

REPORT OF WG 21 ON *NON-INDIGENOUS AQUATIC SPECIES*

The fourth annual meeting of the Working Group on *Non-Indigenous Aquatic Species* (hereafter WG 21) was held under the co-chairmanship of Ms. Darlene L. Smith from October 23–24, 2009. There was participation from all PICES countries and guests from ICES WGITMO, IOC WESTPAC and NOWPAP. Twenty-five WG-21 members and guests attended the meeting (*WG 21 Endnote 1*). meeting agenda can be found in *WG 21 Endnote 2*.

AGENDA ITEM 2

2009 inter-sessional highlights

WG 21 was active throughout the year planning working group activities and interacting with other multilateral organizations. The following are the highlights of these activities:

- Dr. Thomas Therriault, the Principle Investigator of the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) funded Taxonomy Initiative visited Busan and Jeju Island, Korea, in March 2009 to plan a collector plate and Rapid Assess Survey (RAS). This ultimately resulted in a very successful RAS in Jeju (see PICES Press Vol. 18, No. 1, pp. 38–40). WG 21 conducted a 4-day (October 19–22, 2009) RAS in Jeju prior to the PICES Annual Meeting. Participants were from 5 PICES member countries (Canada, Japan, Korea, Russia and United States) as well as from ICES WGITMO and IOC WESTPAC. Collectors from 4 locations (Busan, Ulsan, Masan and Jang Mok) analyzed the samples at the Jeju Biodiversity Institute. Field sampling was conducted at Seongsan Beach. Analysis is being finalized and will be entered into the database. Working Group members, Drs. Junghoon Kang and Kyoungsoon Shin of KORDI, were instrumental in the success of this exercise and WG 21 thanks them.
- Ms. Darlene Smith was invited to give a presentation on WG 21's activities at an IOC WESTPAC workshop on "*Marine invasive species and management in the western Pacific region*" in Bangkok, Thailand (June 4–5, 2009). This resulted in a formal invitation and acceptance for IOC WESTPAC to attend the WG 21 meeting as an observer at PICES-2009. It is also likely that IOC WESTPAC representatives will participate in the demonstration workshop on "*An introduction to rapid assessment survey methodologies for application in developing countries*" to be hosted by Japan in July 2010.
- PICES co-sponsored the 6th International Conference on Marine Bioinvasions held in Portland, Oregon, from August 24–29, 2009. This financial support enabled a number of WG 21 members to attend the Conference. The meeting was attended by all the Chairs and Co-Chairs of the working groups and a numbers of members. The working groups' activities were shared. This resulted in an invitation to WG 21 to present the Non-indigenous Species database at the WGBOSV meeting in Hamburg, Germany in March 2010. It was also agreed that the PICES and ICES Working Groups would meet again following the 7th Marine Bioinvasions Conference to be held in Barcelona, Spain in 2011.

AGENDA ITEM 3

Taxonomy initiative

The Rapid Assessment Survey (RAS), as part of the taxonomic initiative under the MNIS sub-project which is part of the project entitled "*Development of the prevention systems for harmful organisms' expansion in the Pacific Rim*" is funded by a voluntary contribution to PICES from the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan, through the Fisheries Agency of Japan. The project is anticipated to run for 5 years (from April 1, 2007 to March 31, 2012).

In addition to the RAS conducted in Jeju, Korea, collector surveys were undertaken in China and Japan. Dr. Li Zheng presented results from Qingdong and Qingdao, China. Collectors were also put out by Canada and United States but analysis not yet complete.

WG 21-2009

Two proposals (Tokyo Bay and Osaka Bay) for a demonstration RAS workshop were presented by Dr. Hiroshi Kawai. WG-21 selected the Osaka Bay proposal based on the following criteria: cost, biodiversity, facilities and logistics. The demonstration RAS workshop will be held in July 2010 with the precise date to be determined shortly. IOC WESTPAC will be invited to participate and will conduct its own RAS later in the fall 2010.

AGENDA ITEM 4

Marine non-indigenous species database initiative

The marine non-indigenous species database is the other MNIS sub-project funded by MAFF. Ms. Deborah Reusser and Dr. Henry Lee II reported on the following upgrades to the database:

- a. Ability to add images,
- b. Ability to add pdf files,
- c. Ability to output maps to pdf or to a printer,
- d. Bulk import utility,
- e. Utility to produce spreadsheets of information by species.

