

2022 Report of the Section on Marine Birds and Mammals

The meeting of the Section on *Marine Birds and Mammals* (S-MBM; under the auspices of the BIO Committee) was held twice. The first meeting was held virtually on September 1, 2022, from 17:00–19:00 via Zoom, hosted by the PICES Secretariat. The second meeting was held as a hybrid meeting on September 23, 2022, from 09:00–11:30 hours (PDT; UTC-7hrs), in Busan, Korea. The meeting focused on the current activities of S-MBM and on preparations for next project associated with the S-MBM Terms of Reference.

Dr. Patrick O’Hara (Co-Chair, Canada) and Dr. Kaoru Hattori (Co-Chair, Japan) called the meeting to order and welcomed members and observers. Meeting was well attended with members representing Korea, Japan, Canada, and the USA (*S-MBM Endnote 1*; S-MBM members from China and Russia did not attend).

AGENDA ITEM 1

Adoption of agenda

The agenda was reviewed by members and approved (*S-MBM Endnote 2*).

AGENDA ITEM 2

Membership changes

Dr. Miran Kim (Korea) replaces Dr. Kaoru Hattori (Japan) as Co-Chair. Dr. Kyunglee Lee replaces Dr. Hyunwoo Kim (Korea).

AGENDA ITEM 3

Reports from participants

1. Dr. Tsutomu Tamura, as an observer for PICES, provided a report on the 2022 International Whaling Commission Scientific Committee (IWC/SC) meeting held virtually (*S-MBM Endnote 3*). The Committee endorsed the 2022 POWER cruise that was conducted in the central North Pacific (along the Aleutian Islands) in August/September 2022.
2. Participants reported past and future meetings related to S-MBM activities.
 - a. Pacific Seabird Group meeting was held virtually February 2022.
 - b. 24th Biennial Conference on the Biology of Marine Mammals was held as a hybrid meeting in August 2022, Florida, USA.
 - c. Pacific Seabird Group meeting will be in February 2023. Dr. William Sydeman will receive a Lifetime Achievement Award. Dr. Patrick O’Hara will continue as PICES/PSG representative.
 - d. The 5th Effects of Climate Change on the World Oceans (ECCWO5) will be in April 2023, Bergen, Norway.
 - e. Species on the Move Conference (SOTM) will be in May 2023, Florida, USA.
3. NEPSR-3: S-MBM membership contributed as lead author, author, and/or editor
4. S-MBM involvement with other PICES groups
 - a. Dr. K. Hattori – BIO Committee member
 - b. Dr. M. Kim – WG 42 member
 - c. Dr. Y. Watanuki – WG 44 member
 - d. Dr. P. O’Hara/K. Morgan – WG 46 observers, at-sea survey expertise

5. Completion of 2015–2020 S-MBM project on “*Climate and Trophic Ecology of Marine Birds and Mammals*”.
 - a. New datasets are being combined to understand and predict the impacts of changing mid-trophic level micronekton communities on marine birds and mammals.
 - b. Near completion - Dr. Andrew Trites will update at BIO meeting.
Expected Report will include:
 - i. Introduction (A. Trites)
 - ii. Mammals: Diets and consumption (A. Trites and T. Tamura)
 - iii. Birds:
 1. Case study in breeding birds in EEZ Japan (Y. Watanuki)
 2. Population sizes and consumption estimates from Korea (M. Kim, Y. Watanuki)
 - iv. Discussion
 - v. Appendix :
 1. Tables with updated consumption rates
 2. Integrated information from previous workshops and sessions (four topic sessions and 3 workshops since 2016)
6. W7 Workshop: Anthropogenic stressors, mechanisms, and potential impacts on Marine Birds, Mammals, and Sea Turtles (PICES 2022, Busan, Korea)
 - a. First workshop/session in support of Activity Plan 2022–2026 (see below)
 - b. 13 presentations from China, Japan, Korea, Canada, USA
 - c. Pending PICES report summarizing major threats for western and eastern Pacific for marine birds, mammals, and sea turtles.

