

2025 AP-ECOP Report



The [Advisory Panel on Early Career Ocean Professionals](#) (AP-ECOP) had **two business meetings in 2025**:

I. The first was a virtual meeting on September 24/25, 2025, which gathered 13 AP-ECOP members and was moderated by Hana Matsubara with note-taking support from Minkyung Kim and Raphael Roman (all Co-Chairs). The agenda included the following action items:

AGENDA ITEM 1 (ONLINE BUSINESS MEETING IN YOKOHAMA)

Reminder about the AP-SciCom online training: “*Presentation Skills for Ocean Scientists*”

The training took place online on September 25/26 [[link to recording on YouTube](#)]. Hannah Lachance (former Co-Chair) was a co-organizer and co-moderator of the training, while Hana Matsubara (Co-Chair) was invited as a speaker to provide poster design and presentation advice to ECOP attendees.

AGENDA ITEM 2 (ONLINE BUSINESS MEETING IN YOKOHAMA)

Final review of the Science Board 2025 AP-ECOP Report, prepared by all Co-Chairs.

AGENDA ITEM 3 (ONLINE BUSINESS MEETING IN YOKOHAMA)

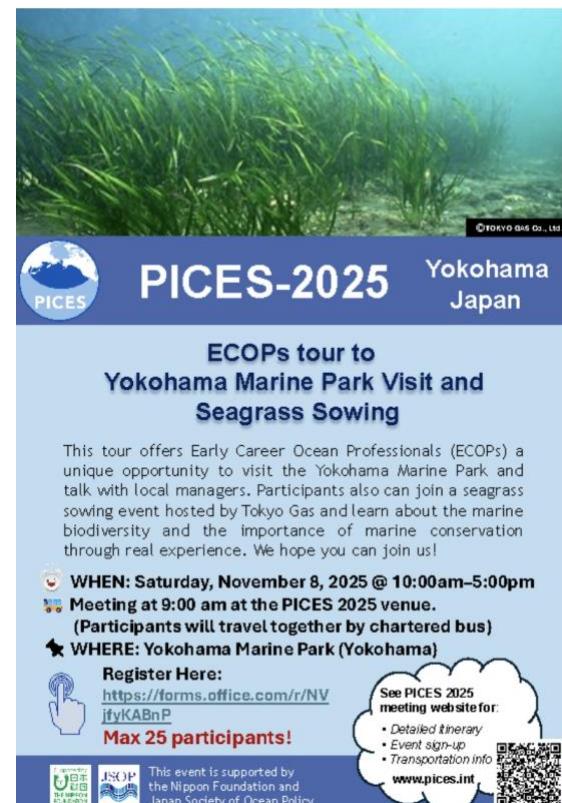
Identification and nomination of AP-ECOP members willing to attend the in-person 2025 Science Board meeting on behalf of AP-ECOP

Lauren Kashiwabara kindly volunteered to represent AP-ECOP at the Science Board meeting in Yokohama, Japan.

AGENDA ITEM 4 (ONLINE BUSINESS MEETING IN YOKOHAMA)

Updates about activities and side events planned for the 2025 PICES Annual Meeting in Yokohama, Japan, including:

- **Yokohama Marine Park Visit and Seagrass Sowing**, planned for November 8.
 - The team was finalizing the design of the flyer and creating a registration form, to be circulated a few weeks before the 2025 PICES Annual Meeting.
- **Site Visit to the Japan Agency of Marine-Earth Science and Technology (JAMSTEC)**, scheduled on November 14.
 - After circulating the side event announcement and online registration form, all slots were filled by September 25, 2025. The total capacity was expanded to 45 people, including staff.



The two

side events highlighted above aimed to deepen PICES ECOPs' understanding of Japan's marine science research landscape and environmental education efforts, while also strengthening networking among ECOPs. Mid-career and senior scientists were also welcome to join if space permitted.

