

PICES Harmful Algal Bloom International Seafood Safety Project

by Vera L. Trainer and Charles G. Trick

A PICES Seafood Safety Project was initiated in 2007 in response to the need to develop a system for harmful aquatic organism data collection and exchange in the Pacific Ocean, to assist both in the prevention of impacts on fisheries and to build the capacity of scientists studying this topic in developing countries in the Pacific Rim. Funded by a voluntary contribution from Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF), through the Fisheries Agency of Japan (JFA), the Project is into its second successful year. The Project is conducted by the PICES Section on *Ecology of Harmful Algal Blooms in the North Pacific* (HAB Section), with Dr. Vera Trainer (Northwest Fisheries Science Center, Seattle, WA, U.S.A., Vera.L.Trainer@noaa.gov) as the Principal Investigator, and focuses on preparing and teaching country-specific training courses most needed to ensure seafood safety in Pacific countries outside the PICES region, *i.e.*, in Southeast Asia and in Central and South America.

It was recognized that other attempts to provide a similar assessment and implementation of seafood safety guidelines experienced variable levels of success, and none have proven to be sustainable over the long-term. It was agreed to take a "community research partnership" approach to produce best results with the relatively minor regional contributions that can be made with available resources. An inclusive and sustainable model for the implementation of the PICES Seafood Safety Project was set up to meet the following criteria, regardless of the geographical location:

- Participation in the Project should be initiated and implemented at the community level. Projects aimed at research scientists and government laboratories can succeed in establishing a core of dedicated researchers, but to exist over the long-term, a project must build on community research partnerships;
- Participation in the Project should lead to sustainable involvement at the local and regional levels and ideally be seen as a realistic career path for both community workers and regional scientists;
- Participation in the Project should engage researchers who are in a multidisciplinary research group so that individuals can gain a balanced perspective on both the entire project and the value of their contributions;
- Accepting that partnerships are essential for success, opportunity is required to build partnerships for extended interactions and commitments. Building of partnerships with stakeholder involvement and continuing education or knowledge transfer are essential to maintain a country's research and monitoring capacities.

Investment into creating the proper framework for the implementation of the Project is a major accomplishment that will pay dividends. Without this investment to detailed analysis we risk a non-sustainable effort. There is now a plan in place that will embrace community partnerships leading to sustainable success.

Having criteria for the implementation of the Seafood Safety Project established, opportunities were investigated for partnerships with agencies and individuals active in complementary programs in geographical areas of interest. Through extensive discussions with active scientists and administrators, the potential for integrating the Project into established regional collaborations has been evaluated.

In November 2007, PICES experts observed a HAB Training Workshop, led by Prof. Dr. Yasuwo Fukuyo, at the Tokyo University of Marine Science and Technology, and met with their IOC-WESTPAC (Intergovernmental Oceanographic Commission's Regional Secretariat for Study of the Western Pacific) colleagues to discuss possible directions for the Seafood Safety Project, what might be learned from past IOC-WESTPAC training classes, and potential for collaboration with these organizations to enhance the effectiveness of our training program. A regional presence was achieved by presenting activities of the PICES HAB Section and the rationale and approach for the Project at the second Asian GEOHAB (Global Ecology and Oceanography of Harmful Algal) Conference in Nha Trang, Vietnam (January 2008) and at the WESTPAC Seventh International Scientific Symposium in Sabah, Malaysia (May 2008). At these meetings, PICES experts communicated with GEOHAB and WESTPAC scientists in order to obtain information about research and monitoring needs pertaining to HABs and seafood safety in southeast Asian countries, and to appraise both the willingness of individual scientists to participate in the PICES Project and the existence of the organizational structure and interest within a country's responsible management agencies to sustain a HABs monitoring effort.

The need for a HAB training program in developing countries is also being assessed via a questionnaire sent, with assistance from Dr. Henrik Enevoldsen, through the IOC network to their contact points (representing both regulatory and research entities) in a number of WESTPAC, and IOCARIBE (IOC Sub-Commission on the Caribbean and Adjacent Regions) and ANCA (IOC Sub-Commission in Central and South American) countries. This questionnaire requested a response from countries detailing their research and monitoring needs on HABs and



Instructors and participants of the PICES HAB International Seafood Safety Project first training class in Manila, Philippines, January 2009.

seafood safety, and their interest in being involved in the PICES Project. Information received back is being used to determine which countries best meet the criteria in the adopted “community research partnership” approach and have to be targeted for training classes/workshops in following years. As partners with IOC we also have gained access to their training classes, and international education/technology transfer activities.

