

Green Crab Watch

European Green Crab Monitoring Manual

<http://greencrab.nisbase.org>

February 2013



Female Green Crab. Photo: Lina Ceballos

Modified from Kachemak Bay Research Reserve Community Monitoring Protocols

This manual provides detailed instructions on monitoring for Green crabs with folding and minnow traps.

SAFETY:

Please be aware that coastlines can be hazardous areas to work in. If you think an area is potentially hazardous and are uneasy about accessing it, **DON'T DO IT!** Be mindful of the tides and if possible, conduct your surveys during low tides. Be sure to let someone know where you are going and when you plan to return. Be careful when traversing uneven ground, especially slippery surfaces such as wet rocks or seaweed. Be aware that mud flats can be like quicksand. Know your mudflats before you head out.

COLLECTION PERMITS:

A scientific collection permit from the state is required to study and/or collect any live crab. Contact your monitoring coordinator for details on how to get a permit. Please make sure all traps are labeled with the contact name and number of the permit holder.

Tammy Davis, the Invasive Species Coordinator, (Division of Sport Fish, Juneau, 1-877-INVASIV) must be informed within 24 hours if either a green crab or mitten crab is caught. The carcass must be turned into ADF&G within 24 hours after notification so that identification can be confirmed and genetic samples taken.

EQUIPMENT:

Dress appropriately for all weather. The most important equipment is that which protects you. Rain boots are required. Raingear, hat and gloves are recommended.

Before leaving to check traps, make sure your kit includes all of the following:

Deployment equipment:

Folding Fukui style	hammer
20x45x60cm Traps (6)	Wooden or metal stakes
Minnow Trap (1)	(if not already attached to trap)
Bucket	Bait and Bait containers
Zip Ties	Knife or clippers
Parachute Cord	

Folding Traps:

Mesh on the folding traps should be no bigger than ½" with an opening on either end. A picture of the trap (the Fukui FT-100) and more details can be found [here](#). Traps can be purchased inexpensively at www.PROMARNETS.com.

Minnow Traps:

Use traps that are about 16" long and made of galvanized steel, preferably coated, so they won't rust. Using wire cutters, cut the openings of the trap to make them about 1 ½' wide. Minnow traps can be purchased from a variety of [places](#) for about \$10. Or you can make your own!
Directions at: <http://media.scouting.org/boyslife/workshop/minnows.pdf>

Optional Floats (6) for use if you are deploying in the subtidal or by boat

Monitoring equipment:

Watch or Phone (time)	Tide book
Knife or Clippers	Clipboards
Data sheets	Pencils
Bucket for holding crabs	ID cards for fish, crab and inverts
Vernier calipers, or rulers	Camera (check card and batteries)
Laminated photo numbers	Thermometer
GPS (optional)	Refractometer or YSI for salinity
Flagging tape for marking stakes	

MONITORING SITE:

Choose a site that is easy to access, relatively sheltered, not too muddy and suitable for green crab. Suitable habitat includes sheltered, shallow, intertidal to upper subtidal, nearshore areas in moderate to high salinities (20-34ppt best). Please respect private property boundaries and only access a monitoring site through private property if you have permission from the owner.

DEPLOYING TRAPS:

Arrive at the site at least one hour before desired time of deployment to set up. All sites should deploy a minimum of 6 folding traps and one minnow trap. We encourage you to set more traps if you are able. For each folding trap you will need cable ties, stakes, and bait containers.

Location: Deploy the traps roughly between -1 and +2 ft mean low tide. Set traps far enough apart so they won't interfere with each others fishing range. Approximately 10 meters (30 feet) is effective. The longer the shoreline you are sampling, the farther apart the traps should be situated. If the habitat on the beach you're sampling varies widely, look for suitable habitat instead of placing traps a uniform distance apart. If eel grass is present, put at least one trap in that area. Be sure to place traps as low as possible, but not so low that they will be covered at the following days' low tide!

Securing traps: These traps are light and need to be anchored to the ground. Secure your traps to the beach by pounding two plastic tent stakes, one on each side of the trap, all the way in. Or: staking it with a 2 foot stake, rebar or PVC pipe. Pound these stakes in so that only 4-5 inches remains exposed. Tie trap to the stake with approximately 4 foot of rope and weigh down the trap with placing a brick or rocks inside. Some bright colored flagging tape or floats tied to the stake may help locate the traps at retrieval time.

