

Report of Working Group 31 on *Emerging Topics in Marine Pollution*

WG 31 met from 9:00 to 18:00 h on November 3, 2016 in San Diego, USA, under the chairmanship of Dr. Won Joon Shim (Korea). The meeting objective was to review activities during WG 31's third year (2016) to discuss a 1-year extension to finalize ecological time series observations (ETSO) for the third North Pacific Ecological Status Report and WG 31 final report, and to discuss the strategy and future plan post-WG 31.



WG 31 participants at PICES-2016; from left: Un Hyuk Kim, Zijun Xu, Juan José Alava, Guangshui Na, Kazuhiko Mochida, Wonjoon Shim, Hideaki Maki, Dong-Woon Hwang, Mikyu Choi, Taichi Yonezawa, Naohisa Kanda.

AGENDA ITEM 1

Welcome and adoption of agenda

Seven (out of 20 WG 31 members) representing three member countries and five observers participated in the meeting (*WG 31 Endnote 1*). The draft agenda was adopted after it was reviewed and slightly modified by the WG (*WG 31 Endnote 2*).

AGENDA ITEM 2

Review of the main achievement of WG 31 – 2016

The Co-Chair reported on the outcome of the MEQ Topic Session S3, entitled “*Source, transport and fate of hydrocarbons in the marine environment*”. Six oral presentations, including one invited speaker (Dr. Kenneth Lee, CSIRO) and two poster presentations (total 8) were accommodated in the session. The session was co-sponsored by GESAMP.

Papers were submitted from Topic Session S4 on “*Indicators of emerging pollution issues in the North Pacific Ocean*” and Workshop W4 on “*Marine environment emergencies: Detection, monitoring, response, and impacts*” (PICES-2015) to the scientific journal of *Archives of Environmental Contamination and Toxicology*. WG 31 discussed the number of papers from S4 submitted to a special issue on “*Pollution Indicators*” (Guest Editors: T. Brown and H. Takada; $n = 15$) and W4 submitted to a special issue on “*Oil Spills*” (Guest Editors: J. Short and U.H. Yim; $n = 19$). It is expected that the two special issues will be published before PICES-2017.

WG 31-2016

AGENDA ITEM 3

Publication of special issue from the topic session at PICES-2016

Papers from PICES-2016 Topic Session S3 on “*Source, transport and fate of hydrocarbons in the marine environment*” will be submitted to a special issue of *Archives of Environmental Contamination and Toxicology*. A tentative short title is “*Hydrocarbons in Marine Environment*” and the special issue will be guest edited by Drs. S. Simonich, H. Maki and R. Duce. Publication date is anticipated to be prior to PICES-2017.

AGENDA ITEM 4

Proposals for a new topic session

A topic session entitled “*Microplastics in marine environments: Fate and effects*” was proposed by co-convenors, Drs. Wonjoon Shim, Hideshige Takada, and Peter Ross for PICES-2017 (**WG 31 Endnote 3**). The topic session proposal was supported by members. It is expected that data and results from this session will also be important as WG 31 supports the needs of FUTURE.

AGENDA ITEMS 5 and 6

NPESR-3 ETSO reports on marine pollution and schedule

Most of the business meeting was spent for this issue. Dr. Juan José Alava (Canada; proxy for Dr. Peter Ross representing WG 31 from the SG-NPESR workshop for time-series evaluation and synthesis, June 28–30, 2016, Sidney, Canada) presented the status of WG 31 ETSO reports collected and reviewed from that workshop. A total 26 ETSO reports on marine pollution were collected from Canada ($n = 7$), China ($n = 0$), Japan ($n = 5$), Korea ($n = 10$), Russia ($n = 2$) and USA ($n = 2$) (Fig. 1).

Country	Hg sediment	Hg bivalves	Cu in marine water	Pb sediments	Pb bivalves	PAHs in mussel and/or sediments	TBT, Irgarol and Diuron	PCBs in bivalves	Dioxins/Furan in sediments & bivalves	PCBs in sediment and/or marine water	POPs in marine mammals	DDT raptors/seabirds	Marine Debris	Microplastics	Total
Canada	1		1							1	1	1	1	1	7
China															0
Japan	1			1			1	1		1					5
Korea	1	1		1	1	1	1		1		2		1		10
Russia	1			1											2
USA						1							1		2
Total	4	1		3		2	2			2	3	1	3	1	26

Figure 1 List of ETSO reports on marine pollution submitted for the third version of the North Pacific Ecosystem Status Report (NPESR3) by WG 31.

China prepared reports but has not received approval from the State Oceanic Administration to release the data. WG 31 will report this issue to MEQ. The deadline for ETSO submissions on marine pollution to NPESR3 has been extended to January 2017 to allow for the collection of more reports from PICES member countries.

AGENDA ITEM 7

Extension of WG 31

All WG members agreed that WG 31 needed to be extended for another year past its 3-year term in order to finalize special issues, ETSO reports on marine pollution, and the WG 31 final report. This request was

included in the MEQ agenda to take to Science Board.

