**Eastern Bering Sea Shelf**

**Title:** Direct Age Determination in *Chionoecetes* *opilio*

**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.).

The measurement of annual growth bands deposited in hard structures underlies the assessment and management of exploited fish stocks throughout the world. However, in crustaceans the estimation of age-structured processes, such as growth and mortality, has been severely limited by the apparent absence of similar structures. Currently, Alaskan crab stock assessment models rely on length-based data.

It has been recently demonstrated that calcified areas in the eyestalks & stomach ossicles in *Chionoecetes* *opilio* are retained across molts. Furthermore, annual growth bands are deposited in these structures and can be counted and used for direct age determination in *C. opilio*. Direct determination of age of individual crab would greatly enhance the resolution and accuracy of population estimates and assessment models.

Kodiak SAP is collaborating with ADF&G on a pilot study to develop and refine the application of band-based aging in *Chionoecetes opilio*. The published technique involves embedding structures in epoxy shortly after removal from the crab; this is not practical for large numbers of crab at sea. The goal of this project is to evaluate at-sea storage/preservation effects on the band-reading protocol. *Chionoecetes opilio* eyestalks and stomach ossicles will be placed in different storage treatments at sea. The material will be processed in Seattle and resultant preparations compared. Our primary objective is to determine the best method for at-sea collection of samples for use in direct aging.

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

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

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

**Affiliation of Requestor:** AFSC – Kodiak

**Data Types:** Biological specimen

**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.

Sampling will be carried out by Kodiak personnel. *Chionoecetes opilio* will be opportunistically selected and morphometrics recorded on a datasheet. Each crab will be assigned a Pathobiology specimen number. For 36 crabs, eyes will be removed by snipping the eyestalks. Crabs will be dissected & the stomachs removed. Left eyes will be cleaned of tissue using a dissecting microscope and placed in epoxy (controls). Right eyes will be placed in one of 3 treatments: 5% formalin, 70 ethanol: 4 glycerol: 26 water (v: v), or frozen. Stomachs will be cut open, rinsed, and ossicles either placed in epoxy, or one of the 3 treatments. For determination of within treatment variation, 42 crabs will be treated as above, except, the paired eyes and stomach from individual crab will be placed together in preservation treatments.

**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 or Eastern Bering Sea Shelf then please provide bounding coordinates and name of region (if known) in the fields provided below.

Place keywords: Example: Bristol Bay, Kodiak, Shumagin,Yakutat

Opportunistic sampling

**Fish Crab or Invertebrate?**

Crab

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

*Chionoecetes opilio*

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

Approximately 20 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.

Subsample Selectively

**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;

Kodiak personnel will select *Chionoecetes opilio* based on size, sex and shell condition, without regard to location or depth.

**Target Quantity:** How many specimens do you want collected?

Kodiak personnel will collect a total of 78 crabs.

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

Yes

**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

Other: eyestalks & stomach ossicles

**Do you require individual specimen-level data to be collected?** yes = each specimen sample will be given a unique specimen number.

Yes

**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 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

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

Calipers, data sheets, dissection tools, dissecting microscope, sampling dishes & trays, sample containers, shipping materials.

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. Special haz mats 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.

5% formalin,

Other: epoxy, ethanol:glycerol

**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 2014. 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 RACE Deputy Director, Frank Morado (206-526-6572).

**Permits issued or pending:**

ADF&G Fish Resource Permit CF-10-038

**SHIPPING INSTRUCTIONS**

In 2014: The EBS shelf, EBS slope, and AI surveys originate and terminate in Dutch Harbor, Alaska. Equipment and sample collections will be shipped to the requester from Seattle. We typically use FEDEX or 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 (i.e., end of leg and end of survey). 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.

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

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

**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