AGENDA ITEM 5 (ONLINE BUSINESS MEETING IN YOKOHAMA)
“Introduction to PICES” Session (November 11) ([AP-ECOP Endnote 3](#))

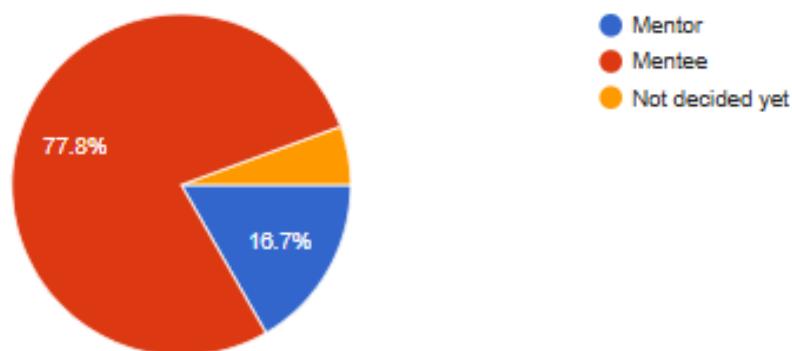
- Shared the existing link of the Master slide deck that the AP-ECOP team put together for the first official “Introduction to PICES” session at the 2024 PICES Annual Meeting in Honolulu, USA. Seven members expressed interest in coordinating and supporting the 2025 iteration of this event, reaching out to Scientific Committee leads while updating and re-designing the living [slide deck](#) (reflecting new ideas and latest community updates).
- The AP-ECOP reiterated that this session is not only tailored for ECOPs but is also open to all newcomers. Since it was promoted as an “ECOP event” in the official conference schedule, the AP-ECOP Co-Chair contacted the PICES Secretariat to request an amendment to the session name and clarification of the intended audience (see the schedule [here](#) and the list of side events [here](#)).
- The “Introduction to PICES” task team included the following members: Raphael Roman, Hana Matsubara, Minkyung Kim, Toya Hirokawa, Lauren Kashiwabara, Hannah Lachance, and Talen Rimmer.

AGENDA ITEM 6 (ONLINE BUSINESS MEETING IN YOKOHAMA)
Mentoring program and results from the pre-PICES 2025 survey

- At the time of the online business meeting, only 36 responses had been received, revealing the need for increased representation of mentors, who only accounted for 16.7% of responses. The mentoring program lead, Minkyung Kim, encouraged everyone to further circulate the mentorship form to ensure balanced pairings of mentors and mentees.

Please choose your expecting role in the mentorship program

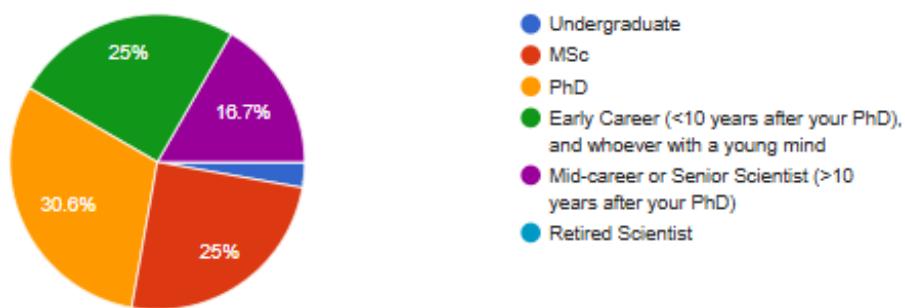
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Please choose your career stage/current degree

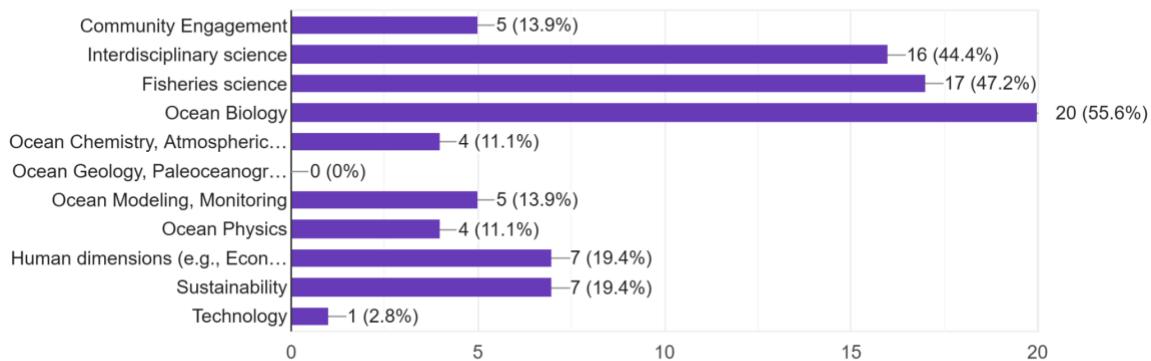
차트 복사

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Please choose your field of study/work

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- As shown in the above bar graph, the 2025 survey was slightly amended to diversify the fields of study/work that participants could select, including human dimensions, interdisciplinary science, sustainability, and community engagement. This change was in direct response to last year's feedback.
- The PICES Secretariat assisted the AP-ECOP team by sending an additional reminder about the mentorship form to all PICES registrants.