After conversations with Bureau of Fisheries and Aquatic Resources (BFAR) personnel during a visit to Manila in May 2008, and through subsequent e-mail and telephone contacts, it was concluded that the Philippines appeared to be a perfect match to the criteria used for country selection in the Seafood Safety Project, including (1) the magnitude of the HAB problem, (2) the need for training, and (3) the likelihood of sustainability. A tentative plan was made to hold the first PICES training class/workshop in this country. Equipment and supplies for a Seafood Safety Traveling Field Kit for the detection and monitoring of HAB toxins, harmful algal species, and associated environmental (abiotic) parameters were purchased to be used for this class and other classes in subsequent years.

It was determined that the greatest need in the Philippines was for:

- training in screening tools for toxin detection because of the periodic lack of mice for the mouse bioassays (the standard regulatory method for testing shellfish for paralytic shellfish poisoning (PSP) toxins);
- a review of phytoplankton identification, with specific focus on harmful species in the Philippines;
- an introduction to relational and online databases.

The training class was held from January 15–23, 2009, in Manila, and was highly successful. There were 11 participants from the BFAR Central Laboratory and 3 from the BFAR Regional and Local Governmental Laboratories during the first 2½-day training session on toxin screening methods. Thirty-three participants took part in the 4-day comprehensive training on phytoplankton identification and toxin screening methods. The quality of teaching and the students’ comprehension of concepts were assessed from two quizzes and one class questionnaire. A notebook was provided to all participants that included an agenda, a summary of HAB syndromes in humans, a phytoplankton key, individual micrographs of HAB species of concern in the Philippines, and handouts on toxin detection methods, including the Jellett PSP test and Abraxis Enzyme-Linked Immunosorbent Assay (ELISA). BFAR Central Laboratory personnel also received a list of supplies, including purchasing information and description of the



Top left: Valentino Macasaet (Fisheries Resources Management Division, BFAR), Mark Wells and Vera Trainer (PICES), Malcolm Sarmiento (Director, BFAR), Sandra Arcamo (Head, Fisheries Resources Management Division, BFAR), Juan Relox (Head, Marine Monitoring Section, Fisheries Resources Management Division, BFAR); Top right: Brian Bill (PICES instructor) demonstrating pipetting to (from left to right) Lourdes (Odeth) Legaspi, Jayson Zulueta, Angelica Bautista, Mark Wells (PICES instructor) and Valentino Macasaet; bottom left: Florie Calmorin, Ramie Gengoni and Evonie Dundumaya identifying harmful algal species by light microscope; bottom right: Lovella Carolino and Ramie Gengoni performing a toxin screening test.

Association of Official Analytical Chemists (AOAC) International method and Interstate Shellfish Sanitation Conference (ISSC) approval of the Jellett rapid test for PSP toxin screening. Over the next year, the Abraxis ELISA and Jellett test strips will be evaluated by Central Laboratory personnel. Monthly communications between PICES experts and Philippine scientists will assure timely progress. A follow-up visit to the Philippines is anticipated in 2010.

We have begun country-of-focus communications for the next training class in Latin America. Initial discussions took place at the IPHAB (International Panel on Harmful Algal Blooms) conference in Paris in April 2009, where PICES experts met with Dr. Leonardo Guzman, the Chairman of the IPHAB and a member of the IOC HAB Working Group for South America, and Jose Luis Peña Manjarrez, Chairman of the IOC HAB Working Group for Central America and Caribbean Sea. Based on discussions with these individuals representing Central and South

America, Guatemala was determined to be one of the countries with the strongest need for HAB training that is not already receiving assistance from other programs. The International Atomic Energy Authority (IAEA) already has planned to give widespread training classes throughout Central and South America in 2009–2010, and because Guatemala is not currently receiving assistance from IAEA, it is considered a logical choice. Our decision is also based on the IOC-supported questionnaire that was submitted by Leonel Carrillo Ovalle, from the Laboratorio de Investigación Aplicada Centro de Estudios del Mar y Acuicultura, Universidad de San Carlos de Guatemala. His response to the questionnaire fulfills our guidelines of need, sustainability and desire of the host country for PICES project training. The first training class/workshop in Latin America is tentatively planned for January–February 2010. This plan will be confirmed during the upcoming site visit of PICES experts to Guatemala in September 2009. We would like to acknowledge MAFF for funding this project, allowing us the opportunity to conduct much needed important work.