

PICES WG 21 Meets in Busan, Korea: The Database Meeting

by Thomas Thierrault

Non-indigenous species are a global concern because they are detrimental to native biodiversity and compromise ecosystem function. To better understand non-indigenous species in the North Pacific (and beyond), PICES established a Working Group (WG 21) on *Non-indigenous Aquatic Species* that had its inaugural meeting at PICES XV in October 2006, in Yokohama, Japan. In April 2007, the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan, through the Fisheries Research Agency (FRA) of Japan, provided a voluntary contribution to PICES for a project entitled “*Development of the prevention systems for harmful organisms’ expansion in the Pacific Rim*”. This project is anticipated to run for five years (from April 1, 2007 to March 31, 2012), and has two distinct components: one on harmful algal blooms (HABs) and the other on marine non-indigenous species (MNIS). The intent of the funding is to develop international systems to collect, exchange and store relevant data, and to foster partnerships with non-PICES member countries and related international organizations, such as the International Council for the Exploration of the Sea (ICES). The contribution is from the Official Development Assistance (ODA) fund and thus, involvement of developing Pacific Rim countries is required in activities under this project. The project is conducted by two PICES expert groups under the Marine Environmental Quality Committee: Section on *Ecology of Harmful Algal Blooms in the North Pacific* (HAB Section) and WG 21. Each group oversees a specific sub-project. Within the non-indigenous species envelope, two specific initiatives have been identified. The first is the development of a comprehensive MNIS database, with Dr. Henry Lee II (U.S. Environment and Protection Agency) serving as the Principal Investigator. The second is a taxonomy

initiative that includes rapid assessment surveys and associated collector surveys in PICES member countries, with Dr. Thomas Therriault (Fisheries and Oceans Canada) serving as the Principal Investigator.

Working Group 21, under the co-chairmanship of Ms. Darlene Smith (Canada) and Vasily Radashevsky (Russia) have focused recent efforts on the database initiative. Following initial discussions held at a joint meeting of PICES WG 21, ICES Working Group on *Introductions and Transfers of Marine Organisms* and ICES/IOC/IMO Working Group on *Ballast Waters and Other Ship Vectors* (May 25–26, 2007, in Cambridge, U.S.A., in conjunction with the 5th Conference on “*Marine Bioinvasions*”), a prototype MNIS database was developed by Dr. Henry Lee and Ms. Deborah Reusser based on the U.S. Environment and Protection Agency and the U.S. Geological Survey “Pacific Coast Ecosystem Information System” (PCEIS) spatial database. At a meeting of WG 21 convened during PICES XVI (October 26–27, 2007, in Victoria, Canada), it became evident that a subsequent meeting was required to beta-test the MNIS database and to develop standardized protocols. Dr. Yoon Lee (National Fisheries Research and Development Institute (NFRDI), Korea) graciously volunteered to host an inter-sessional meeting from March 3–5, 2008, at his institute in Busan. The purpose of the meeting was to reach an agreement on standards, data elements and data entry templates for the MNIS database that will be used to capture information on non-native species and allow sharing of this information, not only among PICES member countries, but more broadly with any community studying non-indigenous species. Species continue to be transported with increasing frequency to



Participants of the inter-sessional WG 21 database meeting (March 3–5, 2008, Busan, Korea).

new environments around the world, primarily *via* activities associated with international trade and commerce (*e.g.*, ballast waters, hull fouling, aquaculture, *etc.*), and once there, some impact ecosystem productivity and function, including local fisheries. Thus, it is critical to understand the distributions of these species in newly-invaded environments as well as in their native environments. This information is essential for undertaking risk assessments and will be a valuable tool to identify, and potentially mitigate, a variety of vectors and pathways.

Day 1 of the Busan meeting started with a round of introductions and opening remarks from our hosts. After reviewing the agenda and expected outcomes from this inter-session meeting, the participants quickly immersed themselves in the world of database structure and function. One of the initial discussions was on what scale the database should be developed and subsequently populated. Existing data on non-native species in PICES member countries has been collected at various scales; whereas some studies included latitude/longitude information for each non-indigenous species, others have focused at much larger spatial scales (*e.g.*, embayments or basins). It was decided that for our purpose of understanding non-indigenous species patterns in the North Pacific, it would be most informative if we worked at a fairly large spatial scale (although the database will allow input at much smaller spatial scales, thereby meeting the needs of all member countries while ensuring seamless merging of country databases for joint, large-scale analyses). After a quick review of existing papers on potential spatial scales for the database, we agreed to use the eco-regions identified in a recent paper by Spalding *et al.* (2007; *Bioscience* 57: 573–582) that defined Marine Eco-regions of the World. The key benefit of this paper for marine non-indigenous species is that the eco-regions are defined for the globe and, given that any species has the potential to be moved anywhere around the globe, researchers can clearly identify the eco-regions to which the species is native and those for which it has invaded. Further, this will allow our MNIS database to be populated by other groups working on characterizing and documenting the distribution of marine non-indigenous species (*e.g.*, by ICES WGs).

Other issues discussed on the first day of the meeting centered on classification standards. When working on non-indigenous species, one needs to know that the species is not native to the ecosystem (eco-regions) where it has been identified. Several classification criteria were determined, including documentation within the database, in order to be able to classify a species as native or non-native. However, the participants did recognize that an increasing body of literature exists for a number of taxa, especially some of the more controversial ones, which suggests that for some species, we simply will not be able to resolve their invasion status, and these will need to be treated as cryptogenic (unknown origin). We also discussed how to identify if non-indigenous species have

become established (self-sustaining population) compared to those that have not and represent “failed” introductions.



Graham Gillespie (Canada), Blake Feist (U.S.A.) and Evgeny Barabanshchikov (Russia) on an impromptu taxonomic survey at a Busan market.

Day 2 provided participants with some “alone time” with the database. After exploring the database by conducting hands-on data entry using our favorite non-indigenous species, we had a series of discussions on the pros and cons of including life history information for these species and on the level of detail that could be incorporated into the database. We also debated about who the end-users of the database likely would be and what their goals would be (*e.g.*, conducting risk assessments). By this point in the beta-testing it was very clear that with enough resources one could build the ultimate database that would include every potential bit of information a researcher could think of. However, it also became apparent that someone would need to serve as the gatekeeper for this database, and that databases do not simply remain error-free all by themselves. Thus, it was decided that, to the extent possible, we would include life history information into the database and that adequate documentation would need to be provided to implement this task. This is consistent with the necessity to add a citation for each species record in the database, thereby providing a mechanism to link an occurrence with a source for this information. After a visit to a local restaurant for lunch and a short stop at a local fish market, the group returned to NFRDI to continue their data entry quests. As expected, there were a number of minor issues identified and corrected with respect to the database itself, but considerable progress was made and the group was very satisfied with the beta-version. The key outstanding issue at the end of Day 2 was how to merge the individual country databases into a common database, or if the databases would be linked.

(continued on page 15)