AGENDA ITEM 7 (ONLINE BUSINESS MEETING IN YOKOHAMA)**Other topics of discussion and final words (food for thought for 2026 and onwards)**

- Discuss the possibility of waiving or reducing registration fees for non-student ECOPs (to help with ECOP retention).
- Design and circulate a capacity development needs survey among North Pacific ECOPs to identify future priority topics for training workshops, summer schools, side events, etc.
- Explore and strengthen collaborative avenues with existing and new PICES partner organizations, including through the co-design of joint side events and capacity development initiatives identified in the above survey. Examples of partners include [ICES](#), [APN](#), and the [Pacific Salmon Foundation](#).

II. The second business meeting was held in-person—with the option to join online—during the 2025 PICES Annual Meeting in Yokohama, Japan, on **November 11, 2025**. Co-moderated by Raphael Roman and Toya Hirokawa (new Co-Chair from Japan), with Hana Matsubara and Minkyung Kim serving as rapporteurs, the AP-ECOP business meeting was attended by 24 ECOPs and mentors, including two online and 12 observers from Russia, China, Canada, Japan, and the USA. Encouragingly, most of the observers present were ECOPs attending their first PICES conference. The meeting was followed by an informal dinner at a nearby izakaya restaurant, facilitating networking between existing and prospective AP-ECOP members (see photo on Page 1). The agenda and outcomes of the meeting are available below:

AGENDA ITEM 1 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)**Welcome and Meeting Procedures**

The Co-Chairs welcomed participants to the meeting ([AP-ECOP Endnote 1](#)) and reminded everyone of the **“English operating rules”**, which aim to facilitate respectful conversations and interactions between native and non-native English speakers—i.e., speaking slowly, using simple grammar, and avoiding indirect expressions and metaphors.

AGENDA ITEM 2 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)**Round of Introductions and Sharing of Relevant Updates from Members**

Participants introduced themselves to get to know one another better. The Co-Chairs also circulated a notebook to gather the contact details of all attendees and to ask whether observers were willing to be contacted again for future involvement in AP-ECOP activities. Hana Matsubara informed everyone about the reservation made at an izakaya restaurant, which all participants were invited to join after the meeting. She requested a show of hands to estimate how many people would attend the dinner and updated the restaurant accordingly.

AGENDA ITEM 3 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)

Science Board Meeting Requests and AP-ECOP Attendance

The Co-Chairs reviewed and confirmed the following requests for consideration at the 2025 Science Board meeting:

- **Hana Matsubara** (Japan) and **Minkyung Kim** (ROK) are stepping down as Co-Chairs from the Western Pacific.
- **Toya Hirokawa** (Japan) will replace Hana as a new AP-ECOP Co-Chair from Japan.
 - Following the 2025 PICES Annual Meeting, the Advisory Panel will officially be Co-Chaired by Raphael Roman (Canada) and Toya Hirokawa (Japan).
 - New Co-Chairs from both the Western and Eastern Pacific are still being actively sought. Ideally, AP-ECOP should have **four Co-Chairs**, two from the Eastern side of the Pacific, and two from the Western side.
- **Will Fennie** (USA) will become a new member of AP-ECOP, representing the United States of America.
- **Travel grants** for two PICES ECOPs to attend the next ICES Annual Science Conference in Brest, France, from 15–18 September 2026 [[link](#)].
 - **Justification:** ICES is one of the most important partner organizations of PICES, and there is still room to strengthen collaboration between our respective ECOP networks (i.e., AP-ECOP & [SIECS](#)). By attending the ICES Annual Science Conference, the PICES ECOP representative(s) will enhance networking between PICES and ICES, collect information, co-organize events, and engage in discussions on future synergies.
 - **Note:** Recipient(s) will be identified by the Intersessional Science Board Meeting in May 2026.

