

Report of Working Group on *Indicators of Marine Plastic Pollution*

The Working Group on *Indicators of Marine Plastic Pollution* (WG 42) held its first meeting on October 20, 2019, from 900 to 1700 h in Victoria, Canada. Nine members and 6 observers (including one by videoconferencing) were in attendance (*WG 42 Endnote 1*). The meeting was co-chaired by Drs. Jennifer Lynch and Chengjun Sun who welcomed the participants. After calling the meeting to order, Drs. Lynch and Sun reviewed the meeting agenda. Three items, the addition of members, frequent scheduled meetings of the WG, and review of the PICES Data Inventory and Policy, were added to the agenda, which was then adopted (*WG 42 Endnote 2*).



WG 42 meeting participants at PICES-2019, Victoria, Canada. From left: Guangshui Na, Wonjoon Shim, Miran Kim, Sang Hee Hong, Chengjun Sun, Jennifer Lynch, Amy Uhrin, Matthew Savoca, Shuhei Tanaka, Kazuhiko Mochida, Yumi Okochi.

AGENDA ITEM 3

Presentations

1. Report of the *Study Group on Marine Microplastics*

Dr. Wonjoon Shim presented an overview of the Study Group on *Marine Microplastics* (SG-MMP) whose one-year term ended in 2018. He briefly discussed the SG's final report which included its findings on MMP hotspots and recommendation for the establishment of a new Working Group on *Indicators of Marine Plastic Pollution*.

2. Overview of WG 42 by MEQ

Dr. Guangshui Na, Chair of the Marine Environmental Quality Committee (MEQ) discussed the role of MEQ, as parent of WG 42, and responsibilities of the WG in its reporting to MEQ.

3. European Union Marine Strategy Framework Directive

Dr. François Galgani, Chair of the MSFD technical group on marine litter, and Co-Chair of the ICES Working Group on Marine Litter, attended the meeting by videoconference. He talked about plastic

pollution studies coordinated and funded by European Union countries and target goals for reduction of marine litter in the European region.

4. Topic Session (S7) on “*Environmental indicators of plastic pollution in the North Pacific*”

Dr. Matthew Savoca reminded participants about the 1-day MEQ-sponsored Topic Session (S7) and co-sponsored by NOWPAP that was going to take place on Wednesday, October 24.

5. Overview of FUTURE

Dr. Toyomitsu Horii, FUTURE liaison to WG 42, discussed the objectives and activities of FUTURE, WG 42’s linkage to the program, and the purpose the FUTURE-WG 42 liaison.

AGENDA ITEM 4

Mission and terms of reference

WG members reviewed the mission statement and agreed to change it from:

- “1. Identify multiple abiotic and biotic environmental indicators of plastic pollution, including meso and microplastics, and additive chemicals in North Pacific, which may contribute towards establishing monitoring guidelines and environmental quality objectives for in the North Pacific and globally.
2. Strengthen partnerships and collaboration with other professional organizations (e.g. Working Group Marine Litter (WGML) of ICES, GESAMP WG40 for microplastic global assessment, NOWPAP MARLITA program, IOC/WESTPAC Asian microplastic capacity building and monitoring program, and Global Interest Group on microplastics of Society of Environmental Toxicology and Chemistry) to address marine plastic pollution related issues.”

to:

- “1. Identify multiple abiotic and biotic environmental indicators of plastic pollution, across different size categories, and additive chemicals in North Pacific, which may contribute towards establishing monitoring guidelines and environmental quality objectives for policy options in the North Pacific and globally.
2. Strengthen partnerships and collaboration with other professional organizations (e.g. Working Group Marine Litter (WGML) of ICES, GESAMP WG40 for microplastic global assessment, UNEP Regional Seas Action Plan: NOWPAP MARLITA program, IOC/WESTPAC Asian microplastic capacity building and monitoring program, and Global Interest Group on microplastics of Society of Environmental Toxicology and Chemistry, U.S. State Department, Monterey Bay Seafood Watch, MARPOL, UNEP G7/G20 Sustainable Development Goals, Protection of Arctic Marine Environment (PAME), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), JPI Oceans, AMAP, OceanObs, International Marine Debris Conference, UNESCO Decade of Ocean Science for Sustainable Development, OSPAR) to address marine plastic pollution related issues.”

