

Alaska Invasive Species Partnership Marine Committee
Kachemak Bay National Estuarine Research Reserve
(KBNERR)

**Invasive Green Crab
Community Monitoring Manual**

Judy Hamilton 2006; updated by C. Bursch 2016, J. Maurer 2020, 2023

This manual provides detailed instructions on monitoring for invasive green crabs with folding, minnow, and shrimp traps in Kachemak Bay.

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.

When accessing monitoring sites, please respect private property boundaries, and only access via private property if you have permission from the owner.

COLLECTION PERMITS:

An Aquatic Resource Permit (ARP) is required for any activity to collect fish, amphibian, shellfish, or marine aquatic plants that is not covered by current sport, personal use, aquatic farm, and commercial regulations. Please make sure all traps are labeled with a permit number current for this year, and contact name and number. We will provide the current permit number to you each year.

EQUIPMENT:

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

Deployment equipment:

Minnow traps (1 if using)	Folding/shrimp traps (5 total)
Bucket	Bait and bait jars (5-6)
Hammer	Stakes (if not attached to traps)

Monitoring equipment:

Thermometer	Salinity meter (refractometer)
Watch	Clipboard/pencil
Data sheet(s)	Tide book
Tub/bucket for holding crabs	Crab, invertebrate, fish ID cards
Ruler/calipers	Camera
Gloves	
Optional: GPS	

MONITORING SITE:

All monitoring sites should be identified as safe for you, the volunteers, ecologically important, and areas where equipment can be retrieved relatively easily. As stewards of Kachemak Bay it is

important that when monitoring we are mindful of our impact on sampling sites and take action to minimize impacts and follow best practices to prevent spreading unseen plants and animals from one site to another. This includes using existing trails where possible, avoiding treading over fragile habitat structure, disposing of bait upland, and cleaning boots and sampling equipment thoroughly to avoid transporting unseen animals or seeds.

Monitoring equipment will be used for one site during the sampling season. If monitoring equipment is to be used at multiple sites during a single season it will be cleaned and stored dry for a minimum of three days between deployments.

DEPLOYING TRAPS:

Arrive at site at least ½ to 1 hour before desired time of deployment. All sites will deploy 5 folding/shrimp traps, optional to deploy 1 minnow trap. For each trap you will need stakes (usually attached) and bait containers. Set the traps at the lowest low tide for the 24 hour cycle, this will minimize the time out of water for organisms in the trap and any potential interference from terrestrial predators or scavengers. The goal is to minimize the time the traps are out of the water when you are not on site.

Location: Deploy traps at a minimum of a -1 ft mean low tide. Set the traps where they will be in water for most of the time deployed, but not too deep to retrieve them the next day. A good way to accomplish this is to set the traps when the lowest low tide of the day is falling. This will minimize any fish caught in the trap being left high and dry. To access the site use existing trails when present.

Distance: Set traps far enough apart so they won't interfere with each other's 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 not be uncovered at the following day's low tide.

Securing traps: These traps are light and need to be anchored to the ground. Secure your traps to the beach by pounding the two tent stakes, one on each side of the trap, all the way in. (You can also use a rebar stake or PVC pipe if the ground is too rocky for the large tent stakes.)

Time Period: Deploy gear for a 24 hour soak period that covers a full tidal and day/night cycle. It is important to check and empty your traps after the designated soak period.

Other details: All traps should have a tag with contact information in case of the unlikely event of a trap being washed away. Know the weather conditions at your site to avoid trap loss and damage from storm driven wave action.

Frequency: The preferred minimum number of sample events from April through September is three times. If monitors can survey more frequently, we encourage this, once a month per site if you have the time. More frequent sampling will increase the chances for early detection of an invasive green crab. ***If an invasive green crab is found anywhere in Kachemak Bay, sampling frequency and trapping density will be increased.***

Baiting Traps: Specify the type of bait used for each trapping event on the data sheet. Currently we are only using herring. Place thawed and cut bait in the container provided inside the trap when deployed. Bait should always be placed in a container to draw in and retain crabs in the trap.