Lauren Kashiwabara confirmed her attendance on the first day of the Science Board Meeting (November 14), representing AP-ECOP. In addition, Rachel Roday, an ECOP observer from the USA, will attend both days of the Science Board Meeting in her capacity as a 2025 Knauss Fellow.

AGENDA ITEM 4 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)

Feedback from the ECOP side event: “Yokohama Marine Park Visit and Seagrass Sowing”, held on November 8, 2025

On November 8, 2025, the PICES AP-ECOP team and the national node of the ECOP Programme for Japan ([ECOP Japan](#)) jointly organized a side event “ECOP’s tour of Yokohama Marine Park and Seagrass Sowing”. The event aimed to foster interaction and networking among ECOPs through hands-on activities and the sharing of good practices in enhancing ocean literacy, featuring Yokohama Marine Park’s SDG activities with the local community and private-sector CSR (Corporate Social Responsibility) initiatives in Japan. In the morning, participants joined a seagrass sowing activity organized by Tokyo Gas CO., Ltd., INPEX Corporation, and other non-profit organizations (NPOs), together with additional participants, including several schoolchildren. After the lunch break, participants attended a lecture by the Marine Park Director about the park’s history and activities, followed by an educational walk through the park and a Q&A session.

"I believe a park is like a mirror of local communities—by maintaining a clean and comfortable Marine Park, we can help to improve the community's awareness and healthiness, and vice versa." Mr. Fumikazu Matsuoka, Director of Yokohama Marine Park.





Positive feedback from participants indicated that they were inspired by the community-based ocean literacy activities and found the event to be a meaningful networking opportunity with other ECOPs at the start of the PICES conference.

The AP-ECOP team could help coordinate similar side events at future PICES Annual Meetings, with the potential support of other Expert Groups. Vera Trainer, an AP-ECOP mentor from the USA and the Co-Chair of the former Study Group [SG-GREEN](#), expressed interest in connecting and following up on the seagrass sowing event.

Acknowledgement: This side event—alongside the tour to JAMSTEC, which took place three days after the AP-ECOP business meeting ([AP-ECOP Endnote 2](#))—were supported by the [Nippon Foundation](#) and the Japan Society of Ocean Policy (JSOP) as part of their support to the activities related to the United Nations Decade of Ocean Science for Sustainable Development (2021-2030) from the perspective of ocean policy. The organizing team also appreciated the kind support from Tokyo Gas CO., Ltd., INPEX Corporation, Japan Philanthropic Association, Waterfront Vitalization and Environment Research Foundation, and the Association for Shore Environment Creation for the Yokohama Marine Park event.

AGENDA ITEM 5 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)

Update from the mentorship program

The mentorship survey that was widely circulated before the 2025 PICES Annual Meeting gathered a **total of 60 responses**. However, **only 11 respondents volunteered as mentors** or expressed willingness to serve as mentors. As a result, some experienced ECOPs were asked to serve as both mentors and mentees, even though they initially indicated a preference to be mentees.

For future years, starting with Nanaimo, Canada, in 2026, the mentorship task team will need to find strategies to **enhance the recruitment of PICES mentors**, notably to avoid burdening mentors with multiple mentees. Indeed, the mentorship task team received several notices about mentors being assigned more mentees than they had requested. In addition, some mentorship program participants noted that the academic background of their mentor or mentee did not match their own. This year, while the team could not fully control these factors, they did their best to ensure suitable matching.

Here are helpful ideas and pieces of advice shared by meeting attendees—some of whom participated in the mentorship program—for enhancing future iterations of PICES mentoring activities:

- **Creating a webpage** dedicated to the mentor-mentee program on the PICES website. This could help further promote the program and potentially include a sign-up option connected to the annual registration form curated by the AP-ECOP team.
- Holding a **dedicated and scheduled mentorship event** during the Annual Meeting, which could be integrated into the annual “Introduction to PICES” session ([AP-ECOP Endnote 3](#)).
- **Rename the “ECOP communication space”** to clearly indicate that it can be used as a meeting place for mentors and mentees.
- Add a **“Mentor”/“Mentee” sticker or marker** to name tags.
 - What about showcasing this in presentation slides?
- Identify ways to create **incentives for mid/senior-career professionals** to join as mentors.
 - For example, offering an additional drink ticket.

