

Study Group: Generating Recommendations to Encourage Environmentally-Responsible Networking (SG-GREEN)

Final report and recommendations

Authors: Vera L. Trainer (USA), Hiroya Sugisaki (Japan), co-chairs; Robin Brown (ex-officio representing PICES), Sung Yong Kim (Korea), Jae-Hyoung Park (Korea)

Executive Summary

With Decision 2022/S/4(ii), PICES approved the Study Group on Generating Recommendations to Encourage Environmentally- Responsible Networking (SG-GREEN). This group conducted a survey of PICES participants, consulted with other international science organizations and Regional Fisheries Management Organizations, reviewed published information and conducted a beach cleanup session at PICES-2024. A detailed analysis of the survey of PICES participants was published in PICES Press. This final report provides recommendations from the Study Group for each of the Terms of Reference and additional information that supports these recommendations.

Background:

The CoVID-19 pandemic has accelerated the need for and expansion of remote conferencing capability worldwide. While there may never be a complete replacement for the social events and serendipitous brainstorming provided by in-person meetings, the urgency of climate change impacts of global travel has highlighted the importance of a balanced approach to sharing scientific knowledge through a combination of remote conferencing and in-person meetings. Similarly, a targeted focus on the UN Decade of Ocean Science for Sustainable Development (UNDOS) has brought to light the importance of remote conferencing as a platform which can provide increased opportunities for under-represented people and countries to be heard, despite economic, travel, or other limitations. Also, some EU countries are now limiting scientist's travel in recognition of the urgent need to address the climate crisis. This discussion on greenhouse gas (GHG) impacts of travel also attracted some parallel discussion on other 'green' implications of international science activities.

PICES has the opportunity to play a leadership role in exploring the appropriate balance of; in-person and remote meetings, pursuing practices leading to the reduction of greenhouse gasses (GHGs), and exploring potential investments in climate-responsible industries, thus providing an example for the international community. This will create a lasting positive legacy for PICES well into the future, that helps improve environmental justice, equity, and diversity in planning its engagement with the worldwide scientific community.

Terms of Reference:

1. Identify a mechanism agreeable to all PICES member countries for sustained green meetings within the PICES scientific structure. In particular, to establish a mechanism that is inclusive to under-represented people and communities, early career ocean professionals, etc.
2. Create recommendations for PICES on best practices to reduce GHG emissions and waste relative to meetings

3. Establish organization-wide green initiatives, such as: eliminating single use plastics, reduced printing, reduced purchases of single use or limited use items at meetings, including meeting gifts.
4. Exploration of PICES investment in climate-responsible industries.
5. Provide recommendations for best practices in purchasing carbon offsets for members for face-to-face meetings, including suggestions for including offsets as part of the conference registration fees
6. Provide suggested actions to promote PICES green initiatives and climate change information.

Final Recommendations - Summary

In-Person Annual Meetings (TOR 1, 2, 5)

- a. Meetings should be as compact as possible because countries are allowing only a certain number of days for travel. Potentially move to shorter talks with brief questions, then open for longer discussion after all speakers in that session.
- b. Tools such as Whova (an event management application for in-person, hybrid and virtual events) are a fantastic way to save paper used for printed agendas and to connect with people at the conference.
- c. Provide lunch for workshops – hold them during lunch or afternoon. This will allow the annual meetings to be more compressed by optimizing the hours available for PICES work within a restricted number of meeting days.
- d. Compress the annual PICES meeting. Hold business meetings online in advance of the annual meeting to allow for no business meetings in person or at least shortened business meetings during the annual meeting.
- e. Presentations are available online on PICES website, pending approval by authors. Please make it widely known once presentations are available!
- f. Explore including carbon offsets in the PICES Annual Meeting registration fee as an optional add-on, as requested in the PICES survey results.

Virtual & Hybrid Meetings (TOR 1, 2)

- g. Have 2 people leading online meetings – one who is chairing and the other making sure that everyone is seen and heard.
- h. Use the raise hand function (mandatory) for online and in-person attendees. By having everyone logged into the meeting on their computers, all participants feel valued and included.
- i. Continue to review technology for virtual meetings (e.g. Whova or Gathertown for poster sessions)
- j. Hybrid format should be used for all business meetings when possible, with possible short business meetings (1-2 h). Or perhaps consider (when technology has improved) completely virtual Annual Meetings every 2nd year.
- k. Online meetings are better for non-native English speakers. Using the raise hand function gives an opportunity for all to participate, however internet access can still be a problem in some countries.

