

EVOS ANNUAL PROJECT REPORT

Project Number: 040624

Project Title: Acquisition and Application of Continuous Plankton Recorder data in the Gulf of Alaska

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Time Period Covered by Report: 1 September 2005-31 August 2006

Date of Report: 25th Sept 2006

1. Work Performed:

There were four objectives described under our work-plan (that was revised for FY05-06):

- i. Sample collection and processing on the transect from Cook Inlet to Puget Sound*

This is the third consecutive year of our collaboration with Horizon Shipping and communication and procedures have been going well. The 2006 field season has been somewhat complicated, owing to the loss of the CPR at sea in late May and the need to fly out a replacement, which required some additional repairs and testing by the crew of the Horizon Kodiak (see Table below). We have extended the sampling season to make up for the lack of sampling in mid-summer.

Table 1. Status of sample collection in 2006

Date	Status of sample processing	Comments
16-19 th March	Sub-set processed, results on web-site	A tear in the filtering mesh at the end of the transect reduced number of samples by 2
27-30 th April	Sub-set processed, results on web-site	
27-29 May	Sub-set processed, results soon to be posted	First third of transect sampled, CPR lost at sea somewhere along the second leg of the transect
29 th June-2 nd July	Sub-set processed, results soon to be on web	Propeller blade lost during first leg, so those samples don't have precise positions (but can still be processed and are useable)
29 th July-1 st August	Samples received, to be processed	First leg sampled normally, next 2 legs there was a jam in the filtering mesh, necessitating onboard repairs
11-13 th August	Samples received, to be processed	Trial leg after repairs carried out, towed between 54°12N 136° 41W to 58°22N 148°44W, successful
9-12 th September	Samples in transit	Appears to have been successful
11-15 th October	To be sampled	Extra set of tows to compensate for problems in July/August

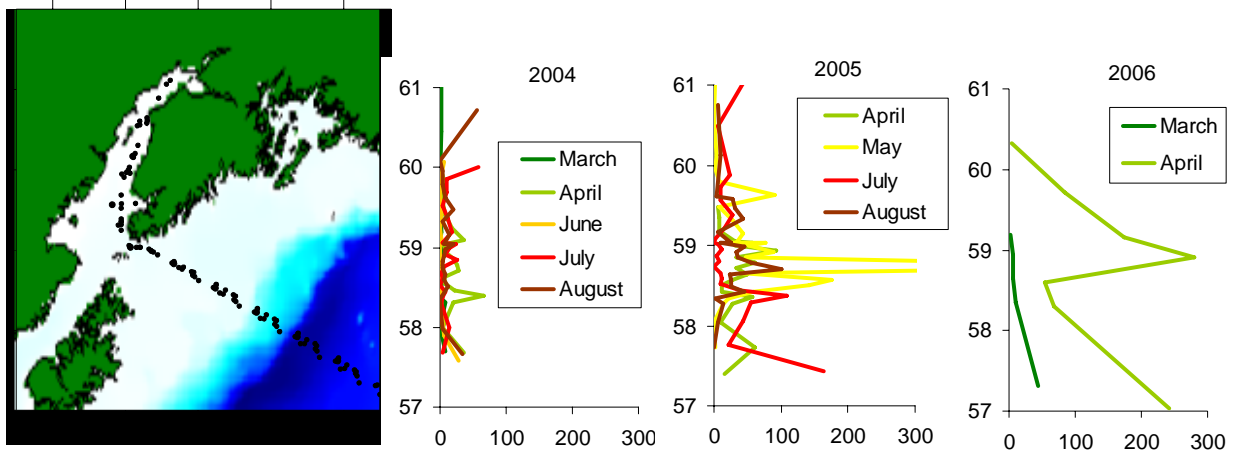


Fig 1. Mesozooplankton biomass on the Alaskan shelf (mg dry weight per sample). Transect positions shown on the left (note consistency of sample positions from month to month). Data from 2006 are preliminary – only a subset has so far been processed and they have not yet been quality controlled.