AGENDA ITEM 6 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)

Next ICES/PICES Early Career Scientist Conference, likely to take place in China in August 2027

These joint ICES/PICES early-career scientist (ECS) conferences are held every 5 years, rotating between the Pacific and Atlantic ocean basins. **In 2022, the fourth ICES/PICES ECS conference took place in St. John’s, Newfoundland, Canada**, where both **Hannah Lachance** and **Raphael Roman** served as PICES ECOP representatives on the Scientific Steering Committee, which was composed solely of early-career professionals.

During the business meeting, both Hannah and Raphael recounted their valuable experiences attending the conference, co-designing its scientific program (i.e. thematic sessions), evaluating abstract submissions, and networking with early-career attendees from around the world.

Importantly, the PICES Secretariat is counting on the support of the AP-ECOP team to **identify and recommend three PICES ECOPs as suitable candidates to join the 2027 early-career Scientific Steering Committee**. Criteria to keep in mind include:

- Gender and geographic **diversity** (no more than one ECOP per PICES member country),
- Potential candidates will need to be put forward in early 2026,
- Ideally, these ECOPs should have existing commitments within PICES.

Note: One ECOP observer from China and one AP-ECOP member from Canada have expressed interest.

AGENDA ITEM 7 (IN-PERSON BUSINESS MEETING IN YOKOHAMA)

Moving forward in 2026

- Recruiting new ECOP members and Co-Chairs
 - Following this in-person business meeting, **Nozomi Ihara (Japan)**, the 2025 [FUTURE ECOP Awardee](#), expressed interest in joining the AP-ECOP as an official member. Following consultations among the Co-Chairs and with Japanese Governing Council (GC) members, the AP-ECOP team put forward her nomination for membership at the 2025 Science Board meeting.
 - **Toya Hirokawa (Japan)** has officially been appointed as a new Co-Chair from the Western Pacific.
 - Several ECOP observers have also expressed interest in joining AP-ECOP meetings and activities planned for 2026, with the intention of **submitting membership requests at the 2026 Intersessional Science Board (ISB) meeting**.

AP-ECOP Membership Needs

ECOP members welcome from all PICES member countries but especially from:

- United States,	- China,
- Canada,	- Russia

1-2 Co-chair role(s) opening for ECOP(s) from the Eastern Pacific

- Great leadership experience
- In conjunction with the other co-chairs lead reporting to science board; lead regular advisory panel meetings; help decide and lead tasks geared at accomplishing the terms of reference.



- Any ideas for a workshop or thematic session for the 2026 Annual Meeting should be consolidated into a proposal and submitted by November 24, 2025. Update: No proposals have been put forward by AP-ECOP per se. However, **a few AP-ECOP members co-designed prospective sessions and workshops**, including:
 - “*Weaving knowledge systems to co-design transdisciplinary and actionable solutions*” (**workshop**; AP-ECOP co-convenor: Raphael Roman)
 - “*From Indicators to Integration: Building a Standardized Multinational North Pacific Ecosystem Status Reporting Framework*” (**workshop**; AP-ECOP co-convenors: Talen Rimmer and Seung-Tae Yoon)
 - “*Breaking Barriers, Building Bridges: Communication Strategies to Advance Climate-Informed Fisheries Management*” (**workshop**; AP-ECOP co-convenor: Steven Bograd)
 - “*Connecting science to decisions: effective communication for actionable science*” (**workshop**; AP-ECOP co-convenors: Hannah Lachance and Raphael Roman)
 - “*Pathways and process towards sustainable urban ocean where humans and nature co-exist*” (**session**; AP-ECOP co-convenor: Yoonja Kang)

- Discuss the possibility of waiving or reducing registration fees for non-student ECOPs (to help with ECOP retention).
- Design and circulate a capacity development needs survey among North Pacific ECOPs to identify future priority topics for training workshops, summer schools, side events, etc.
- Explore and strengthen collaborative avenues with existing and new PICES partner organizations, including through the co-design of joint side events and capacity development initiatives identified in the above survey. Examples of partners include [ICES](#), [APN](#), and the [Pacific Salmon Foundation](#).

