

REPORT OF ADVISORY PANEL ON CONTINUOUS PLANKTON RECORDER SURVEY IN THE NORTH PACIFIC

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The Advisory Panel on *Continuous Plankton Recorder Survey in the North Pacific* (CPR-AP) met from 17:00-19:00 hours on October 18, 2004. The Panel Chairman, Dr. Charles B. Miller, called the meeting to order and welcomed the participants (*CPR-AP Endnote 1*). The draft agenda for the meeting was reviewed and adopted (*CPR-AP Endnote 2*).

Dr. Miller reported that the MONITOR Technical Committee, at its meeting held October 17, 2004, agreed to accept the CPR Advisory Panel as a sub-committee. This is meant to institutionalize the role of the CPR project as a PICES monitoring activity. The Panel will continue to oversee CPR activities as before.

The Panel received reports on current CPR activities from Drs. Sonia Batten and William J. Sydeman.

Meeting summary

Funding

The CPR project has received continued funding through 2006. For the NW to SE towing lines across the Gulf of Alaska, funding is from the EVOS-Gulf Ecosystem Monitoring (GEM) Program. For the Vancouver to Yokohama great-circle run (including the southern Bering Sea), funding is from the North Pacific Research Board (NPRB), and it is now sufficient to support three runs each year (April, June and October). This success with funding requests is good news, and a tribute to the work already completed.

Changed routes

A significant change has been made in the Gulf of Alaska run. The tanker company that deployed recorders from outside Prince William Sound to Long Beach has ended their participation, necessitating a shift to freighter

traffic from Cook Inlet (Anchorage) to Puget Sound. The CPR Advisory Panel thanks *Polar Tankers* for their cooperation over the first five years of the project, and extends thanks to *Horizon Shipping* and the "Horizon Kodiak" for taking on the project now. Scientifically the change means that (1) a different portion of the Alaskan shelf will now be sampled and (2) the long section down the California Current will now be lost. The old and new lines through the central Gulf of Alaska are broadly overlapping, so considerable comparability will remain there. Sampling along the new route has been completed for six months, March to August of 2004, one more run than had been taken on the tanker route from 2000 to 2003. The sea-chest temperature-salinity recorder previously installed on the tankers has not yet been moved to the ships on the new run.

Sample processing

Reasonably rapid work-up of CPR zooplankton has continued. Dr. Batten and Mr. Douglas Moore are working up 20% of a series consisting of every fourth CPR sample (except on the Alaskan shelf where all samples are processed), which is the total eventually examined by SAHFOS. This is done at the Institute of Ocean Sciences (Fisheries and Oceans Canada) in Sidney, British Columbia, Canada. Results from sample processing are posted on the project website at <http://www.sahfos.org>. All of the processed samples have been counted each year by SAHFOS staff within a year of collection. The remainder of the samples has been archived. Dr. Batten provided a report on current results to PICES, which is attached as *CPR-AP Endnote 3*.

Bird and mammal monitoring

Dr. Sydeman reported that the marine bird and mammal monitoring on the east-west run completed its third year of observation in 2004. A total of 8 transects, with about 160 days at sea

have been logged. All observations have been made by one observer, Michael Henry (PhD candidate at the University of British Columbia).

The relative abundance of Tufted puffins along the route illustrates relative densities between seasons and years (Fig. 1).