AGENDA ITEM 4

Discussions

1. S-MBM Activity Plan, 2022–2026: Interaction between MBMs and other ecosystem components and stressors.
 - a. Deferred start date due to COVID-19 slowdown.
 - b. Refinement of sub-themes, confirmation of phases (*S-MBM Endnote 4*).
 - c. Added a new possible workshop theme: Changing roles of recovering mammals and declining marine birds in ecosystems (led by Andrew Trites) (*S-MBM Endnote 4*).
 - d. Developed and submitted two workshop/session proposals for PICES-2023:
 - i. S-MBM/MEQ workshop (1 day): *Bio-indicators of meso to global scale marine pollution: techniques for integration and standardization* (*S-MBM Endnote 5*),
 - ii. S-MBM/S-CCME/FIS/BIO/FUTURE Topic Session (1.5–2 days): *Anticipated and realized effects of climate change on predatory fish, birds, and mammals of the North Pacific* (*S-MBM Endnote 6*).
2. Interest in including Sea Turtles as focal taxa in S-MBM activities.
3. Requests to BIO/SB:
 - a. Full day business meeting for PICES-2023 divided into 2 days:
 - i. Virtual pre-meeting (3 hours),
 - ii. Hybrid business meeting during PICES annual meeting (3 hours).
This includes virtual AV support necessary to conduct a hybrid meeting.
 - b. AV support for workshop and session at PICES-2023 to facilitate hybrid participation.
 - c. Increase effort to enlist new members (currently 2 S-MBM members are retiring).
 - d. Concern about ICES–PICES collaborations and joint meetings, given differing policies with respect to Russian participation.

S-MBM Endnote 1**S-MBM participation list**Members

Kaoru Hattori (Japan, Co-Chair)
 Patrick D. O'Hara (Canada, Co-Chair)
 Ken Morgan (Canada)
 Andrew W. Trites (Canada)
 Tsutomu Tamura (Japan)
 Yutaka Watanuki (Japan)
 Yong-Rock An (Korea)
 Miran Kim (Korea)
 Elliott L. Hazen (USA)
 Willam Sydeman (USA)

Members unable to attend

Canada: Douglas F. Bertram, Kenneth Morgan
 China: Shuai Chen, Wei Lei, Xuelei Zhang, Liyuan Zhao
 Korea: Hyunwoo Kim (Korea)
 Russia: Alexander Boltnev, Vjatcheslav P. Shuntov,
 Andrey Vinnikov
 USA: Rolf R. Ream

S-MBM Endnote 2**S-MBM meeting agenda**

09:00 September 24, 2022 (KST; UTC+09:00)

17:00 September 23, 2022 (PDT; UTC-07:00)

1. Call to Order – Review Agenda
2. Introductions - meeting participants, new members of PICES community
3. Reports from participants
 - a: Activities and Achievements
 - 1) Pre meeting on September 1, 2022
 - ✓ Changes of Co-chair
 - 2) Activity Plan 2022-2026
 - 3) W7 “Anthropogenic stressors, mechanisms and potential impacts on Marine Birds, Mammals, and Sea Turtles” on September 23, 2022 at PICES-2022
 - 4) Contributions to published NPESR III Regional Report as lead author, author or editor
 - 5) Progress on final products on 2015-2020 project
 - 6) Others
 - b: Report of IWC activities (T Tamura)
 - c: International Symposium related to S-MBM activities:
 - If any
 - d: Other activities (if any)
4. Discussions
 - a: S-MBM project
 - b: Planning PICES 2023 Annual Meeting (Seattle, USA; Oct 23-27, 2023)
 - ✓ Proposals of Sessions/Workshops
 - ✓ Business meeting
5. Others

S-MBM Endnote 3

PICES Observer Report of the 2022 IWC Scientific Committee Meeting

Tsutomu Tamura

Institute of Cetacean Research, 4-5, Toyomi-cho, Chuo-ku, Tokyo 104-0055, Japan.