AP-ECOP Endnote 1

AP-ECOP business meetings participation list (both online and in-person)

Members

*Hannah Lachance (USA)
 *Raphael Roman (Canada, Co-Chair)
 *Minkyoung Kim (Korea, Co-Chair)
 *Hana Matsubara (Japan, Co-Chair)
 *Steven Bograd (USA)
 Pengbin Wang (China)
 Seung-Tae Yoon (Korea)
 *Yoonja Kang (Korea)
 Talen Rimmer (Canada)
 *Toya Hirokawa (Japan, new Co-Chair)
 Shin-ichi Ito (Japan)
 *Satomi Takagi (Japan)
 *Keyseok Choe (Korea)
 Will Fennie (USA, new member)
 *Lauren Miki Kashiwabara (USA)
 Yuan Lin (Japan)
 Peng Lian (China)

Note: Stars '*' identify AP-ECOP members who attended both business meetings.

Members unable to attend both meetings

Canada: Mary Kevin, Saeseul Kim
 China: Zuhao Zhu, Heping Li
 USA: Alexandra Davis, Matthew Savoca
 (stepped down), Erin Satterthwaite (stepped
 down), and Vera Trainer

Observers in Yokohama, Japan

Ling Fang (China)
 Pavel Emelin (Russia)
 Shun Kageyama (Japan)
 Ihara Nozomi (Japan)
 Christina Kong (Canada)
 Marine Lebrec (USA)
 Fengming Lv (China)
 Zeyu Zeng (Canada/China)
 Sofia Khudyakova (Russia)
 Hanna Na (Korea)
 Rachel Roday (USA)
 Devon Warawa (PICES Secretariat)

AP-ECOP Endnote 2 (Source: 2026 PICES Press article)

Tour to JAMSTEC – ECOP Side Event (November 14)



This event was organized to provide ECOP participants at PICES with an opportunity to learn about Japan's leading marine science institutions and to foster networking for future research collaboration.

On November 14th, 38 ECOPs, including master's and doctoral students as well as research fellows, took part in the tour. The program began with a guided visit to JAMSTEC, followed by inspirational presentations from one JAMSTEC researcher, four researchers

from the Japan Fisheries Research and Education Agency (FRA), and a researcher from the Ocean Policy Research Institute of the Sasakawa Peace Foundation (OPRI-SPF).

Each speaker introduced their institution's research activities and shared insights into their respective career paths. The event concluded with a networking session, where participants engaged in active discussions and built new connections.



Among the 25 ECOPs who answered the feedback survey, the overall satisfaction with the event (on a 5-point scale) was 4.64. Many participants particularly enjoyed the presentations by Japanese ECOPs (approx. 40%) and the networking sessions (approx. 40%). Respondents also expressed interest in similar events in the future. At the same time, some requested longer networking opportunities and the possibility of visiting laboratories. Based on this feedback, AP-ECOP is considering organizing similar events on a continuing basis, incorporating even more opportunities for interaction.

AP-ECOP Endnote 3 (Source: 2026 PICES Press article)**“Introduction to PICES” Session – Background and Ways Forward**

In its efforts to identify and explore ECOP engagement needs and opportunities across PICES’s Expert Groups, the AP-ECOP team first organized a workshop at the 2022 Annual Meeting in Busan, Republic of Korea ([read the summary here](#)). The workshop intended to demystify all the PICES acronyms, providing opportunities for newcomers to gain institutional knowledge about how PICES functions and to learn about Expert Groups that align with their professional or research interests, potentially sparking new collaborative pathways across the North Pacific. Six experienced PICES members acting as (co)-chairs of Scientific and Technical Committees—including BIO, POC, HD, MEQ, and MONITOR—and FUTURE (PICES’s flagship or integrative science program) accepted our invitation to join the workshop to introduce the scope and breadth of their work, and how ECOPs can get involved. Over 30 people attended the workshop, most of them ECOPs.



Participants at Workshop 4 (W4): “Exploring Engagement Opportunities for ECOPs within PICES and Internationally”, during the 2022 PICES Annual Meeting in Busan, Republic of Korea. Credits: Hannah Lachance.

The workshop in Busan laid the foundations for the very first “*Introduction to PICES*” session that the AP-ECOP team convened in Honolulu, USA, during the 2024 PICES Annual Meeting. With the support of the PICES Secretariat, this special session was integrated into the general conference schedule on the day following the opening ceremony. This first trial was successful, attracting over 20 attendees from all career stages, the majority of whom were participating in PICES for the first time. The AP-ECOP Co-Chairs received positive and encouraging feedback, which will be used to enhance future annual iterations of this activity.