AGENDA ITEM 8

Preparation and publication of WG 31 final report

The content of the final report was discussed by WG 31. Main content of the WG 31 final report will be ETSO reports on marine pollution. The publication schedule is set as follows:

- Finalize contents (30 November, 2016),
- Designate contributors (15 December, 2016),
- Collection of draft (30 April, 2017),
- Review the draft (15 May, 2017),
- Collection of revised report (30 June, 2017),
- Preparation of Executive Summary (30 July, 2017),
- Finish and submit the report to MEQ (30 August 2017).

AGENDA ITEM 9

Post-WG 31 plans

Members discussed what future activities might take place after 2017, pending approval of the WG's extension. The following ideas were proposed.

New Study Group for specific topics on

- Marine plastic debris, including microplastics,
- Pharmaceuticals and personal care products (PPCP; e.g. antibiotics, sunscreen),
- Impact of contaminants on the ecosystem,
- Interaction of climate change and bioaccumulation/toxic effects,
- Biological pollution (e.g. pathogens),
- Impact of offshore mining.

New Section for broader topics on

- Chemical pollution
- Marine Environmental Emergency (e.g. oil and HNS spills)

Dr. Shim instructed that the WG will correspond by email to decide on what type of expert group and future directions it will take (2018~) prior to the next PICES Annual Meeting so a proposal can be submitted to MEQ.

AGENDA ITEM 10

Preparation of WG 31 report for MEQ

Dr. Shim will prepare a brief report and requests to bring to the MEQ meeting on November 9.

AGENDA ITEM 11

Relations with other groups/organizations

No discussion.

AGENDA ITEM 12

Other business

None

WG 31 Endnote 1

WG 31 participation list

Members

Dong-Woon Hwang (Korea)
Hideaki Maki (Japan)
Kazuhiko Mochida (Japan)
Guangshui Na (China)
Wonjoon Shim (Korea, Co-Chair)
Zijun Xu (China)
Un Hyuk Yim (Korea)

Observers

Juan José Alava (Canada)
Chuanlin Huo (China, MEQ Chair)
Naohisa Kanda (Japan)
Taichi Yonezawa (Japan)
Miky Choi (Korea, MEQ)

Members unable to attend

Canada: John Elliott, Peter S. Ross (Co-Chair)
China: Zhengguo Cui, Haiyan Lv, Qun Wang
Japan: Hideshige Takada
Korea: Hyo-Bang Moon
Russia: Olga N. Lukyanova (Co-Chair), Vladimir M. Shulkin Mikhail Simokon
USA: Staci Simonich, Nancy Wallace, Gina M. Ylitalo

WG 31 Endnote 2

WG 31 meeting agenda

Thursday, November 3, 2016

1. Welcome and adoption of agenda (Co-Chairs)
Welcome members and introduce the agenda about the WG 31 meeting
2. Review of the main achievement of WG 31 – 2016 (Co-chairs)
Summarize the main achievements of WG 31 in the past 1 year
3. Discussion about a special issue in 'Hydrocarbon' (All)
4. Proposals for new topic sessions (Co-conveners)
Introduction of the proposed topic session and workshop for 2017 and discussion
5. Presentation of status and trend (Ecosystem Time Series Observation; ETSO) reports for the designated contaminants (Dr. Juan José Alava)
6. Discussion about future schedule of ETSO reports (All)
7. Discussion about 1 year extension of WG 31 (All)
8. Discussion about WG 31 final report (All)
9. Post-WG 31 plans
10. Preparation of WG 31 report for MEQ meeting (All)
11. Relations with other groups/organizations (All)
Introduce the progress on their work with other groups or other organizations.
12. Other business (All)

WG 31 Endnote 3**Proposal for a 1-day MEQ Topic Session on
“Microplastics in Marine Environments: Fate and Effects” at PICES-2017**

Convenors: Wonjoon Shim (Korea), Hideshige Takada (Japan), Peter Ross (Canada), TBA (NOWPAP)

Co-sponsor: NOWPAP

Microplastics are now ubiquitous from the near shore to open ocean, from the sea surface to bottom, and from subtropical to polar seas. Relatively high abundance of microplastics has been reported in the North Pacific Gyre as well as coastal waters of North Pacific region among the world oceans. In addition, with decreasing size, they become more bioavailable to small aquatic organisms down to zooplankton. Ingested microplastics have been found in various taxa across trophic levels. Associated chemicals in microplastics may be transferred to an organism upon ingestion. Microplastics represent trans-boundary pollution which can also deliver associated chemicals and invasive organisms to regions far removed from source. Microplastics are increasingly recognized as a potential threat to biota in the ocean. However, because of their size detecting the presence of microplastics and adverse biological effects, if any, becomes considerably more challenging. The objective of this session is to present status and trend information for microplastic pollution and its environmental consequences in the PICES region. Papers are invited that assess microplastics 1) hotspots in the PICES region, 2) sources and input pathways, 3) fate and behaviour of microplastics, 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 microplastics will be also considered.