**Eastern Bering Sea Shelf**

**Title:** Bitter Crab Syndrome in Eastern Bering Sea *Chionoecetes* spp.

**Name of Requestor / Point of Contact:** Pam Jensen

**Email:** Pam.Jensen@NOAA.gov

**Daytime Telephone:** 206-526-4122

**Affiliation of Requestor:** AFSC

**Is this project NEW or is it repeat/continuation of a past project and all of the methods and other pertinent information ARE THE SAME? \***

For new collections, type NEW COLLECTION and provide a general description and justification (250 words max). For repeat collections, type REPEAT COLLECTION and provide title and year/s (If you can't remember, give approximate titles and years)

REPEAT COLLECTION, but in addition to the standard collection, I would like to collect blood samples from a total of 100 mature snow & 100 mature Tanner crabs. Over the last 3 years BCS rates have steadily climbed to an all-time high of 48% & 28% in immature snow & Tanner crabs, respectively. I would like to determine whether these high infection rates are present in adults also, & use this data to guide potential process studies in the future. PREVIOUS YEARS: 2014, 2015, 2016 EBS, titles similar to: Bitter Crab Syndrome in North Pacific Chionoecetes spp.

**Not in 2017 form:**

**General Description and Justification:** Please provide a succinct (500 words maximum) description and justification for your proposed project or collection. Please be sure to detail the goals of the project, how the data or specimens will be used, and why it is important for this project to take place at this time (opposed to during future surveys, other available research platforms, etc.).

Bitter crab syndrome (BCS) is a potentially fatal disease of commercially important *Chionoecetes* spp. in the eastern Bering Sea (EBS). It is caused by a parasitic dinoflagellate, *Hematodinium* sp., and is considered an emerging disease worldwide in decapod hosts. Efforts to monitor disease incidences and distribution in EBS *Chionoecetes* spp. over a 25 year period have generated data to track possible trends in the North Pacific and may provide insight as to how climate conditions influence disease patterns. Such trends are important from an industry perspective considering affected Tanner and snow crabs possess a bitter flavor, rendering the meat unmarketable. Recently (2014 & onward), sampling effort has been redirected to index sites, which provide increased ability to determine infection levels and investigate disease-related trends. Since 2014, *Hematodinium* incidence has shown a strong spatial component and infection levels have continued to increase annually in both Tanner and snow crabs. The primary goal of this project is to survey *Chionoecetes bairdi* and *C. opilio* for *Hematodinium* infection at the designated index sites within the Bering Sea, continuing to analyze the data for possible effects on Tanner and snow crabs. The data gathered at the index sites will be used to inform process studies on the effects of this disease on crab hosts and to build a model of infection occurrence in *Chionoecetes* spp. in the Bering Sea.

**Data Types \***

Select the category that best describes your collection. If your project is a combination of the two data types, fill out request forms for each and reference both.

Biological specimen

Haul / Instrument / Camera/ Net Mensuration/ Other

**Fish, Crab or Invertebrate? \***

For storage, presevation, and shipping planning purposes, please categorize your collection as either fish, crab or invertebrate**.**

fish

crab

invertebrates

various combinations

Other: 

**Species to be collected:** List species by scientific names

*Chionoecetes bairdi*

*Chionoecetes opilio*

**Detailed collection procedure:** Provide a detailed description of collection procedures including the use of any special equipment and forms. Be as specific as possible and include the desired sampling location(s). If your protocol is graphical and/or cannot be described in text, e-mail the file, including your project title, to RACE.Surveycollections@noaa.gov. For accepted projects, the applicant will be asked to provide an updated full draft of the protocols for inclusion in the At-Sea Operations Manual and a ‘cheat sheet’ for deck operations along with an example of any special data forms.If e-mailing a file, please reference the title of your project in the filename and list below in the provided box.

At the pre-assigned stations within the index sites for *Chionoecetes bairdi* or *C. opilio*, Kodiak staff will randomly select 20 immature crabs. Crab morphometrics will be documented on a provided datasheet and each crab will be assigned a Pathobiology specimen number. For each crab, species, size, sex, shell condition, biometrics, maturity, haul number and visual BCS status will be recorded. Using a clean syringe, 0.2mL of hemolymph will be extracted from each crab & transferred into a well in a 96-well collection plate of 100% ethanol. The plate will be inverted to mix, & sharps and biological waste disposed. At one index site per species, hemolymph samples will be similarly documented and withdrawn from 100 mature crabs.

**The following questions on this page are for metadata purposes only; they are not a substitute for the information that you provide in your collection procedures above. Information requested in these questions should be covered in your collection procedures.**

**Geographic Region of Collection**

Can your collection be distributed throughout the entire survey area? If not and the sampling area is more restricted than the general survey terms of Gulf of Alaska, Eastern Bering Sea Shelf, Northern Bering Sea then please provide bounding coordinates and name of region (if known) in the fields provided below.

**Place keywords:**

Example: Bristol Bay, Kiska, Pribilof Canyon

Sampling will occur at six specific index sites (three for *C. bairdi* and three for *C. opilio*) throughout the Bering Sea and within established EBS Shelf survey stations. Sites will include: Bristol Bay, Pribilof Islands, St. Matthew Island and northeast stations.

**Sample Design**

The following sections tells us how often and how many samples to collect.

**Target Quantity**

Ideally, how many specimens do you want to be collected ?

20 immature crab samples per station at each index site. Each index site will contain 10 stations, and sampling will be conducted by Kodiak staff on each boat. A total of approximately 1200 samples from immature crabs & a total of 200 from mature crabs will be collected.