Initially, the title for this recurring session was “*PICES 101*”, but after further consultations with AP-ECOP members, the team realized that while “101” is conventionally used in North America to refer to an introductory university course, it is not widely understood in Asia. As a result, the AP-ECOP team converged on the current title, “*Introduction to PICES*,” ensuring it is accessible and welcoming to participants from all member countries.



Participants at the first “Introduction to PICES” session during the 2024 PICES Annual Meeting in Honolulu, USA. Credits: Hana Matsubara.

To keep the momentum going ahead of the 2025 PICES Annual Meeting in Yokohama, Japan, the AP-ECOP team refined their living master slide deck—i.e., one that evolves and adapts with time to remain accurate and relevant—and reached out to existing or new Scientific and Technical Committees Co-Chairs to see whether their respective slides needed changes and updates. Scheduled early in the conference, the second “Introduction to PICES” session gathered over 30 participants, including the Co-Chairs of MEQ, POC, FIS, and the FUTURE Program. In addition to offering networking tips and listing various engagement opportunities to help welcome new “PICESeans”, the session invited a former PICES intern—Key-Seok Choe—to share his story and formative experience within PICES, inspiring ECOPs to apply for future internships. During next year’s Annual Meeting in Nanaimo, Canada, another former intern expressed interest in doing the same.



Attendees and invited speakers joined the second “Introduction to PICES” session during the 2025 PICES Annual Meeting in Yokohama, Japan. Credits: Hana Matsubara.

Importantly, these special “Introduction to PICES” sessions offer a valuable platform for Scientific and Technical Committee leads to discuss and identify interdisciplinary cross-committee synergies, with ECOPs playing an active role as bridge-makers.

Moving forward, to ensure a greater turnout and enhance the overall quality of the “Introduction to PICES” sessions, the AP-ECOP team plans to:

- **Invite** representatives from the PICES Secretariat and the Governing Council to further clarify PICES's governance structure.

- **Ensure** 100% representation and participation of Scientific and Technical Committee leads. Previous events secured attendance from 50-75% of the Committees, with AP-ECOP Co-Chairs speaking on behalf of the missing ones. Though challenging due to simultaneous sessions, it would be ideal to have at least one Co-Chair from each Committee join the session, which would also help newcomers identify who they are and reach out more easily during the conference.
- **Further refine** slides and make them even more engaging (including figures from recently published work or research in progress).
- **Improve** communication and promotion of the “*Introduction to PICES*” session at the opening ceremony and in the Whova App.

AP-ECOP Endnote 4

2025 ECOP-related publications that AP-ECOP members* contributed to

* AP-ECOP members listed as (co)-authors appear in **bold**.

1. Kaikkonen, L., Strand, M., Singh, P., Shellock, R., **Roman, R.**, Smith, A. J., Joshi, S., Baker, C. A., Bigham, K. T., Dias, B. S., Erinosh, B. T., Fernandes, J. F., Ferraro, M., Garcia-Garin, O., Gianelli, I., Elías Ilosvay, X. E., Kostianaia, E., Leyba, I. M., Li, S., Marshall, T., Oliveira, R. R., Outinen, O., Rouyer, M.-M., Scopetani, C., & Singh, D. (2025). Guidelines for ensuring meaningful engagement of early career researchers in scientific collaborations: Recommendations from and for marine and polar scientists. ICES Journal of Marine Science, 82(8), fsaf143. <https://doi.org/10.1093/icesjms/fsaf143>
2. Elsler, L. G., Hörstmann, C., Polejack, A., Puskic, P., **Rimmer, T.**, Ojwala, R. A., Oostdijk, M., Coelho, L. F., Darias, M. J., & Kaikkonen, L. (2025). Leave no one behind in the UN Ocean Decade. One Earth, 8(6), 101344. <https://doi.org/10.1016/j.oneear.2025.101344>
3. Li, Shenghui et al. (2025). Early career ocean professionals' declaration on ocean negative carbon emissions for our ocean and future. The Innovation, Volume 6, Issue 9, 101007. <http://dx.doi.org/10.1016/j.xinn.2025.101007>. Note: Both **Minkyung Kim** and **Raphael Roman** contributed as co-authors.