Time Period: Deploy gear for a minimum of one full tidal and day/night cycle (for approximately 24 hours). It is important to check and empty your traps after the designated period so the crabs aren't out of the water too long. The longer the trapped animals are unprotected from the effects of sun and air the less likely they will survive until they can be released.

Other details: All traps should have an escape hatch and a contact tag with contact information in case of the unlikely event of a trap being washed away.

Frequency: The preferred minimum sampling frequency is at least 3 times from April through September. If monitors can survey more frequently, we encourage this, as we would like to have data for all six months of the spawning and growth season. Sampling more often increases the chances of finding an invasive green crab. If a green crab were to be found anywhere near your area, sampling frequency and trapping density should be increased.

Baiting Traps: If Herring is available, this is the preferred bait. Specify the type of bait used on the data sheet. Fish such as herring, halibut, or salmon or cat food can be used as bait. Place a small piece of bait, (1-2" sq is adequate) in supplied container. The holes in the container should make the bait container sink when the tide comes in and release the scent of the bait into the water column to attract crabs. If the trap doesn't close tightly or there are holes in the mesh, use cable ties to close these up.

Note: When walking to and from your monitoring site, it is important to do a visual scan of your beach for European green crab molts (exoskeletons) and carapaces (back shell). We recommend that all sites do a shoreline molt survey at the end of the summer (Sept or Oct) each year. This can be done in a few hours and can be very effective. Frequently, the presence of European green crab is initially revealed through the discovery of a molt before a live animal sighting (this is true of Willapa Bay, Washington).

DEPLOYING AND RETRIEVING TRAPS BY BOAT:

If you are deploying traps by boat, you will need to have a buoy with a line attached to the trap in order to retrieve it. Make sure the line is long enough to float at high tide. Traps can be staked or weighted to keep them in place. If you have chosen a calm site, the buoy and line should be enough to find the trap again and you shouldn't need a weight. If your site is subject to currents or wave action, you may need to use a set of anchors and a long line. What type of anchor you use will depend upon the type of bottom substrate. Use what works best in your area (fishermen are a good resource for such information). Snap the traps to the line with a buoy on each so it looks like [this](#). If necessary, traps may be placed closer together than in a land based deployment, though about 30 ft apart is still the goal. You may also find it helpful to use a digital recording device in lieu of a data sheet, if the weather is rough or rainy. The data can then be transferred directly to the computer upon return to the lab.

MONITORING:

Traps should be checked only after being submerged for 24 hours or a full tide cycle. Having at least two people working a trap is best. One person should be assigned as data recorder while the other removes crabs from the trap and measures and determines the sex of each. Any other monitors can be charged with releasing crabs back into the water, and taking pictures.

1. Fill out monitoring information:

Site and Monitors: It is easier to fill out site information prior to pulling traps. Each site should have a documented site name and site description. Make sure all observer names are recorded. List monitoring location, trap deployment date and time on the datasheet. Write the trap check date and start time on the datasheet. Draw a sketch of the trap layout and habitat on the bottom of the datasheet, number the trap locations from left to right facing the water and indicate key habitat features by checking for all appropriate habitat descriptions on the datasheet. Collect temperature and salinity data and enter on data sheet.

2: Fill out catch information:

Catch Removal: Open the trap and put all captured organisms into the bucket. This is most easily done by gently shaking the trap upside down and collecting crabs as they shake loose. Wear gloves so you don't get pinched or bitten. Fish and shrimp are more delicate, so work with them first to minimize handling time. Be gentle with all the organisms you catch. When measuring crabs, hold them gently by their main body cavity from the back, not by their claws or legs. If you turn a crab upside down they will hold still for you. If crabs are missing appendages or have parasites, be sure to note this on data sheet. **If the trap is empty, write "Empty" adjacent to trap number. For each individual crab record the following:**

Trap No.: Assign each organism to a trap number. Record and list information for all catch *individually*—each on a separate line. If more space is required, begin a new data sheet and number the pages.

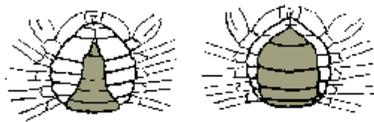
Identification: Identify the organisms using the identification information provided on the Green Crab Watch website. You can download the following pages and laminate either of them for use in the field: http://platewatch.nisbase.org/pdfs/Carcinus_maenas.pdf and the [KBRR Crab Guide](#). For non crabs, identify them (or take a photograph), using the species list at the end of this protocol for reference. Any crab that is not easily identified or is suspected of being an invasive crab should be photographed as described below.