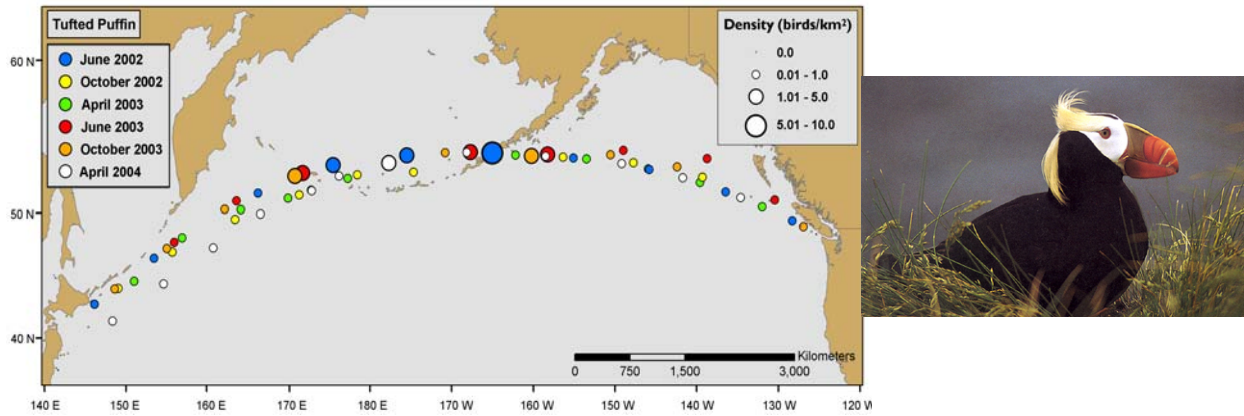


Fig. 1 Tufted puffin distribution and abundance across the North Pacific based on PICES/CPR-MBM surveys from June 2002-April 2004. Densities in June and in the southern Bering Sea were highest, yet puffins were found in all habitats (coastal and oceanic) in all seasons and years. Therefore, puffins may serve as a flagship species for this project. “Gum-ball” plot produced by Christopher Rintoul (PRBO).

D. Hyrenbach, M. Henry, W. Sydeman, K. Morgan and D. Welch have prepared a manuscript on methods for surveying marine birds from vessels of opportunity. S. Batten, D. Hyrenbach, W. Sydeman, P. Yen and D. Welch have prepared a publication characterizing biogeographic zones, or “meso-marine ecosystems”, features that appear in both the bird counts and plankton composition. The transect divides with remarkable consistency into a set of zones occupied by distinct fauna. There are 10 meso-marine ecosystems from Canada to Japan; some of them bounded at obvious features like shelf edge crossings, some less readily explained.

The presence of M. Henry on the east-west transect has made possible the maintenance of a sea-chest-mounted nitrate monitoring system based on automated wet chemistry. This was

deployed on one summer run in 2004. Variation in nitrate across the Pacific was evident as distinct zones of high and low concentration: high nitrate in areas expected to be HNLC ecosystems, low nitrate when crossing coastal currents and continental shelves. PRBO (Point Reyes Bird Observatory) Conservation Science is seeking a postdoctoral fellow to work up satellite observations to overlay with bird data along the east-west transect.

Future prospects

Given that funding is in place for sampling through 2006, and that CPR samples are examined and interpreted in rapid and informative fashion, the future prospects of this project are good. Dr. Batten, upon whom the project heavily depends, reported that she is willing to stay with the work through at least the currently funded period.

CPR-AP Endnote 1

Participation List

Members

Sonia D. Batten (Canada/UK)
Charles B. Miller (U.S.A., Chairman)
Jeffery M. Napp (U.S.A.)

Observers

Michael J. Dagg (U.S.A.)
George L. Hunt (U.S.A.)
K. David Hyrenbach (U.S.A.)
Hyung-Ku Kang (Korea)
Phillip R. Mundy (MONITOR Chairman)
William J. Sydeman (U.S.A.)

CPR-AP Endnote 2

CPR-AP Meeting Agenda

1. Progress report on the Continuous Plankton Recorder program
2. Bird observer report
3. Comments on other plankton monitoring efforts
4. Other business

CPR-AP Endnote 3

Progress report on the PICES CPR project by Dr. Sonia Batten

Over 1900 processed CPR samples are currently in the database, and these contain abundance data for 256 plankton taxa; more samples are to be added for 2004. A sub-section of samples are processed quickly (20-25% of the samples that are ultimately processed) and as each transect is completed the data (species found, abundance and biomass of mesozooplankton), including comparisons with previous transects, are posted on the project web site at http://www.sahfos.org/Pacific_Project. Time series graphs of data for the separate regions sampled by the CPR are available on the website.

Rather than review all of the various results this report will focus on the east-west transect. Recent integrative studies have shown that both plankton and seabird communities sampled by this transect divide into distinct regions. Community composition analyses show changes in plankton communities (from the CPR data) and bird communities (from MBM observations) occurring at the same points along the transect. Figure 2 shows the results of cluster analyses with each sample (or observing period) coloured according to the cluster it belonged to.

Plankton data from 2000 and 2001, and bird data from 2003 also showed the same divisions at the same places, suggesting that these are consistent community patterns, or “meso-marine ecosystems” (MME) as we term them. Comparison with physical data suggested that the MMEs are defined by the topography (such as the transition between the continental shelf and open ocean) and by the currents of the North Pacific (such as the splitting of the North Pacific current into the California and Alaskan currents). A manuscript has been prepared which describes this integrative study and the characteristics of the ecosystems. This result was used to divide the transect into 10 regions that can be examined separately, and more meaningfully, in our data summaries (Fig. 3).