The 68D Scientific Committee (SC) meeting

Meeting place: Virtual Meetings

Meeting period: From April 25 to May 13, 2022

Chair: Dr. Alexandre Zerbini (Brazil)

Participants:

National delegates 223, Invited Participants (IP) 190, Observers 31, Inter-governmental organizations 9, Non-governmental organizations 35 and IWC Secretariat 23

The following sub-committees, working groups and *ad hoc* Working Group were established in this year:

- Sub-Committees
 1. Implementation Reviews and Simulation Trials (IST)
 2. In-depth Assessment (IA)
 3. Other Northern Hemisphere whale stocks (NH)
 4. Other Southern Hemisphere whale stocks (SH)
 5. Small Cetaceans (SM)
 6. Whale Watching (WW)
 7. Aboriginal Subsistence Whaling (ASW)
 8. Conservations Management Plans (CMP)
 9. Non-Deliberate Human-Induced Mortality of Cetaceans (HIM)
 10. Environmental Concerns (E)
- Working Groups
 1. Stock Definition/DNA Testing (SD/DNA)
 2. Ecosystem Modelling Approaches (EM)
 3. Abundance Estimates, Stock Status and International Cruises (ASI)
- *Ad hoc* Working Groups
 1. Photo-ID (PH)
 2. Sanctuaries (SAN)
 3. Databases and Related Issues (GDR)

The 2022 meeting of the IWC Scientific Committee was held from April 25 to May 13, 2022. As in 2022 it was held virtually due to the global coronavirus pandemic (COVID-19). The meeting Chair (A. Zerbini) and Vice-Chair (L. Porter) worked with the Convenors and the Secretariat to plan a series of ‘virtual’ pre-meetings and workshops prior to the Committee meeting.

The meeting schedule consisted of several days of pre-meetings. Following the one-day Plenary Session, twelve days were allocated to sub-group meetings, and two days of Plenary to discuss a variety of issues and

agreement of the Committee's report. At SC68D, three concurrent sessions were held in two time slots consistently each day.

The following topics were related to North Pacific matters.

- In-depth Assessment (IA) Sub-Committee

This Sub-Committee discussed the in-depth assessment of several whale species in the North Pacific. An in-depth assessment includes the examination of current stock size, recent population trends, carrying capacity and productivity.

1. *Comprehensive Assessment of North Pacific sei whales*: A multi-area age-structured population model has been developed by Punt (USA). An intersessional correspondence group was established to review the data used and to oversee the further development of the population model. The work to date has proceeded on the basis of two working hypotheses regarding the population structure: (i) a single stock of sei whales distributed throughout the North Pacific; and (ii) five stocks, centered on five designated sub-areas. The intersessional group reported that work on the summary document is not yet complete and work will have to be continued during the next intersessional period. The terms of references of this intersessional group are below.
 - *Check final model inputs and review results of the model fitting.*
 - *Produce a document detailing the input data and the main modelling results.*
 - *Produce a document summarizing the status of sei whales in each area of the North Pacific.*
 - *Review any new genetic results or abundance estimates that become available.*
2. *In-depth Assessment of western North Pacific common minke whales*: An intersessional workshop had been planned to further the In-depth Assessment, but it was not possible to hold it this year prior to the Committee meeting. The In-depth Assessment is based on three primary stock structure (the J-stock, O-stock and P-stock) hypotheses. The Committee reiterated the need to conduct an in-depth assessment of western North Pacific common minke whales with a focus on bycatch levels and the status of J-stock. The Committee agreed to re-establish the intersessional group and to reiterate its support for holding the intersessional workshop prior to SC69. The final decisions regarding the plausibility of stock hypotheses will be made by the Committee at the next meeting, based on recommendations from the intersessional workshop.
3. *Comprehensive Assessment of North Pacific humpback whales*: The Comprehensive Assessment of North Pacific humpback whales began in 2016 with an intersessional workshop held in 2017. Since then, the type of assessment model to be applied has been refined, additional analyses of abundance and genetic data have been undertaken, the structure of the areas included in the modelling and data analyses have been modified, and commercial catch series have been updated. In addition, the set of stock structure link assumptions (number of breeding stocks and the feeding areas to which they migrate) was updated during discussions of the Scientific Committee. To complete the Comprehensive Assessment of the North Pacific humpback whale by 2024 the Committee recommended that the Intersessional Steering Group be re-established. The terms of reference are to further the work towards the assessment, organize an in-person intersessional workshop in late 2022 or early 2023 (location to be determined), and complete the assessment modelling.

