

## Report of the Study Group on *Marine Pollutants*

The Study Group on *Marine Pollutants* (SG-MP; 2011–2013) met for its final business meeting under the chairmanship of Dr. Peter Ross in Nanaimo, Canada, on Saturday, October 12, 2013 (see *SG-MP Endnote 1* for list of participants). This ½-day meeting followed the workshop (W7) on “*Traditional seafoods of the Snuneymux’w First Nation in Nanaimo, BC: Insight into food, social and ceremonial uses*”.

At the meeting participants reviewed past activities of SG-MP and

- i) made changes to complete the SG-MP final report for submission to MEQ for approval;
- ii) made changes to the proposal for a new Section on *Emerging Topics in Marine Pollution* (later recommended as a Working Group by Science Board; *SG-MP Endnote 2*). Included in the list of plans for the proposed Section were Topic Sessions and workshops, which will lead to special journal issues and a contribution to the 3<sup>rd</sup> PICES North Pacific Status Report during the period 2014–2016;
- iii) finalized a proposal for a Topic Session on “*Marine debris in the ocean: Sources, transport, fate and effects of macro- and micro-plastics*” (*SG-MP Endnote 3*) for PICES-2014 in Yeosu, Korea (to be co-sponsored by NOWPAP, GESAMP and ICES).

### *SG-MP Endnote 1*

#### SG-MP participation list

##### Members

Peter S. Ross (Canada, Chairman)  
 Shigeru Itakura (Japan)  
 Won Joon Shim (Korea)  
 Staci Simonich (USA)  
 Mikhail Simokon (Russia)  
 Zijun Xu (China)

##### Observers

Hideaki Maki (Japan)  
 Karin Baba (Japan)

### *SG-MP Endnote 2*

#### Proposal for a Section on *Emerging Topics in Marine Pollution (S-ETMP)*

##### *General objectives*

Pollution can adversely affect the health and abundance of marine biota, especially in densely-populated coastal areas. The downstream socio-economic consequences can be significant, with numerous examples of consumption advisories, commercial fishery closures, commercial trade interdictions and diminished aboriginal access to food resources around the North Pacific Ocean. The protection of ecosystem health and services requires an ability to detect emerging pollutant issues before serious adverse impacts arise. Regulations, policies and other management actions resulting from marine pollution research in the past have led to dramatic declines in environmental concentrations of a number of harmful pollutants, subsequently improving the health of marine biota.

This proposed Section will provide leadership on emerging pollution issues to the PICES community, reporting through the MEQ Committee. The S-ETMP will convene a series of timely Topics Sessions and workshops, and coordinate special issues in international peer-reviewed journals. The Section will ensure the continued availability of expertise on marine pollutants within PICES, and deliver guidance to the FUTURE Advisory Panels (notably AICE and SOFE). The Section will collaborate with other PICES expert groups in

co-convening activities or compiling data. Importantly, the Section will address the question identified in the FUTURE Science Plan “*How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?*”

### *Terms of Reference*

1. Document and profile emerging marine pollution issues in the North Pacific Ocean within the PICES community by:
  - a. Convening Topic Sessions and workshops on new and emerging pollutants and pollution issues;
  - b. Coordinating a series of special issues in international peer-reviewed journals based on topic sessions; and
  - c. Contributing to the next edition of the PICES North Pacific Ecosystem Status Report by compiling data describing spatial and temporal trends for pollution indicators in the North Pacific Ocean.
2. Strengthen partnerships to deliver Topic Sessions/workshops and to publish special issues with:
  - a. Other PICES expert groups, especially those identified in the FUTURE Science Plan.
  - b. Other multilateral organizations, including the International Council for the Exploration of the Sea (ICES), the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), and the Northwest Pacific Action Plan (NOWPAP).

### *Proposed activities 2014–2019 (3 yr + 3 yr)*

The Section on *Emerging Topics in Marine Pollution* will engage in specific activities that will identify contaminants of emerging concern, prioritize pollutants from the many sources, and assess the relative importance of pollutants among other natural and anthropogenic stressors. Members will contribute to discussions and strategic planning with the MEQ Committee as well as through other PICES expert groups. The S-ETMP will build on the success of a number of activities carried out by the SG-MP, including two workshops (2011, Khabarovsk: *Pollutants in a changing ocean: Refining indicator approaches in support of coastal management* and 2013, Nanaimo: *Traditional seafoods of coastal aboriginal communities in the North Pacific: Insight into food, social and ceremonial uses at Snuneymux’w First Nation in Nanaimo, British Columbia*) and two Topic Sessions (2012, Hiroshima: *Environmental contaminants in marine ecosystems: Seabirds and marine mammals as sentinels of ecosystem health*; 2013, Nanaimo: *Status, trends and effects of pollutants in coastal ecosystems: Implications for wildlife and humans*). The proposal for establishing a S-ETMP will benefit from the current support of ICES and GESAMP.

### *Topic Sessions at PICES Annual Meetings*

- 2014: *Marine debris in the North Pacific Ocean: source, transport, fate and effects of macro- and micro-plastics* (solicit expert input from WG 29 on the role of ocean currents in shaping marine debris transport and fate; co-sponsored by NOWPAP, GESAMP and ICES);
- 2015: *Indicators of emerging marine pollution issues in the North Pacific Ocean* (co-convene a session with WG 28 on multiple stressors, WG 30 on radiation, and S-HD, and with support of AP-SOFE, AP-AICE and AP-MBM);
- 2016: *Sources, transport and fate of hydrocarbons in the marine environment*, including oil spills, vessel emissions, long-range transport (co-convene a session with partners to be determined, and with support of AP-AICE);
- 2017: *Climate influences on pollutant transport, fate and effects in the North Pacific Ocean* (co-convene a session with S-CCME on climate variability and change, and with support of AP-COVE);
- 2018: *Seafood safety in the Pacific Ocean: Risks vs benefits* (co-convene a session with WG 30 on radiation, S-HAB on natural toxins, and S-HD, and with support of AP-AICE).

