

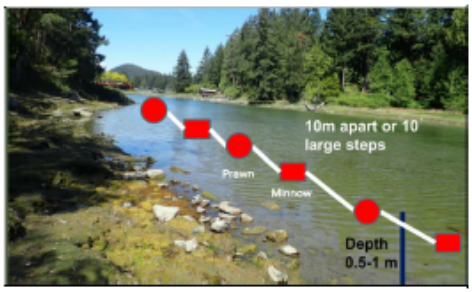
Appendix G – Early Detection Monitoring Methods Short Field Guide

EUROPEAN GREEN CRAB EARLY DETECTION MONITORING SHORT GUIDE

DAY 1 - DEPLOYING TRAPS

Prior to departure

- ☐ Notify DFO of activities 24 hours prior
- ☐ Prepare safety plan, discuss with team
- ☐ Send daily travel plan to person not in the field
- ☐ Confirm all safety equipment is present
- ☐ Confirm all trapping gear is present
- ☐ Thaw approx. 1 herring/trap, cut each into 2-3 chunks



Example of trap placement

At site

- ☐ Prepare traps:
  - Load each bait cup with 2-3 chunks of herring and place one cup in each trap
  - Close traps with rot cord
  - Mend any holes/damage if present
- ☐ Set 6 traps 10 meters apart at each site
  - Ensure they will remain submerged at low tide
  - Alternate minnow and folding prawn traps
  - Note organization, licence number, coordinates (DD) of each set, site, area, date, time, and method of trap deployment (groundline or individual)
  - Secure traps and mark with flagging tape or buoys as necessary

Upon return

- ☐ Clean/rinse equipment with freshwater

DAY 2 - RETRIEVING TRAPS

Prior to departure

- ☐ Review safety plan with team
- ☐ Send daily travel plan to person not in the field
- ☐ Confirm all safety equipment is present
- ☐ Confirm all data collection equipment is present

At site

Complete data collection with paper datasheet or Survey123.

- ☐ Note the time the first trap is pulled
- ☐ Note observations, such as weather, eelgrass, decaying vegetation, bear tracks, traps tampered with or moved
- ☐ Record salinity and water temperature
- ☐ Count and record non-crab species:
  - Identify (if unknown take photo) and record total numbers
  - Promptly return bycatch, prioritize fish
- ☐ Count and record all crab species*:
  - Identify (if unknown take photo), measure the first 10 male, female and berried of each species, record carapace width (mm), then count total per sex
  - Return native crabs

***If European green crabs are captured:**
- DO NOT return to water, place in Ziploc/sealed container for transport to freezer
- Contact DFO.AISPacific-AISPacifique.MPO@dfo-mpo.gc.ca

Wrap up

- ☐ Clean/rinse equipment with salt water
- ☐ Dispose of bait
- ☐ Upon return, clean equipment with freshwater upland away from the ocean and let dry before using again
- ☐ Notify DFO if there were any fish or terrestrial mortalities
- ☐ Submit data to DFO

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY

EUROPEAN GREEN CRAB EARLY DETECTION MONITORING
SHORT GUIDE
GEAR CHECKLIST

DAY 1 DEPLOYING TRAPS	DAY 2 RETRIEVING TRAPS

Personal gear:
- Waders/boots
- Backpacks
- Layers of clothing appropriate for conditions
- Sun protection (sunscreen, hat, sunglasses)
- Gloves
 	
Survey necessities:
- Copy of your Scientific Licence
- Datasheets and pencil, or device with app
- GPS unit or phone app
- 3 minnow and 3 prawn traps per site
- Bait cups (1 per trap)
- Bait (1 herring per cup cut into 2-3 pieces)
- 1 stainless steel stake per trap or the 70m rope for every 6 traps
- 2 buoys for each rope (if applicable)
- Knife
- Tissue for wiping iPad/refractometer
- Flagging tape (if applicable)
- Spare trap/buoy clips
- Extra rot cord and gangen
- Permanent marker
- Trap identification tags (1 per trap)
 	
Safety equipment:
- First aid kit (Level 1 or Level 3 in remote areas)
- High visibility vest
- Cell phone or radio
- PFDs
- Bear spray, flares, horn or whistle
- Site specific safety plan
 	
 
	Everything from Day 1 plus:
	- Three sorting bins
	- Camera
	- Calipers
	- Refractometer
	- Species ID guide
	- Ziploc to carry old herring bait back out (if applicable)
	- Sealed container or Ziploc bags to transport EGC
	
	 
	Survey123 data collection app example
	
	On the Survey 123 app:
	- Fill out same information as paper datasheets (organization, coordinates (DD) of set, site, date, time, and method of trap deployment (groundline or individual)
	- Bycatch **species** and **number** (all non crab species)
	  - Press the + sign to add more species
	  - Photograph if unknown species
	- Crab **species, sex, count** and **size**
	  - Press the + sign next to **crab size** to add another size (Measure 10 of each sex and species)
	  - Press the + sign at bottom for another **species** or another **sex** of crab
	  - Photograph if unknown species
	- Hit the **checkmark** to submit record, if no service, save in the **Outbox**, when you get to Wi-Fi go into the **Outbox** and hit **Send**
	- Review data for the day on the device or in **ArcGIS online** and ensure there are no errors while it's still fresh in your memory, make any necessary corrections

PACIFIC SALMON FOUNDATION

COASTAL RESTORATION SOCIETY