The latest version of the database was installed on Working Group members' laptops at the meeting. Development of the database will be finished March 31, 2010. WG 21 members agreed to submit data quarterly to Dr. Lee for wrap-up. However, they were not able to resolve the question of a web-based application or long-term maintenance of the database.

AGENDA ITEM 5

Glossary of terms and definitions

A draft of a glossary was completed by Mr. Graham Gillespie. WG 21 members will review the glossary and add terms that are missing. Mr. Gillespie will then sort and compare the entries and prepare a final version by October 2010.

AGENDA ITEM 6

Compilation of database of NIS experts including taxonomists

Dr. Blake Feist prepared a draft compilation of NIS experts. WG 21 members will review the draft and Dr. Feist will produce a final version by January 2010 to be posted on the Working Group's webpage.

AGENDA ITEM 7

Summary of marine bioinvasions in the North Pacific

Dr. Lee reported on progress on the marine bioinvasions database. Data entry is slower than planned. WG 21 members agreed to supply data in a timely manner as discussed above. They also agreed that an atlas of NIS species, with distribution maps and ecological characteristics, would be the best way to communicate a summary of marine bioinvasions in the North Pacific. The atlas would be a PICES publication and brochure, with a CD, and pdf file posted on the PICES website. The atlas will be completed October 2010 with publication in 2011.

AGENDA ITEM 8

Korean port environmental risk assessment technology

Dr. Junghoon Kang presented Korea's efforts to develop environmental risk assessment technologies for ports. This includes monitoring and risk assessment.

AGENDA ITEM 9

ICES Code of Practice on Introductions and Transfers of Marine Organisms

Dr. Judith Pederson, Chair of ICES WGITMO, presented a summary of the ICES Code of Practice on Introductions and Transfers of Marine Organisms. A number of ICES member countries, including Canada, use this code as a basis for their approvals of transfers of marine organisms in their aquaculture industries. This summary will be included in WG 21's final report in 2012.

AGENDA ITEM 10

International Maritime Organization Ballast Water Standards

Dr. Lee presented a summary of IMO Ballast Water Standards. To date, no PICES member countries have ratified the IMO convention on ballast water. Dr. Lee's summary will be included in WG-21's final report in 2012.

AGENDA ITEM 11

Topic Session proposal

WG 21 recommends a ½-day Topic Session on “*Join the club: Integrating non-indigenous species with other anthropogenic influences on coastal ecosystems*” at PICES-2010 (*WG 21 Endnote 3*). We believe that the PICES 2010 Annual Meeting in Portland is particularly well suited for this proposed topic session. First, since much of the research on the impacts of NIS on coastal marine systems occurs in North America, Portland would serve as a convenient hub for this special session. Second, The Center for Lakes and Reservoirs (CLR) at Portland State University (PSU) is an internationally renowned Center that focuses on NIS research and serves as a conduit for much of the NIS research that occurs on the West Coast of the United States.

Proposed budget: \$3,500 to cover travel of 2 keynote speakers.

AGENDA ITEM 12

Recommendations to MEQ

The Working Group recommends that the MEQ Committee approve:

- a. Holding a 4- to 5-day demonstration RAS workshop in Japan (MAFF funding),
- b. Holding a 4-day Rapid Assessment Survey in Oregon (MAFF funding),
- c. Holding a 2-day Working Group meeting at PICES-2010,
- d. Advising Science Board that WG 21 intends to publish an atlas of non- indigenous species in the North Pacific in 2010,
- e. Approving a ½-day Topic Session at PICES-2010 in Portland, Oregon, and travel support for 2 keynote speakers.