Partnership with Other Organizations (TOR 1, 2, 3, 4, 5, 6)

- l. It was proposed to have a new SG as a collaboration with other international organizations. How do we get to net zero? This would be a Study Group on Sharing Best Practices.

- m. Partner with other organizations...OECD (Organization to Economic Cooperation and Development) and international groups such as ICES, Ocean Solutions, Professional Societies (ASLO, AGU, ISSHA), APN, ECOP, (ONCE part of ISO, International Standards Organization) and organize a joint workshop. Continue to share “greening” strategies with other international organizations.

Recycling (TOR 1, 2, 3)

- n. Reuse plastic name tags and announce on Whova that they are reusable.
- o. PICES coffee cup as a swag item (cleanable). The reusable utensil set was very popular.

Investments (TOR 4)

- a. PICES Secretariat and Governing Council should continue to investigate potential investments in climate-responsible industries.

Community Engagement (TOR 6)

- b. Continue holding beach cleanup events or other environmentally-focused community outreach events, such as the beach cleanup event held in collaboration with the Waikiki Aquarium in 2024 (see Appendix 1).

SG-GREEN Activities:

1. On-line Survey

An online survey of PICES members to help us understand how to make PICES meetings more sustainable was conducted from October 2023 to March 2024 in collaboration with S-HD. Chinese colleagues were contacted separately, as they are unable to use Google Forms (Pengbin Wang led this effort). The survey was also extended to PICES members who could not attend PICES 2023 annual meeting, and the deadline was extended accordingly.

The survey included demographic questions to understand the participants’ backgrounds, as well as questions on preferences for attending the PICES annual meeting either online or offline, and on topics related to carbon offset and ocean preservation.

A total of 158 participants from 11 countries responded to the survey. A request for greater participation in the survey was published after the PICES Annual Meeting in PICES Press Vol. 32, No. 1 (<https://meetings.pices.int/publications/pices-press/PICES-Press-2024-Vol32No1.pdf#page=60>) and the overall results of the survey were published in PICES Press Vol. 32, No. 2 (Appendix 2 and <https://meetings.pices.int/publications/pices-press/PICES-Press-2024-Vol32No2.pdf#page=57>)

2. Information from International organizations (TOR 1)

SG-GREEN and PICES Secretariat sent messages to a variety of international marine science organizations and Regional Fisheries Management Organizations (RFMOs) asking for advice and experience with “greening” of scientific meetings and related activities. We shared the results from the PICES survey conducted at PICES-2023 and asked the following questions:

- a. Is your organization conducting similar efforts on "green conferencing", carbon offsets and ocean preservation issues? If so, would you like to share your results and insights?

- b. Are you aware of other scientific groups/organizations who are conducting such work?
- c. How do your considerations of "greening" of operations impact the ability of your organization to interact with PICES and other international organizations?

In general, we received very few responses, perhaps suggesting an opportunity for PICES to lead the charge in greening of meetings. Again, this suggests that a Study Group on Sharing Best Practices could be very helpful to guide international groups on greening of their meetings. The responses are summarized in the following table:

Organization	Response
ICES	ongoing discussions between Secretariats. Some policies have been developed for joint ICES/PICES activities as outlined in Section 3 for the MSEAS Symposium. There is a review of ICES experience with hybrid meetings in Section 5 below.
NPFC	nil response
NPA FC	NPAFC is conducting internal discussions on the important issue and will respond after this consultation is complete
ISC	Nil response
SOLAS	Nil response
SCOR	Nil response
NOWPAP	<p>“Yes, our organisation (both NOWPAP and UNEP) are fully compliant with the current policy of UN to reduce our carbon footprint in relation to travel (downgrading travelling class, choosing the most direct route, etc,) and meetings (in addition to the latter – also encouraging holding meetings online to reduce travelling required. UNEP collects and assesses all information in relation to the carbon footprint. There are also measures introduced to avoid using of plastics.</p> <p>And this is relevant not only to scientific meetings but to meetings and travelling in general”</p> <p>(https://www.unep.org/about-un-environment/sustainability/environmental-performance)</p>

3. Literature and informational websites on carbon offsets

Carbon offsets for travel, tourism, and shipping may be one of the most misunderstood and controversial topics in sustainable travel. There are many sites that promise exact carbon offset

metrics per dollar spent, and others that leave the subject very vague. Unfortunately, there is no standard for purchasing or investing in carbon offsets, and the truth is that they are complicated and don't always work like they should, or as they're advertised. For example, in one particular instance one of the largest carbon offset suppliers employing protections for large areas of rainforest, were recently reviewed by scientists that analyzed their methods and outcomes. Analyses of their carbon offsets found that the offsets overstated their impact on deforestation ([West et al., 2020](#)). Thus, we are left wondering if carbon offsets are a viable option for sustainable travel, and if so, what the best options are.

