



North Pacific Research Board *Project Synopsis*

PROJECT

302
536
601

FUNDING SUMMARY

Principal Investigators

Sonia Batten

Sir Alister Hardy
Foundation for Ocean
Science

David Welch

Fisheries and Oceans
Canada

Year funded

2003

Research period

July 2003–July 2007

Budget

\$379,995
(through 2007)

A Continuous Plankton Recorder survey of the North Pacific and southern Bering Sea

BAROMETERS OF THE OCEAN

Plankton—microscopic plants, bacteria and animals, as well as larger fish eggs, fish larvae, and invertebrates—form the base of the marine food web. Because they live less than a year and have little control over where they drift, plankton respond very quickly to changes in their environment. Poor conditions for plankton mean less food is available for larger animals, which as a result also have a poor year, go somewhere else or eat whatever else is available.

WHY WE DID IT

We wanted to know more about how plankton respond to variability in ocean conditions. Using research ships to monitor plankton in the open ocean can be very challenging, but we need these data to help us understand and manage our marine resources.

HOW WE DID IT

Volunteer commercial ships tow the Continuous Plankton Recorder (CPR) along their regular routes. The CPR needs no accompanying scientist, making it relatively inexpensive to operate. Beginning in 2003 (and continuing through 2007 as Projects 536 and 601), vessels have towed a CPR for more than 5,500 km across the Pacific, following the “Great Circle” from British Columbia to Japan. We obtained 340 18-km samples from transects that occurred in every season except winter, and have analyzed 85 samples from each transect to identify and count the organisms we found.

WHAT WE DISCOVERED

We identified ten distinct plankton communities across this section of the Pacific, and noted that seasonal and yearly amounts of plankton varied greatly between regions. Using data from a collaborative

(Continued)



CPR 161 suspended from the davit prior to streaming in the sea at 15 knots. (Sonia Batten)

The Big Picture

We identified ten distinct plankton communities across the North Pacific, and found that seasonal and yearly amounts of plankton varied greatly between regions. We plan to link this variability to the range of cool and warm conditions that occurred during our sampling period.

NPRB Research Interest

NPRB supports fundamental science to study the structure and function of ecosystems in order to understand the populations they support. Plankton communities fuel the upper ocean ecosystem and influence the health of fish, birds and mammals. Knowledge of plankton is needed to improve our understanding of how ecosystems work, as well as the ability to forecast how climate change might impact the transfer of energy through lower trophic levels.



RESEARCH THEME

Lower Trophic Levels

project, we also discovered seabird communities that varied relative to their proximity to land and major ocean currents.

WHAT'S NEXT

We are now starting to link this variability to the range of cooler and warmer conditions that occurred during our sampling period. We intend for these surveys to become part of a larger monitoring effort; since we don't know what's coming next in terms of climate change, nor yet exactly how organisms respond to changes, continued monitoring is essential.

OUTREACH

Scientific Articles

- © Batten, S.D., and Crawford, W.R. (2005). The influence of coastal origin eddies on oceanic plankton distributions in the eastern Gulf of Alaska. *Deep Sea Research II*, 52, 991-1009.
- © Batten, S.D., Hyrenbach, K.D., Sydeman, W.J., Morgan, K.H., Henry, M.F., Yen, P.Y., and Welch, D.W. (2006). Characterising Meso-Marine Ecosystems of the North Pacific. *Deep Sea Research II*, 53, 270-290.

Conference presentations

- © Batten, S.D. (2007) Changes in oceanic northeast Pacific plankton populations: what may happen in a warmer ocean? 4th Zooplankton Production Symposium, Hiroshima, Japan
- © Batten, S.D., Welch, D.W., Lindley, A. and Moore, D. (2006) Relevance of CPR survey results to Alaskan fisheries resource issues. Alaska Marine Science Symposium, Anchorage, AK (oral)
- © Batten, S.D. and Welch, D.W. (2005). Progress of the CPR-based survey in the Gulf of Alaska. Alaska Marine Science Symposium, Anchorage, AK (poster)
- © Batten, S.D., Welch, D.W. and Moore, D. (2005) Seasonal distribution of Euphausiids on a transect from the Gulf of Alaska to the Bering Sea. North Pacific Marine Science Organization, Vladivostok, Russia (oral)
- © Batten, S.D. and Welch, D.W. (2004). A CPR-based survey to monitor the Gulf of Alaska and detect ecosystem change. Alaska Marine Science Symposium, Anchorage, AK (oral)
- © Batten, S., Okkonen, S., Royer, T., and Welch, D. (2004) Gulf of Alaska circulation and large-scale plankton distributions. Eastern Pacific Ocean Conference (EPOC) 2004, Sidney, BC, Canada (oral)
- © Batten, S., Sydeman, W.J., Hyrenbach, D., Morgan, K. Henry, M., Yen, P., and Welch, D. (2003). Multi-ecosystem sampling in the North Pacific Ocean using CPR. North Pacific Marine Science Organization, Seoul, Korea (oral)

Workshops and Meetings

- © Life in the Pacific Ocean: using the *Skaubryn* to study the smallest plants and the biggest whales, presentation by S. Batten to the Canadian Institute of Marine Engineering, April 2005

Website

- © www.sahfos.org (select Pacific Project)

Popular Article

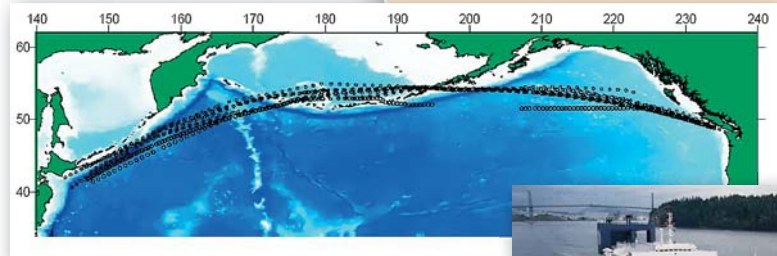
- © *Fairplay Solutions*, September 2003

Radio/TV/Film

- © S. Batten appeared on *Consider This* (Alaska Public Broadcasting television/radio show), January 2004

MISSION OF THE NPRB

Building a clear understanding of the North Pacific, Bering Sea and Arctic Ocean ecosystems that enables effective management and sustainable use of marine resources



Above (left): "Great Circle" CPR transect from British Columbia to Japan; above (right): the cargo vessel *Skaubryn*, one of several vessels that have towed the CPR. (Sonia Batten)

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