WG 21 Endnote 1

Participation list

Members

Evgenyi Barabanshchikov (Russia)
Blake E. Feist (U.S.A.)
Graham Gillespie (Canada)
Hao Guo (China)
Jungcheon Kang (Korea)
Hiroshi Kawai (Japan)
Henry Lee II (U.S.A.)
Deborah Reusser (U.S.A.)
Kyoungsoon Shin (Korea)
Darlene Smith (Canada, Co-Chairman)
Thomas Therriault (Canada)
Hisashi Yokoyama (Japan)
Li Zheng (China)

Observers

Judith Pederson (ICES)
and others

WG 21 Endnote 2

WG 21 meeting agenda

1. Opening remarks and introductions
2. 2009 inter-sessional highlights
3. Taxonomy initiative (funded by MAFF)
4. Marine non-indigenous species database initiative (funded by MAFF)
5. Glossary of terms and definitions
6. Compilation of database of NIS experts including taxonomists
7. Summary of marine bioinvasions in the North Pacific
8. Korean port environment risk assessment technology
9. ICES Code of Practice on Introductions and Transfers of Marine Organisms
10. International Maritime Organization Ballast Water Standards
11. Topic Session proposal
12. WG 21 recommendations to MEQ

WG 21 Endnote 3

**Proposal for a ½-day Topic Session on
“Join the club: Integrating non-indigenous species with other anthropogenic influences on
coastal ecosystems” at PICES-2010**

When people think of anthropogenic forcing in coastal marine ecosystems, commercial fishing, aquaculture, pollution and urbanization usually come to mind. Another type of anthropogenic forcing, typically not classified as such, is the presence of non-indigenous species (NIS). While the occurrence and subsequent impacts of NIS in coastal ecosystems are usually not classified as anthropogenic, the mechanisms of their introductions are, by definition, anthropogenic.

The Advisory Panel on Anthropogenic Influences on Coastal Ecosystems (AICE-AP), under the auspices of FUTURE, identified NIS as an exemplary anthropogenic impact on coastal marine systems. Further, in order to begin addressing the three key questions identified as priorities for FUTURE research activities, AICE and COVE (Climate, Oceanographic Variability and Ecosystems) Advisory Panels made it a priority to either establish new PICES expert groups or to build on and extend existing activities in PICES. Working Group 21

(*Non-indigenous Aquatic Species*) was one of the existing expert groups that was specifically suggested to “form an association with AICE”. Therefore, we propose a PICES Topic Session dedicated to NIS as an anthropogenic influence on coastal ecosystems, which would facilitate the priorities set forth by the aforementioned advisory panels

If we wish to integrate NIS with other anthropogenic influences, we need a better understanding of ecosystem or regional impacts of NIS. Many, if not most, studies on the impacts of NIS in marine systems are done at small spatiotemporal scales, *i.e.*, typically over small areas (1 m²) or under controlled circumstances with single species interactions. Conclusions from these studies are often scaled up and extrapolated to entire ecosystems or regions, but the extrapolations are limited by the fact that NIS consequences for whole ecosystems are not limited to single species interactions within homogeneous habitats. The dynamics of NIS impacts vary over space and time. Processes occurring over seasonal, annual and decadal time horizons interact in complex ways with habitat type, condition and availability, native species assemblages, trophic interactions, and food web dynamics. Understanding these complexities requires restructuring how we think about NIS invasions and their impacts on the health of coastal systems. Including and integrating NIS invasions with other anthropogenic influences would help advance our objective of getting a better understanding of the ecosystem and regional impacts of NIS introductions.

Problems arising from the existence of NIS in coastal systems should be addressed using an ecosystem based approach. Continuing to study and manage NIS invasions as single species problems must be replaced by examining NIS within the context of the systems in which they invade. For example, global climate change is expected to have clear consequences with regard to future NIS introductions, establishment, and range expansion of currently established populations. Ignoring this complex interaction will only hinder efforts to control established populations and prevent new introductions. Integrating NIS invasions with existing anthropogenic stressors will facilitate a holistic approach to addressing the challenges facing our coastal marine ecosystems.

Recommended Convenors: Blake Feist (USA) and Hiroshi Kawai (Japan)

Suggested invited speakers:

- John J. Stachowicz, Professor, Department of Evolution and Ecology, University of California, Davis (tentative) to speak on ecosystem and regional consequences of marine NIS invasions in coastal systems;
- Toshiyuki Yamaguchi, Professor, Department of Earth Science, Chiba University, Japan (tentative) to speak on Biogeography and impacts of recently introduced non-indigenous barnacles in Japan.