- Abundance Estimates, Stock Status and International Cruises (ASI) Working Group

1. North Pacific Sighting survey cruise (IWC-POWER): The IWC-POWER (North Pacific Ocean Whale and Ecosystem Research) program is an international collaborative effort coordinated by the IWC and

Japan. The project includes line transect sighting for estimating population abundance and biopsy skin-sampling and photo ID for stock structure on major large cetaceans. It started in 2010.

2. The Committee reiterated to the Commission the great value of the data contributed by the IWC-POWER cruises which have covered many regions of the North Pacific Ocean not surveyed in recent years. The programme addressed important information gaps for several species, and has already contributed greatly to the ongoing assessment work of the Committee. The Committee endorsed the 2022 POWER cruise planed in the North Pacific from August to September (Figure 1).

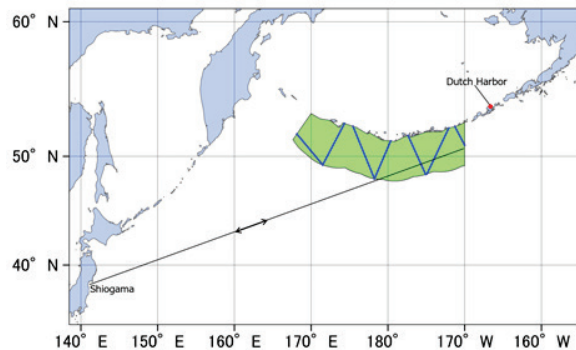


Figure 1. 2022 IWC-POWER survey area (green), and survey course (blue bold lines), and round-trip voyage (black-arrowed line).

- Other matters

The SC also covers the other Sub-Committees and Working Groups such as environmental concerns, small cetaceans, whale watching, and by-catch.

It was agreed that the workshop to incorporate scientific considerations in an updated western gray whale CMP (Conservations Management Plan) should be held in La Jolla before the next SC meeting.

The 2022 Scientific committee report of IWC can download the following link.

<https://archive.iwc.int/pages/search.php?search=%21collection73&k=>

- 2023 Meeting schedule

Due to the uncertainty over the Committee's operation in the next biennium and the need to compensate for three years of limited progress, funds have been allocated to allow the Committee to meet in-person in 2023. Due to budget constraints, the biennial meetings will be scheduled to start in 2024.

S-MBM Endnote 4

S-MBM Activity Plan 2022–2026

“Interaction between MBMs and other ecosystem components and stressors”

Sub-themes:

1. Documenting, understanding, and potentially forecasting **changes in forage species and response of MBMs** to these changes.
2. **MBMs as ecological indicators** of changing marine ecosystems using metrics such as population vital rates, spatiotemporal distributions and abundances, diet composition, body condition and stress hormones.

Phases:

1. Identification and assessment of important stressors (anthropogenic and environmental) on MBMs, developing Pathways of Effects (POE) models, and estimating potential impacts from these stressors.
2. Use of MBMs as indicators of impacts regionally and among regions.
3. Comparative synthesis of information from phase 1 and 2 across the PICES region.

Upcoming possible workshop themes:

1. Anthropogenic stressors, mechanisms and potential impacts on MBMs (led by M. Kim, P. O’Hara and Y. Watanuki)
2. Climate change (including Marine Heat Waves) associated changes in migration patterns/distribution of MBM (led by W. Sydeman, K. Hattori and P. O’Hara)
3. Predicting changes in small pelagic prey fish and potential impacts on MBMs (led by H.W. Kim and E. Hazen)
4. MBMs as indicators of impacts (led by R. Ream and W. Sydeman)
5. Changing roles of recovering mammals and declining marine birds in ecosystems (led by A. Trites)

S-MBM Endnote 5

Proposal for a Workshop on
“Bio-indicators of meso to global scale marine pollution: techniques for integration and standardization”
at PICES-2023