For example, there are now five successive June east-west transects that have been sampled (2000-2004), and Figure 4 shows mean mesozooplankton abundance for each of the ten MMEs, in each year. In 2004, abundances were generally higher in the western Pacific than the east, while in 2002 the reverse was true, probably owing to differences in seasonality. The eastern Pacific was very warm in 2004, and

the spring increase in sub-arctic copepods appears to have been earlier; abundances in

June were quite low, whereas abundances in April were unusually high.

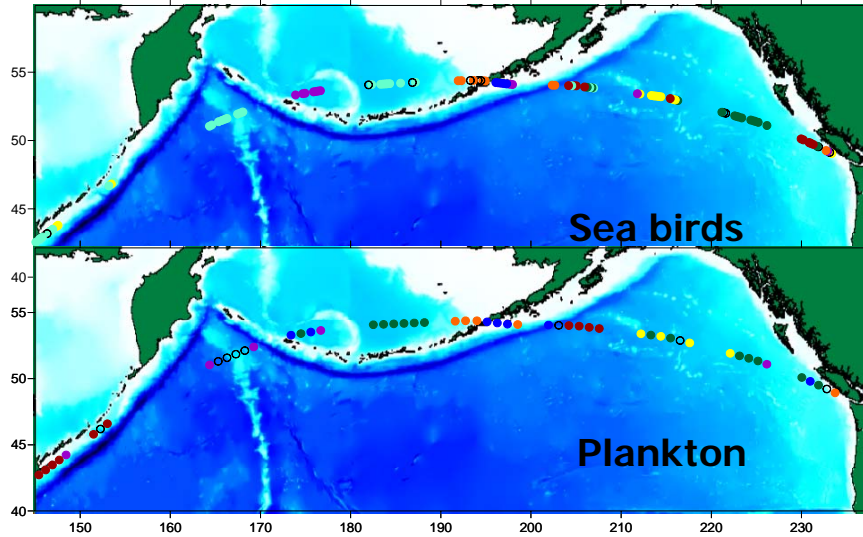


Fig. 2 Separate cluster analyses of the taxonomic data (presence/absence data for plankton, abundance data for birds) along the east-west transect in June 2002. Gaps indicate night. Open circles are samples that did not form a cluster, otherwise colours indicate samples with similar community composition within each trophic group.

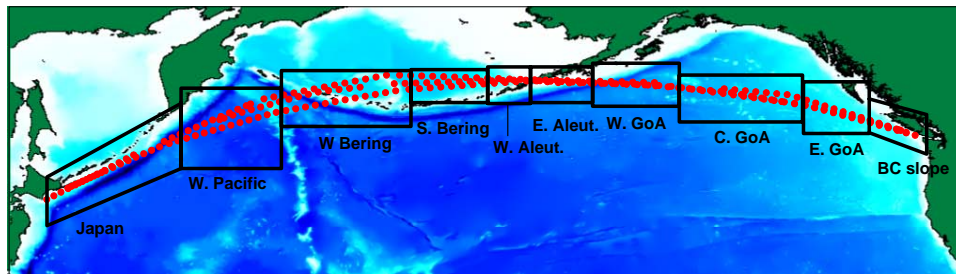


Fig. 3 Meso-marine ecosystems along the CPR-MBM transect.

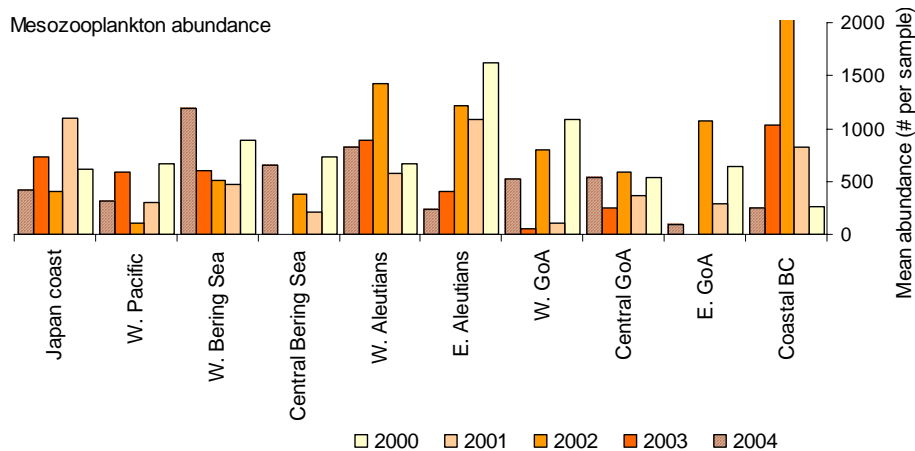


Fig. 4 Mean mesozooplankton abundance in each MME in the June east-west transect of each year.