When trapping in an estuary be sure to dispose of the bait upland to prevent transporting unseen predators to new habitats and attracting foraging birds and mammals that could be habituated to monthly free meals.

Note: When walking to and from your monitoring site, it is important to do a visual scan of your beach for invasive green crab molts (exoskeletons) and carapaces (back shell). Frequently, the presence of invasive green crab is initially revealed through the discovery of a molt before a live animal sighting. (this is true of Annette Island, Alaska)

MONITORING:

Traps should be checked after being submerged for 24 hours, or a full tide cycle.

Having at least two people working a trap is best. Have one person assigned as a data recorder, write in pencil and legibly. At the end of the trapping event review the datasheet to ensure all the information is recorded accurately. Have another person removing, measuring and sexing each crab from the trap. Any other monitors can be charged with releasing crabs into the water where they will not be preyed upon or accidentally stepped on, and taking pictures.

1. Fill out monitoring information:

It is easier to fill out site information prior to pulling traps. Each site should have a documented site name and site description. A site map and description with a sketch of the trap layout should be completed once a year for every site. Changes to trap location during the sampling season should be noted on the datasheet when they occur. Make sure all observer names are recorded on the data sheet for each trapping event.

List trap deployment date and time on the datasheet as well as the trap check date and start time on the datasheet. Circle all appropriate habitat descriptions and weather during trap checking. Take temperature and salinity prior to checking the traps, enter results at the top of the data sheet.

2: Fill out catch information:

Assign each organism to a trap number. **If the trap is empty, write “Empty” adjacent to the trap number.**

Organism removal from traps: Wear gloves so as not to get pinched or bit. Work quickly and gently with animals. If there is a large number of organisms, more than 10, in the trap place the crabs in the bucket with water from the site. Identify, or photograph, count, record and release fish in a safe location near the site of capture directly from the traps to minimize handling and exposure to air.

Be gentle removing crabs from the traps, and hold them by their main body cavity, not by claws or legs. If you turn them upside down when holding them they will hold still. If crabs are missing appendages, have parasites or eggs, be sure to note this on the data sheet. **For each individual crab, record the following: species, size, sex.**

Crab ID: Using the provided ID guides, all crabs captured in each trap should be identified if possible. Any crab that is not easily identified or is suspected of being an invasive crab should be photographed.

Crab Size: The size of a crab is determined by measuring its carapace (back) width at the widest point. Measure carapace using calipers or a ruler. Measure the **first 10 female** and **first 10 male** crabs from each species in the trap. If more than 10 male or female crabs are caught for a species, count the additional individuals and record the **total number** of male and female crabs caught in the space provided. (See Figure 1)



Figure 1. Measuring crab carapace

Crab Sex: The sex of a crab is determined by the width and shape of its abdomen (shaded area in Figure 2) 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)

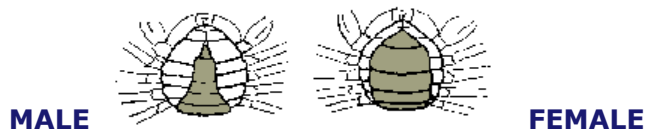


Figure 2. How to determine the sex of a crab.

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

- a. Hold crab over your data sheet so we can see your name and date in the photo. This will give us an idea of the size and ideally all the site information will be in the same photo.

Reporting Invasive Green Crabs: In the event that you catch an invasive green crab - or any other unidentifiable crab – after you have recorded the data, place the animal in a container marked “preserved specimen” and place it in your freezer. Fill out some kind of label with the date of capture, trap location (be specific), the name of the surveyors and a contact phone number, and place this label in the container with the specimen. IMMEDIATELY contact your monitoring coordinator (907) 235-4799 to confirm the crab’s identity and contact the Invasive Species

Hotline at 1-877-INVASIV (1-877-468-2748). It is important to get identification confirmation as soon as possible.