WG members reviewed the terms of reference and agreed to change ToR 1 from:

“To review micro- and mesoplastic pollution (e.g., abundance, distribution, composition, and potential impacts) in North Pacific and its marginal seas”

to: “To review pollution (e.g., abundance, distribution, composition, and potential impacts) across different size categories in North Pacific and its marginal seas”.

ToR 1 – *To review pollution (e.g., abundance, distribution, composition, and potential impacts) across different size categories in North Pacific and its marginal seas.*

The WG will ask *Environmental Pollution* if they would consider a special issue of 3 to 4 review papers on plastic pollution in the North Pacific based on the mini review prepared by SG-MMP.

- Sea surface and water column – Wonjoon Shim?
- Shoreline, sediment, sea floor – Amy Uhrin and Shuhei Tanaka
- Biota ingestion – Chengjun Sun, Matthew Savoca, Sanghee Hong, Jennifer Lynch
- Biota entanglement – Jennifer Lynch?

Timeline: October 2020 marginally polished draft
June 2021 submit to journal

Format template to be taken from ToR 2 and 3; deadlines to be recommended by Dr. Lynch

- Review abundance, distributions and impacts with a comparison to other ocean basins – North Pacific is the most plastic polluted,
- Recommend indicators of plastic pollution,
- Think about recommending a target goal.

ToR 2 – *To identify multiple organismal and non-organismal indicators of plastic pollution and its environmental impacts including associated chemicals in the North Pacific and its marginal seas.*

- WG 42 will create a list of indicators and discuss how these could be incorporated into the 3–4 review articles.

ToR 3 – *To recommend guidelines for monitoring environmental indicators and a target improvement goal for the established indicators.*

- François Galgani gave an overview of the European Union’s work towards this task;
- Plan to invite someone from the OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) Commission to define how they came up with Good Environmental Status for northern fulmars in 2021, keep in mind North Pacific has 1-3 orders of magnitude higher levels of plastic pollution than the North Atlantic;
- We will conclude the 3–4 review articles with recommended indicators and consider providing target goals to NOWPAP and UN Sustainable Development Goals

ToR 4 – *To convene a topic session and/or workshop on environmental indicators and impacts of plastic pollution and coordinate a special issue in an international peer-reviewed journal.*

- WG 42 submitted a proposal for a Topic Session on “*Using environmental indicators to assess baselines, targets, and risk of plastic pollution in the North Pacific*” at PICES-2020

ToR 4 – *Contribute to FUTURE by publishing a final report summarizing results of the Working Group deliberations.*

- To be completed in 2021.

At the request of MEQ, WG 42 will add a sixth ToR: *Review the PICES Data Inventory, and identify data and/or data products developed under the direction of WG 42 not currently recorded in the Data Inventory and inform MEQ, the TCODE Chair and the Secretariat.*

AGENDA ITEM 5

WG 42 achievements

Drs. Lynch and Sun noted that although the WG got a late start (June 2019) due to the slowness of filling membership, it has been very active since that time.

- WG 42/MEQ sponsored a 1-day Topic Session (S7) on “*Environmental indicators of plastic pollution in the North Pacific*” at PICES-2019;
- Prof. Juying Wang participated in a marine litter management workshop in September 2019 in Dalian, China;

WG 42 – 2019

- Drs. Shim and Lynch participated in an international Workshop on “*The science of microplastics in the World Ocean*”, October 15–18, 2019, Woods Hole, Massachusetts.

Request: MEQ to recommend to Science Board that Governing Council members act quicker and completely to fill membership positions. WG 42 requests 2 additional members from Canada, and 3 members from Russia.