For PICES purposes, given that we do not have the expertise or means to fully research projects in which to invest, we could follow what other large organizations have employed. For example, Marine Socio-Ecological Systems (MSEAS) has initiated a "[Plastic and Carbon Policy](#)" at their 2024 meeting. The statement on their 2024 meeting website states the following.

Plastics use policy

The organizers of MSEAS-2024 are actively seeking to minimize the use of single-use plastics and other waste at the conference, and are working with the Local Organizing Committee to achieve this. We recommend that participants bring their own reusable beverage containers. More information will follow.

Carbon offset policy

The Convenors of MSEAS 2024 ask that you carefully consider the carbon cost of attending this conference.

There are many discussions of ways to limit carbon emissions. If you plan to attend the conference then purchasing offsets is one of the simplest options available, and a range of airlines that offer carbon offset options can be seen at:

<https://thepointsguy.com/guide/everything-you-need-to-know-carbon-offsetting-flights>

Based on the above statements, it seems that MSEAS has left it to their constituents to manage carbon offsets on their own. PICES could go a step further and use information and tips from the article above (among other resources) to form a guide for PICES members. In addition, PICES could play a direct role in carbon offset purchasing if finances allow and there is consensus on a path forward.

An overview of key points taken from the article linked above, follow.

CO₂ basics

Airplanes emit various particles and gasses, including carbon dioxide (CO₂), into the atmosphere. In this article, we focus on CO₂ because it makes up 65% of global greenhouse emissions.

CO₂ is one of several greenhouse gases that occur in the atmosphere. When functioning properly, greenhouse gasses regulate the earth's temperature.

Estimating your carbon footprint

The US Environmental Protection Service (EPA) website has a Carbon Footprint Calculator but doesn't include flights

There are many calculators that can be used to estimate the carbon emissions related to flights. Many are simplistic and give a rough estimate by considering your mileage flown (*then links to site to do a simple calculation for yourself*).

Some calculators go a step farther and consider your class of service, since larger seats take up more space and hence account for a greater amount of fuel used per passenger. *These are all just estimates and change based on cargo weight, headwinds, plane shape/type, etc.*

Critics of carbon offsetting say that spending to offset emissions merely allows polluters to feel better about their emissions and discourages working to reduce them.

While there may be some truth to that, if you're going to fly, offsetting your carbon emissions by supporting the right projects is better than doing nothing.

Certified carbon offset organizations

Many companies and organizations are willing to take your money. Unfortunately, not all of these provide high-quality carbon offsets.

Some companies have entire teams that evaluate carbon offsetting projects to ensure that they are high-quality. *However, as stated above, PICES does not have the resources, time or access to evaluate individual projects in detail.* **The next best option is to get suggestions from environmental organizations you trust or well-recognized organizations that list certified and verified carbon offsetting projects.**

Three organizations that provide such listings are [Gold Standard](#), [Green-e](#) and [Climate Action Reserve](#).

On each organization's website, the projects are sortable by location and offset type(s).

[Gold Standard](#) makes it easy to donate to a particular project on their website, while [Green-e](#) and [Climate Action Reserve](#) refer you to individual projects

The site then moves onto suggestions for reducing individual emissions and lists all of the airlines with carbon offset programs and how each generally works.

Reduce your emissions

The most effective way to reduce your CO₂ emissions is to reduce your fossil fuel consumption. This could mean having a teleconference instead of traveling for a meeting. If you do travel, you can reduce your footprint by taking vacations closer to home, flying nonstop when possible, taking a bus, train or fuel-efficient vehicle instead of a short-haul flight, booking a flight on a more fuel-efficient aircraft, flying economy class instead of business class.

Airline Carbon Offset Programs

Most airlines have internal practices and plans to decrease their carbon footprint. But, as some passengers become increasingly concerned about the carbon emissions associated with their travel, some airlines have started offering customers the opportunity to get involved.