Size: Measure the total length (fish or other organisms) or carapace length (crab) using calipers or a small ruler. The size of a crab is determined by measuring its maximum carapace width (mm). The carapace width is the distance across the crab's back at widest point. (See Figure 1)

Sex: The sex of a crab is determined by the width of its abdomen (shaded area) which curls around the crab's underside. The male crab has a narrow, triangular abdomen, while the female has a much broader abdomen. (See Figure 2)



Figure 1: Measuring the carapace width



MALE

FEMALE

Figure 2: Illustration showing the narrow male abdomen and the wide female abdomen.

Photographing unidentified Crabs: If a crab is not easily identified or if you suspect it may be an invasive species:

- a. Place it on a flat surface along with a laminated photo number (begin with “1,” and so on as necessary).
- b. Hold crab on our data sheet so we can see your name, site location and date in photo, along with a laminated photo number (begin with “1,” and so on as necessary).
- c. Turn the crab upside down and take a second picture. This will allow us to verify the size and sex the crab.
- d. Record the photo number on the data sheet along with the crab’s size/sex info.

Reporting Green Crabs: In the event that you catch a European green crab - or any other unidentifiable crab – after you have recorded the data and photographed the crab, place the animal in a bag or container to be put into your freezer. Please fill out a label with the container that includes the date the trap was set, trap location (be specific), the name and phone number of the monitor, as well as the name of the organization (if applicable). Contact your monitoring coordinator as soon as possible to confirm the crab’s identity. It is important to get identification confirmation as soon as possible. If you do not get a same day response, contact Tammy Davis, the Invasive Species Coordinator, Alaska Department of Fish and Game, Division of Sport Fish, Juneau, Invasive Hotline at 1-877-INVASIV (1-877-468-2748) or Linda McCann at mccannl@si.edu. If the green crab (or mitten crab, see figure 1) identification is confirmed, Tammy Davis must be informed within 24 hours. The carcass must be turned into ADF&G within 24 hours after notification so that identification can be confirmed and genetic samples taken.

Check End Time: Note your finishing time on the data sheet.

Report data: The data sheet should be filled out completely and returned to your coordinator as soon as possible so that the data can be proofed and uploaded to the website at <http://greencrab.nisbase.org>.

TRAP REMOVAL:

Please be sure to clean all debris, plants, and animals out/off your traps between surveys. Remove stakes, rinse with fresh water, clean traps and fold them flat. If continuing your monitoring during the next tide series, store in a safe place. Contact your coordinator at the end of the season for turning in gear for the winter.

Monitoring Coordinators

Southeast Alaska: Linda Shaw linda.shaw@NOAA.gov

Prince William Sound: Joe Banta banta@pwsrca.org and Jeremy Robida jeremy.robida@pwsrca.org
(Valdez)

Kachemak Bay: Catie Bursch catie.bursch@alaska.gov

On-Site Checklist

Trap Deployment:

- Securely place stakes in ground at least 30 feet apart. Pound in tent stakes on either side of trap or larger stakes should be placed deep enough, that only 4 -5 inches are exposed.
- Enter the number of traps deployed on data sheet.
- All traps should have a contact tag tied securely to traps.
- Place bait containers (with bait!) in each trap. Either attach containers to trap with zip ties, or weigh them down with water.
- Fill out date and time of deployment on data sheet.
- Draw a sketch of the traps and fill out the habitat description on data sheet.

Checking Traps:

- Enter all monitor names on data sheet.
- Enter date and start time on data sheet.
- For each trap:
 - Removed crabs gently and place in holding bucket if necessary
 - If trap is empty:
 - Enter trap number and “empty” on data sheet.
 - For each crab enter on the data sheet:
 - trap number
 - crab species (use identification card)
 - sex (abdominal flap is pointed in males, rounded in females)
 - carapace length (widest part of carapace measured in mm using calipers)
 - any appropriate notes (parasites, broken appendages)
 - For any non-crab species enter on data sheet under bycatch:
 - trap number
 - species
 - any appropriate notes
 - For any unidentified crabs, take photo for identification. If you think it may be an invasive crab, do not release it! Place unknown crab species in a container or bag to be put in the freezer.
 - Release all other crabs and bycatch back into the water.
- Make sure all data is easy to read.
- Fill out end time on your data sheet
- Remove bait from traps.
- Fold traps, removing any debris
- Remove stakes if not monitoring at next tide cycle.
- Return your data sheet to your monitoring coordinator

Thanks!! We appreciate you doing this!