Duration: 1 day

Convenors: Yutaka Watanuki (Japan), Patrick O’Hara (Canada), Miran Kim (Korea), Andrew Ross (Canada)

Potential Invited Speakers:

Loren Roman (plastics in seabirds, Canada),

Bright Braune (mercury in seabirds, Canada),

Hideshige Takada (standardization of POPs, Japan)

Rates of discharge of pollutants including heavy metal, persistent organic pollutants (POPs), and plastics are increasing despite concerted effort to control them. Many of these pollutants are transported through air and water currents from a diversity of sources, then deposited in remote regions, including Arctic and Antarctic Seas, impacting ecosystem health in these regions. During past PICES meetings, MEQ and BIO (MBM-AP, which is now S-MBM) co-convened workshops and symposia in relation to the status and impacts of marine pollution. This workshop aims to develop standardized techniques to monitor the level of pollution in the remote regions where conventional sampling is difficult by using bioindicators (MBMs, Sea Turtles, Fish, Squid, Mussels, and species from other taxa that can be used potentially as a pollution bioindicator) as in situ samplers, producing indicator data of ecosystem health. For example, MBMs are useful bio-indicators of marine pollutions as they bio-accumulate and magnify the low concentration of pollutants found in water to levels that are more easily detectable and measurable. As well, pollutant concentrations measured in MBM species can be considered average pollution levels integrated across a range of spatial scales, from meso to global, depending on life-history traits of the bio-indicator species. However, using MBMs as bioindicators for various pollutants requires the standardization of techniques for measuring and reporting concentration of each pollutant in each tissue for each species, as a suite of magnification factors, as well as differing half-lives among toxins affect concentrations. Not all possible sentinel species occur in all subregions of the North Pacific, and for this reason we need to integrate further the concentration of pollutants in various tissues from various species. For example, plastic loads in stomachs of Northern Fulmar has been used successfully as indicator of plastic pollution in Europe and northern North Pacific, but this species does not occur in the south central N Pacific. In this workshop, we plan to review and compare approaches used for detecting and measuring pollutants in different tissues in various species. We also welcome original works on multiple tissues of a single species or those on a single tissue of multiple species. We discuss the approach for standardization and integration of the concentration of pollutants in the tissue of MBMs and other possible sentinel organism for the North Pacific.

Anticipated outcomes:

Report to PICES and possible publication

Workshop requirements:

Travel support funds are requested for one invited speaker. We will invite a second speaker from a local institution to minimize costs.

Travel support request:

For one invited speaker. We will invite a second speaker from a local institution to minimize costs. Support for hybrid meeting is required.

S-MBM Endnote 6

**Proposal for a S-MBM/S-CCME/FIS/BIO/FUTURE Topic Session on
 “Anticipated and realized effects of climate change on predatory fish, birds, and mammals of
 the North Pacific”
 at PICES-2023**

Duration: 1.5-2 days

Convenors: William Sydeman (USA), Elliot Hazen (USA), Patrick O’Hara (Canada), Sukgeung Jung (Korea), Yutaka Watanuki (Japan), Miran Kim (Korea), Elizabeth Libby Logerwell (USA)

Potential Invited Speakers:

Kaoru Hattori, Japan (confirmed),

Briana Abrahms, University of Washington, USA (not confirmed),

Jonathan Reum, Alaska Fisheries Science Center, USA (not confirmed),

William Cheung, UBC, Canada (not confirmed),

From ICES/presenter (not confirmed),

Alistair Hobday, U. Tasmania (not confirmed),

Jefferson Hinke, SWFSC, La Jolla (not confirmed)

Measurements and models tell us that Earth’s climate is changing rapidly, yet the rates of change in warming as well as spatial shifts in isotherms (*i.e.*, the “velocity of climate change”), vary among ecosystems of the North Pacific. Species responses to climate change vary in relation to life-history traits including foraging and migration ecology, which determine adaptive capacities (*e.g.*, abilities to shift location or prey switch with changes in habitat). While there have been many species-specific assessments of responses relative to observational and predicted ocean change, the impact of climate change on complex ecological relationships (*e.g.*, predator-prey dynamics) and ecosystem structure and connectivity is not well understood. Moreover, recent research has suggested that maintaining healthy top predator populations may help mitigate the effects of climate change on ecosystem functions. Therefore, for this session, we solicit interdisciplinary studies on observed or predicted climate change and responses of predatory fish, marine birds, and mammals. We will focus on how climate change is affecting the North Pacific’s top marine consumers directly or indirectly through trophic interactions (for example, how metabolic changes in predatory fish may be making them more or less susceptible to changes in food resource availability). Transdisciplinary modeling and observational studies are encouraged.