This section of the article describes some carbon offsetting programs offered to customers by airlines. For each of these programs, participation by customers is completely voluntary and independent from the flight booking process.

4. PICES investment in climate friendly industries

In a discussion of SG-GREEN with the PICES Secretariat, the possibility of PICES investment of climate-friendly industries was discussed. PICES has short term investments of funds held in accounts that currently do not offer an opportunity for investment in climate -responsible industries. PICES is one of seven organizations in the International Fisheries Commission Pension Society. The IFCPS manages and invests aggregated funds from the organizations (all headquartered in Canada or the USA) and contributions to meet the pension commitments of the partner organizations. The IFCPS investment plan does include ESG (Environmental, Social and Governance) considerations when selecting investments and in fact climate change and carbon emissions is of importance to the member Commissions given their areas of responsibility. The Statement of Investment Policy and Procedures has the following language: “The Pension Society expects the Manager of Managers to report regularly (at least annually) on ESG rankings of the investment managers, carbon intensity and other key indicators to help it assess progress in managing ESG risks and opportunities”. At a review, in November 2023, members discussed the complexities of carbon emissions and other contributors to climate change as well as related government policies that may influence investment risks, which speaks to the fact that climate-responsible investing is already a routine consideration at each annual meeting of the Society.

5. Hybrid meeting considerations

The PICES Secretariat has participated in a few hybrid conferences in the past year, including PICES-2022, ECCWO5 and the ICES ASC. A summary of their impressions is here: to run a hybrid meeting requires resources – technology and personnel. This is best done by a professional company and that comes with a cost. For the three events above production companies were used for each but the costs were NOT passed onto the registrants - registration fees for remote participants were subsidized by the sponsoring organizations. There are also still technical challenges – despite professional companies running the online portions both ECCWO5 and the ICES-ASC had connectivity issues. For PICES annual meetings the costs of the venue are covered by the host country. Hybrid annual meetings would be more expensive than the current in-person only model. Countries would save on travel costs but those are distributed among agencies and institutes and from different budgets, so it is not so easy to calculate or demonstrate savings. We have also had members tell us that even for virtual participation, travel approval is still needed for them to be able to pay a registration fee. For PICES-run International Symposia the registration fees cover the venue costs for the most part, with some additional contributions from organizations. If events are to be hybrid, then the organizers would need to decide whether the additional costs are shared by all registrants, or online costs are covered by online registrants. It is likely that fees for online participation would be as high, or higher, than fees for in-person participation if this was put in place and it is not clear people would be willing (or able) to pay (even if they save on time and travel costs). Whichever way the costs are apportioned, costs for running the meeting would definitely increase and registration fees would have to, as well. Hybrid definitely allows more people to participate, and if the sessions are streamed then there are recordings available which could be used as a resource after the meeting has ended. This was done for ECCWO5 (207 videos of talks are available where the authors gave permission) but so far there are not many views of the presentations. ICES Secretariat were kind enough to send their initial review of this year’s ASC and here are some points relating to the hybrid component:

- Collectively, attendees watched more than 1,000 hours of conference video content, either live streamed or as recordings of sessions. Around 75% of this was from remote attendees watching the live streamed sessions.
- The experience for online attendees and speakers, and for conveners to incorporate hybrid into their sessions was mixed. Feedback points at difficulties in several areas and a lack of engagement from the remote audience. To some, including the videos from remote speakers had a negative influence.
- ICES staff report - Wide consensus that hybrid with live streaming is not preferred compared to a fully in-person conference, and that it diminishes the quality of sessions while costing lots of resources.
- Hybrid option is great for accessibility. If continuing to keep ASC online, advertise it a lot to have more online users. Keep experimenting with the hybrid format, consider if hybrid could be in select sessions only, and the cost not absorbed by ICES.
- From a feedback survey: Participants top three reasons to join online are cost reasons, institute not covering travel and to save CO₂. Online participants rated their satisfaction with the online experience a 2.2 out of 5. This reflects the feeling of remote participants that they were not able to participate in the sessions, as 62.5 % gave this answer.
- From a feedback survey: The experience of conveners of running a hybrid session varied from stating that the interaction with remote participants ruined the flow of the session and proved to be challenging, to ignoring remote presenters and having a great experience thanks to the technical team.