List of species you may find in traps

TaxonGroup	SpeciesName	Common Name
Crustacean	<i>Cancer antennarius</i>	Pacific Rock Crab
Crustacean	<i>Cancer gracilis</i>	graceful crab
Crustacean	<i>Cancer jordanii</i>	hairy rock crab
Crustacean	<i>Cancer oregonensus</i>	pygmy Cancer crab
Crustacean	<i>Cancer productus</i>	red rock crab
Crustacean	<i>Carcinus maenas</i>	European Green Crab
Crustacean	<i>Hemigrapsus nudus</i>	purple shore crab
Crustacean	<i>Hemigrapsus oregonensis</i>	yellow shore crab
Crustacean	<i>Heptocarpus sp.</i>	Grass Shrimp
Crustacean	<i>Metacarcinus magister</i>	Dungeness Crab
Crustacean	<i>Pachygrapsus sp.</i>	Lined Shore crab
Crustacean	<i>Pagurus hirsutiusculus</i>	hermit crab
Crustacean	<i>Pandalus borealis</i>	pink shrimp
Crustacean	<i>pandalus danae</i>	coon striped shrimp
Crustacean	<i>Pandalus platyceros</i>	Spot Shrimp
Crustacean	<i>Pugettia sp.</i>	Kelp crab
Crustacean	<i>Telmessus cheiragonus</i>	helmet or horse crab
Echinoderm	<i>Pisaster sp.</i>	Sea Star
Echinoderm	<i>Pycnopodia helianthoides</i>	sun star
Fish	<i>Apodichthys flavidus</i>	penpoint gunnel
Fish	<i>Atherinops affinis</i>	topsmelt silverside
Fish	<i>Cebidichthys violaceus</i>	Monkey faced Prickleback
Fish	<i>Citharichthys stigmaeus</i>	speckled sanddab
Fish	<i>Cymatogaster aggregata</i>	surf perch
Fish	<i>Enophrys taurina</i>	Bull Sculpin
Fish	<i>Gadus macrocephalus</i>	Pacific cod
Fish	<i>Gasterosteus aculeatus</i>	Stickleback
Fish	<i>Gillichthys mirabilis</i>	Long Jawed Mud Sucker
Fish	<i>Hemilepidotus hemilepidotus</i>	red irish lord
Fish	<i>Hemilepidotus hemilepidotus</i>	Irish Lord Sculpin
Fish	<i>Hexagrammos decagrammus</i>	kelp greenling
Fish	<i>Hexagrammos lagocephalus</i>	rock greenling
Fish	<i>Hippoglossoides elassodon</i>	Flathead Sole
Fish	<i>Lepidopsetta bilineata</i>	Rock sole
Fish	<i>Leptocottus armatus</i>	Pacific Staghorn sculpin
Fish	Mugilidae	Mullet

TaxonGroup	SpeciesName	Common Name
Fish	<i>Mustelus sp.</i>	Smooth Hound Shark
Fish	<i>Myliobatis californica</i>	Bat Ray
Fish	<i>Myoxocephalus polyacanthocephalus</i>	Great Sculpin
Fish	<i>Oligocottus maculosus</i>	Tidepool Sculpin
Fish	<i>Ophiodon elongatus</i>	ling cod
Fish	<i>Pholis laeta</i>	crescent gunnel
Fish	<i>Pholis sp.</i>	Gunnel
Fish	<i>Porichthys sp.</i>	Midshipman
Fish	<i>Sabastes maliger</i>	quillback rockfish
Fish	<i>Scorpaenichthys marmoratus</i>	Cabezon sculpin
Fish	<i>Sebastes caurinus</i>	copper rockfish
Fish	<i>Sebastes paucispinis</i>	Bocaccio Rockfish
Fish	<i>Syngnathinae</i>	Pipefish
Fish	<i>Triakis semifasciata</i>	Leopard shark
Gastropod	<i>Hermisenda crassicornis</i>	nudibranch
Gastropod		Moon Snail

other possibilities: snails, blenny, goby, herring, silverside, flounder