Anticipated outcomes:

- a) Topic session report to be distributed to PICES on the summary of the presentations and discussion.
- b) Potential review paper or special issue in relevant journal depending on presenter interest.

Topic Session format and participants:

We anticipate a 1.5–2-day topic session with presentations focusing on (a) historical patterns of climate variability and change, (b) predicted patterns of predator and prey, (c) methods of modeling or detecting trophic interactions in ocean ecosystems, (d) future risks induced by increased overlap between predators following prey and human activities. We anticipate 5 invited talks, and 35–80 participants who have research interests on climate-ecosystem change, marine predators, and climate-ready ecosystem and species management.

S-MBM-2022

Topic Session requirements:

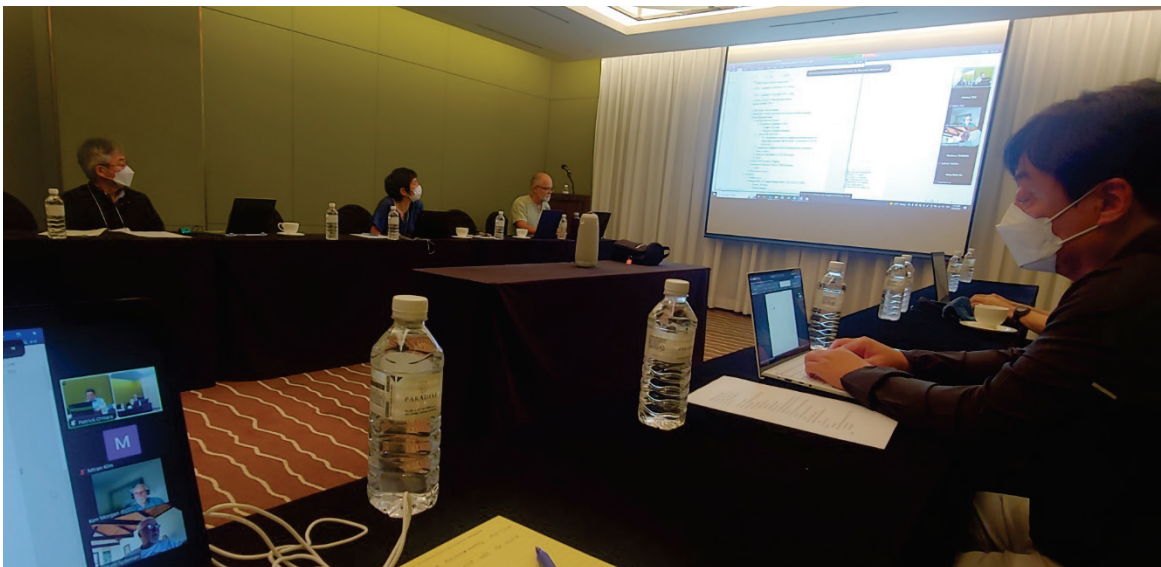
Travel funds are requested for 2 invited speakers. Note: we plan on having 5 invited speakers, with 3 from local institutions to minimize costs. We request projectors, laser pointer, DVI or HDMI cables.

Publication requirements:

The topic session summary and presentations will be included in S-MBM, S-CCME, and FIS annual activity reports to FUTURE, and we will also work towards a review paper or special issue based on presenter / author interest.



1st meeting in virtual, 1 September, 2022, via Zoom. Zoom screen capture during virtual pre-meeting.



2nd meeting in hybrid, September 23, 2022, Busan, Korea. Photo taken during virtual business meeting at PICES-2022.