AGENDA ITEM 6

Other business

- WG 42 requests MEQ to recommend to Science Board that Governing Council members act quicker and completely to fill membership positions. WG 42 requests 2 additional members from Canada, and 3 members from Russia.
- The WG agreed that quarterly meetings (via Skype) to review progress would be worthwhile. Dr. Lynch will coordinate the first one in mid-January.
- As requested by MEQ, WG 42 reviewed the PICES Data Inventory Management Policy and will identify and submit any data/data products as they become available to TCODE, MEQ and the Secretariat.
- Upcoming meetings: see *WG 42 Endnote 4*.

WG 42 Endnote 1

WG 42 participation list

Members

Jennifer M. Lynch (USA, Co-Chair)
Chengjun Sun (China, Co-Chair)
Sang Hee Hong (Korea)
Miran Kim (Korea)
Kazuhiko Mochida (Japan)
Matthew Savoca (USA)
Wonjoon Shim (Korea)
Shuhei Tanaka (Japan)
Amy Uhrin (USA)

Members unable to attend

Canada: Peter S. Ross,
China: Daoji Li, Connie Ka-yan Ng, Juying Wang
Japan: Hideshige Takada
Korea: Seung-Kyu Kim

Observers

François Galgani (ICES) (remote conferencing)
Toyomitsu Horii (Japan)
Guangshui Na (MEQ Chair, China)
Yumi Okochi (Japan NUS Co., Ltd.)
Hyoung Chul Shin (Korea)
Taleafumi Toshida (Japan)

WG 42 Endnote 2

WG 42 meeting agenda

1. Welcome and introductions
2. Review and adoption of meeting agenda
3. Presentations to WG 42
4. WG 42 mission and terms of reference
5. WG 42 achievements

6. Other business
WG 42 Endnote 3

Proposal for a Topic Session on
“Using environmental indicators to assess baselines, targets,
and risk of plastic pollution in the North Pacific”
at PICES-2020

Duration: 1 day

Convenors: Chengjun Sun (China), Matthew Savoca (USA), Sanghee Hong (Korea)

Potential Invited Speakers: Jennifer Provencher (Canada) Anela Choy (USA) Sarah-Jeanne Royer (USA)

The North Pacific and its marginal seas are heavily polluted with plastics. It is important to develop environmental indicators of plastic pollution to determine baselines, set targets, and project risk to species and ecosystems. The goal of this session is to continue to identify indicators – both biotic and abiotic – of plastic pollution, and to move beyond the development of indicators to determine how we can use indicators to determine baselines in the North Pacific. Environmental indicators will also prove important to project risk from plastics to the ecosystem. Risk may be assessed by the quantity or abundance of plastic particles, or as the concentration of plastic associated pollutants in organismal tissues. Research presented in this topic session will help us elucidate the status and trends of plastic pollution and their environmental impacts in the North Pacific to better allow comparisons to other regions globally. This science-informed approach will allow us to make informed decisions for plastic usage and litter management policies.

WG 42 Endnote 4

Upcoming meetings and products of interest

- November 6–8, 2019 – 3rd WESTPAC Workshop on [*“Distribution, source, fate and impacts of marine microplastics in Asia and the Pacific”*](#), Shanghai, China (Chengjun Sun presenting);
- January 27–28, 2020 – National Academies of Sciences, Engineering, and Medicine Workshop on [*“Emerging technologies to advance research and decisions on the environmental health effects of microplastics”*](#), Washington, DC, USA (Jennifer M. Lynch presenting);
- April 21–23, 2020 – International Symposium on [*“Plastics in the Arctic and Sub-Arctic region”*](#), Reykjavik, Iceland (co-sponsored by PAME, UNEP, ICES, PICES, OSPAR Commission, IASC and others);
- June 4–6, 2020 – China National Conference on (marine) Microplastics Pollution and Control;
- ~summer 2020 – Polymer kit with FTIR spectra and DSC melt curves for sale by Hawaii Pacific University.