**If the requested amount or frequency of specimens is not achieved, will the request still be useful?**

Yes

**Estimated Time:** In general, how much time does it take to set up, collect, record, and preserve each sample ?

Approximately 5 minutes per sample

**Sampling Design**\*Please select a sampling method that best describes your project. DO NOT SUBSAMPLE = collect every one that comes up in the net; SUBSAMPLE RANDOMLY = the specimens do not need to meet ANY set criteria and therefore will be collected at random across the collection area; SUBSAMPLE SELECTIVELY = Collect only those specimens that meet the criteria set by you in the next question. SUBSAMPLE RANDOM STRATIFIED = specimens will be collected randomly from each of the strata you designate in the next question.

Do not subsample

subsample randomly

subsample selectively

subsample random stratified

Other: 

**Selective and Randomly Stratified Subsamples ONLY:** Specify The Criteria. For Choosing Specimens Examples: selective criteria could be specific size ranges, photogenic, specific depths, etc; random stratified could be specimens collected by sex/size/area;

Subsample random stratified. Six index sites are designated, three for C. bairdi and three for C. opilio. At the appropriate index site, either immature C. bairdi or C. opilio will be randomly selected for sampling, without regard to sex or shell condition. Maturity will be determined by carapace width in males and pleon shape in females. At one index site each, mature Tanner & snow crabs will be randomly selected for sampling, without regard to sex or shell condition.

**Specimen Type**\* The typical specimen types to be collected on the surveys are listed below. Please select the type that best describes your collection. If none meet your collection's description, select 'Other' and provide your own

Pathological Tissue

(CLang Note: other possible choices: muscle tissue, whole animal collection)

**Do you require individual specimen-level data to be collected?** Haul data are the latitude, longitude, depth, temperature associated with each haul. If you need haul data for each of your specimens, it is mandatory that the Cruise-Number, Vessel-Number, and Haul-numbers be recorded every time we collect your samples; any forms provided by you must contain those fields. Copies of haul data will be e-mailed to the the requestor when survey data are finalized after the end of the field season (usually by October of the same calendar year)

Yes

**If you answered YES to the question above, please select or enter any additional morphometrics that are required by your project.**

Kodiak staff will record on data sheets

**Do you need to be able to link your project to haul data?\***If you need haul data (e.g. latitude and longitude, depth, temperature, etc) for each of your specimens, it is mandatory that the CruiseNumber, VesselNumber, and Haul numbers be recorded every time we collect your samples; any forms provided by you must contain those fields. Copies of haul data will be e-mailed to the the requestor when survey data are finalized after the end of the field season (usually by October of the same calendar year)

Yes – please link my collection with haul data

**SUPPLIES & EQUIPMENT**

Provide a list of all supplies needed for your project or collection.

The person making the request is responsible for providing or arranging for all needed supplies including chemicals.

Incomplete applications will delay the evaluation process and may result in your application being rejected from consideration.

**Supplies provided by the AFSC \***

Small quantities of some supplies, such as sample bags, freezer boxes, and standard chemical like ethanol and formaldehyde may be available, but applicants must arrange this specifically with survey contact(s) prior to the start of the survey. If asking for large specimens, then you must supply containers. Select supplies and equipment needed for your project or collection that AFSC will supply.

None

specimen labels

sample bags

freezer boxes

ethanol

formaldehyde

glycerol/thymol

**Supplies provided by the requestor**\*List all remaining supplies and equipment needed for your project or collection that you will be providing

calipers

syringes

prefilled ethanol plates

needle disposal container

datasheets

Chemical Hygiene\* Select or type in all chemicals and hazardous materials in your project. Please e-mail MSDS's for all chemicals other than formaldehyde, ethanol, and glycerol/thymol to [RACE.Surveycollections@noaa.gov](mailto:RACE.Surveycollections@noaa.gov). Special hazardous materials will not be allowed. They must conform to those that we are already using. FAILURE to disclose chemicals and hazardous materials will terminate your project.

None

Formaldehyde

Ethanol

Glycerol/Thymol

Other: 

**PERMITS**

It is the responsibility of the person making the request to obtain all the necessary permits required for the collection and shipment of specimens, and the RACE Division must have copies of the permits no later than 20 April 2017. Note that RACE Division survey efforts are currently covered under ADF&G Fish Resource Permit CF-10-038 for expected levels of whole specimens or samples taken. NO LIVE ORGANISMS, TISSUES, OR VIABLE GAMETES are currently covered by this permit and will need separate permit. Please direct any questions regarding permit coverage to a particular project to the RACE Deputy Director,(206-526-4103).

**Permits issued or pending:**

ADF&G Fish Resource Permit CF-10-038

**24/7 Contact Name**:\* Christie Lang

**24/7 Contact Phone Number**:\* 206-554-1755

**SHIPPING INSTRUCTIONS**

At the end of the field season, equipment and sample collections will be shipped to the requester from Seattle. The carrriers we typically use are FEDEX, UPS, and Alaska AirCargo. Contacts and phone numbers of someone available 24/7 to discuss logistics and problems or authorize billings at the anticipated time of shipment. The person making the request will pay for all charges associated with shipping and storage including the following: 1) completed shipping company forms with the shipping account number 2) any additional packing materials such as zip lock bags 3) if samples are frozen, coolers or commercial waxed boxes must be provided.

**Detailed shipping instructions:** [NOTE: FedEx next-day shipping imposes some complications. If you are requesting this method of shipping, please make sure to plan carefully with the Survey Coordinator.]

Ship with RACE survey supplies