Other bycatch: Identify other bycatch species (fishes and invertebrates) to the best of your ability. For fishes measure total length and record it on the datasheet for the first 10 individuals of each fish species caught. If more than 10 individuals are caught, count the total number and enter that information in the space provided. You do not need to determine if fish are male or female. If possible take pictures of any fish you are unsure of and share them with KBNERR.

Report data: The data sheet provided by the Reserve (see attached) should be filled out completely and returned to the Reserve at the end of the season, or sooner if you think you will misplace it. Datasheets can also be mailed to KBNERR at any time at Attn: Harmful Species Program, KBNERR 2181 Kachemak Drive, Homer, AK 99603.

*** If multiple datasheets are used during a trapping event, when you begin a new data sheet be sure to number the pages. ***

TRAP REMOVAL:

Please be sure to clean all debris, plants, and animals out/off your traps between surveys. Clean the traps and fold them flat. If continuing your monitoring during the next tide series, store in a safe dry place. Otherwise, return them to Kachemak Bay National Estuary Research Reserve office at 2181 Kachemak Drive, 235-4799.

Molt Walk Survey

All crabs must molt to grow, and the molted exoskeletons are often deposited by the high tide onto the upper beach with seaweed and other beach wrack and debris (Figure 20). In addition to the live trapping, searching for molts provides another modality by which volunteers look for evidence of European green crabs in nearby waters. Indeed, several range expansions of this species have been identified first through molts rather than through capture of live crabs.

Protocol: Volunteers begin at the established site marker, then have 20 total person minutes (20 minutes for one molt collector, 10 minutes for each of two molt collectors, etc.) to collect as many

molts as possible. Volunteers are instructed to target the highest concentrations of molts in the general area but pick up any molts they see. Once the time is up, volunteers identify, count and record the species of all the individual molts collected.



Figure 20. Crab molts, including green crab carapace (top left) in beach wrack. Photo: WASG, Jeff Adams

On-Site Checklist

Trap Deployment:

- Deploy traps at least 30 feet apart from each other.
- Stakes should be placed securely in the ground, deep enough that no more than 1-2 inches remains exposed.
- Enter the number of traps deployed on the data sheet.
- All traps should have permits and be tied securely to stakes.

- Weigh all traps down with either bricks or rocks.
- Place bait containers (with bait!) in each trap. Either attach containers to traps with zip ties, or weigh them down with water.
- Fill out date and time of deployment on the data sheet.
- At the beginning of the sampling season draw a sketch of the site with trap locations on the site map and fill out the habitat description on the site map.

Checking Traps:

- Enter all monitor names on the data sheet.
- Enter date and time on the data sheet.
- For each trap:
 - o Removed animals gently and place in holding bucket with water if necessary
 - o If trap is empty:
 - Enter trap number and “empty” on the data sheet.
 - o For the first 10 male and female crabs of each species enter on the data sheet:
 - trap number
 - crab species (use identification card)
 - sex (abdominal flap is pointed in males, rounded in females)
 - carapace size (widest part of carapace measured in mm using calipers)
 - any appropriate notes (parasites, eggs, broken appendages)
 - count any additional individuals and fill in the total catch on the data sheet
 - o For any non-crab species enter on data sheet under bycatch:
 - trap number
 - species
 - any appropriate notes
 - o For any unidentified crabs, take photos for identification. If you think it may be an invasive crab, do not release! Place unknown crab species in a container with a label including location caught, contact number and the date caught. Freeze specimen and contact KBNERR for assistance with identification.
 - o Release all native crabs and bycatch back into the water.
- Make sure all data is easy to read.
- Remove bait from traps and discard upland.
- Remove any debris from traps and fold them for storage in a safe dry place.
- Return data to Kachemak Bay Research Reserve in a timely manner.
- Thoroughly clean all sampling gear, including boots, to prevent the spread of unseen organisms and seeds.