One summary index calculated from the CPR data is mesozooplankton biomass (Fig 1). Data from 2005 have now been fully processed and quality controlled and showed a much higher biomass than in 2004. May showed the highest values and is the result of the short annual peak of the large copepods *Neocalanus plumchrus* and *N. flemingeri*. May was not sampled in 2004 and the peak may have been missed, however, biomass through summer 2005, after the large copepods had descended to enter diapause, was still several times higher than in 2004. Preliminary data from 2006 suggest that biomass may be high again in 2006. The April sampling occurred right at the end of the month and *Neocalanus* was abundant, but so were other smaller copepods. Interannual variability in biomass within and south of Cook Inlet is clearly high.

ii. Euphausiid distribution/abundance

Preliminary observations of CPR samples collected on the Alaskan shelf around the Aleutian Islands seasonally in 2002/03 suggested that the abundance of euphausiids increased as the transect approached the shelf, irrespective of time of year. Given that this region is an important foraging ground for juvenile salmon (into at least the late autumn) as well as for marine birds and mammals, we investigated the euphausiid distributions in more detail during 2005. Since this was reported in last year's report only modest progress has been made on the manuscript for this objective. It has, however, been presented at the annual PICES conference and at the Marine Science in Alaska Symposium.

iii. Decapod larvae taxonomy

Recruitment is a key factor in the strength of commercial stocks of decapods such as red and blue king crab, Tanner crab, snow crab (*Chionoecetes* spp.) and Dungeness crab (*Cancer* spp.). Sources of larval populations may be far removed from the adult stocks and recruitment will be affected by environmental conditions as well as fishing effort. One mechanism which may contribute to the dispersal of decapod larvae is the anti-cyclonic eddies that are formed in winter a long the eastern continental margin of the northeast Pacific. CPR samples taken in 1997 and 2001-2003 in which decapod crustaceans were recorded have been re-examined and the

decapoda identified and measured. Some previously undescribed zoea stages could be referred to species and characteristics of these are described in a manuscript that has just been submitted (Lindley and Batten). Distributions and seasonal occurrence of decapod taxa in the samples are also described and discussed with particular emphasis on *Sergestes similis*, *Cancer* spp. and *Chionoecetes* spp. The records of *Cancer* spp in the central Gulf of Alaska together with the presence of *Pseudocalanus* in the same area may indicate the influence of water originating on the continental shelf. Using temperature as a guide we estimate that the larvae could have been in the plankton for over 3 months. Sea Surface Height (SSH) anomalies for 1st July 2003 (3 months prior to the sample collection) show two eddies close to the Alaskan shelf; one east of the Aleutian Islands and one south of Prince William Sound. It is possible that the larvae were entrained in an eddy while it was close to the shelf, subsequently swirled around the outer rim and carried offshore. The larvae would at some point leave the eddy through its decay process, possibly enhanced by vertical migration, and would then be subjected to the surface currents. Given that the October 1st SSH anomalies show the PWS eddy to have moved south and slightly west this is the more likely candidate for the origin of the *Cancer* larvae. The location of the samples containing the larvae from October 1st is not near to an eddy, however, we do not know how currents and the organism's behaviour may have influenced their drift if they left the eddy some weeks earlier. The records are close to the Patton Seamount but there are no records in OBIS (<http://www.iobis.org/>) or in <http://www.swrcb.ca.gov/rwqcb3/Facilities/DukeEnergy/CancerCrabs.pdf> of *Cancer* spp. in seamounts in the area and Hoff and Stevens (2005) did not mention the genus in the results of their survey of the seamount. The records of *Chionoecetes* most distant from the shelf could potentially indicate water of neritic origin. The absence of other typically neritic components of the plankton recorded in these samples and since *C. angulatus* and *C. tanneri* are known from depths as great as 3330m and 1944m respectively these records may be of these species rather than the more typically neritic *C. bairdi* or *C. opilio*.

iv. *CPR:Bongo comparison*

This work was completed in 2005 and reported in last year's annual report. The results of this study were included in a presentation at a Scientific Committee on Ocean Research (SCOR) working group 115 symposium (Standards for the Survey and Analysis of Plankton) held in May 2006.

2. Future Work:

No changes to proposed work, other than the extension of the sampling season described in Table 1. Sample and data analysis will be ongoing.

3. Coordination/Collaboration:

We continue to collaborate with scientists from around the north Pacific coast, mainly through PICES (North Pacific Marine Science Organisation) activities.

4. Community Involvement/TEK & Resource Management Applications:

Technicians from PWS Community College were trained in 2002 in CPR servicing/loading. Since then, they have been responsible for servicing the CPRs from the EVOS funded transect in Valdez and sending the unloaded samples to the Institute of Ocean Sciences, BC for processing. The crew of the Horizon Kodiak have been responsible for servicing the towing body and