### *Meetings/Workshops*

- 2014: S-ETMP meeting, data compilation;

- 2015: *Indicators of emerging marine pollution issues in the North Pacific Ocean* (co-convene a data compilation workshop with WG 28, and with support of AP-MBM);
- 2016: *Oil spill monitoring and characterization* (co-convene a workshop with the Korean Institute of Ocean Science and Technology (KIOST), and with support of AP-AICE);
- 2017: *Status and trend of marine pollution in the coasts of North Pacific rim* (co-convene a data compilation workshop with NOWPAP, and with support of AP-MBM);
- 2018: *Monitoring and assessment of marine pollution in the coasts of North Pacific rim* (co-convene a data compilation workshop with NOWPAP, and with support of AP-MBM).

#### *Special journal issues*

- 2015: Marine debris in the North Pacific;
- 2016: North Pacific pollution indicators;
- 2017: Source, transport and fate of hydrocarbons in the North Pacific;
- 2018: Climate-pollutant interactions in the North Pacific;
- 2019: Seafood safety in the North Pacific.

#### *Compilation of data for marine pollution*

Compiled data for marine pollution indicators and findings will be delivered to multiple PICES expert groups and in particular to AP-SOFE in support of the PICES North Pacific Ecosystem Status Report ~2016/17.

The S-ETMP will directly address the following questions of FUTURE program:

#### *3. How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?*

- 3.1. What are the dominant anthropogenic pressures in coastal marine ecosystems and how are they changing?
  - By characterizing emerging pollution priorities in the North Pacific Ocean.
- 3.2. How are these anthropogenic pressures and climate forcings, including sea level rise, affecting nearshore and coastal ecosystems and their interactions with offshore and terrestrial systems?
  - By documenting the impacts of emerging pollutants in the North Pacific Ocean, especially in coastal environments, and in a changing ocean environment.
- 3.3. How do multiple anthropogenic stressors interact to alter the structure and function of the systems, and what are the cumulative effects?
  - By collaborating with other expert groups to document importance of marine pollution relative to multiple stressors.
- 3.4. What will be the consequences of projected coastal ecosystem changes and what is the predictability and uncertainty of forecasted changes?
  - By developing approaches to pollutant indicators that account for climate variability and change.
  - By characterizing changing pollution risks as climate changes.
- 3.5. How can we effectively use our understanding of coastal ecosystem processes and mechanisms to identify the nature and causes of ecosystem changes and to develop strategies for sustainable use?
  - By prioritizing pollutant sources and types in support of source control, regulations and best practices.
  - By translating compiled data and findings through the PICES North Pacific Status Report to formats that are understandable to the general public and a wider audience.

***Proposed membership\****

Recommended Co-Chairmen: Olga Lukyanova (Russia), Peter S. Ross (Canada), Won Joon Shim (Korea), Staci Simonich (USA)

Proposed members:

John Elliott (Canada)

Zhengguo Cui (China)

Zijun Xu (China)

Ziwei Yao (China)

Shigeru Itakura (Japan)

Hideaki Maki (Japan)

Sang Hee Hong (Korea)

Hyo-Bang Moon (Korea)

Mikhail Simokon (Russia)

Joel Baker (USA)

Gina Ylitalo (USA)

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\*The additional members for the proposed Section on *Emerging Topics in Marine Pollution* will be designated by each PICES member country based on their expertise related to the Section topics.

***SG-MP Endnote 3***

**Proposal for a 1-day MEQ Topic Session on  
“Marine debris in the Ocean: Sources, transport, fate and effects of macro- and micro-plastics”  
at PICES-2014**

Co-Convenors: Won Joon Shim (Korea), Peter S. Ross (Canada), Olga Lukyanova (Russia), Sangjin Lee (NOWPAP), Peter Kershaw (GESAMP), Jesus Manuel Gago Piñeiro (Spain)

Marine debris is increasingly recognized as a threat to biota in the ocean, which can have a range of socio-economic impacts from coastal areas to the open ocean. The majority of marine debris consists of synthetic polymers, or 'plastics', which readily float on the ocean surface or are suspended in the water column. Microplastics may be attributed to the intentional manufacture of commercial products or the fragmentation of plastic products. They can increase the bioavailable fraction of marine litter and act as a vector for the delivery of intrinsic or adsorbed toxic chemicals to exposed biota. Floating, submerged and beached debris have been documented in marginal seas and the adjacent coastal zone of the North Pacific Ocean. In addition, the North Pacific Ocean Gyre is known to accumulate floating debris in what has become known as the “Great Pacific Garbage Patch”. Marine debris represents trans-boundary pollution which can also deliver associated chemicals and invasive organisms to regions far removed from source. The objective of this session is to present status and trend information for marine plastic debris pollution and its environmental consequences in the PICES region. Papers are invited that assess macro- or micro-plastic debris 1) hotspots in the PICES region, 2) source and input pathways, 3) long-range transport, 4) role as sink or source of associated toxic chemicals, and 5) biological and ecological effects. Recommendations on how to address growing problems associated with marine debris will be also considered.