Cost of ICES-ASC hybrid:

There were costs relating to the hybrid setup of the venue that their Local Organizing Committee (LOC) covered and so aren't included, but for the remainder (Production company, additional ICES staff, IT software, etc.) it amounted to 356 Euro (CAD\$ 515) per remote attendee, or \$63 per livestream view.

Although it is agreed that watching a recorded presentation from a remote presenter is less engaging for the live audience, from a logistics perspective it is too challenging to rely on a live remote presentation. There are connectivity challenges that can occur with no warning, for anyone, and sound quality issues that often occur too. It makes it much less stressful for organizers and conveners to know that all the presentations in the session are ready to go, either as a PowerPoint given by someone in the room, or a video to play. There is merit in PICES and ICES continuing to share information and recommendations on hybrid possibilities, whether informally like this or through a dedicated meeting.

Appendix 1.

Beach cleanup activity, PICES 2024.



PICES - 2024 Honolulu, Hawaii

Beach Cleanup

Let us work together to create the “Ocean We Want”!
The Waikīkī Aquarium and PICES SG-GREEN are sponsoring
a beach cleanup side event at the 2024 PICES Annual
Meeting. We hope you can join us!

WHEN: Saturday, October 26, 2024 @ 10am–12pm
WHERE: The Waikīkī Aquarium

Please bring reef-safe
sunscreen and water with you.

See PICES 2024
meeting website for:
Transportation
Event sign-up
Directions
www.pices.int



Appendix 2. SG-GREEN survey report

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NORTH PACIFIC MARINE SCIENCE ORGANIZATION

PICES by the Numbers: Survey on Reducing PICES Impacts on Climate Warming and Environment Restoration Activities (SG-GREEN)

Vera Trainer, Hiroya Sugisaki, Robin Brown, Sung Yong Kim, and Jae-Hyoung Park

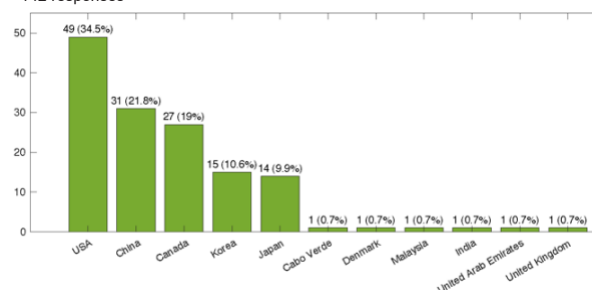
Climate scientists need to meet in a responsible manner. Our plan to reduce the impact of PICES on climate warming is part of the integrity of the organization. At PICES-2023 and over the months that followed, the SG-GREEN (Study Group on Generating Recommendations to Encourage Environmentally-Responsible Networking), with the help of the Human Dimensions Committee, conducted an online survey to query the PICES membership about their interest in changing how we meet, purchasing carbon credits to offset the cost of meeting in person, participating in beach clean-up, and other environmental activities. Given that many of us are climate scientists and care about the future of our planet, the responses to surveys show an overwhelming interest in changing the way that we do business. The survey was divided into questions about 1. Demographics, 2. Annual meetings, 3. Carbon offsets, and 4. Ocean preservation activities, and the results are summarized below.

Demographics

Summarizing the demographic section, approximately 158 members completed the survey, with 53% identifying as female and 46% identifying as male. The age ranged from <25 to >65, with 36% identifying as Early Career Ocean Professionals (ECOPs). Most respondents were in the ecology, biology or fishery area of study (n=109) with others specializing in various areas of oceanography, including physical (12), chemical oceanography (8), general oceanography (8), polar oceanography or social science/management (7).

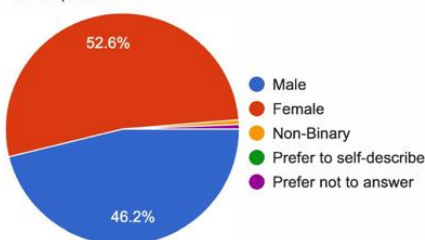
What is your country?

142 responses



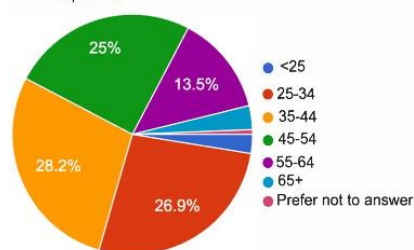
What gender do you identify with:

156 responses



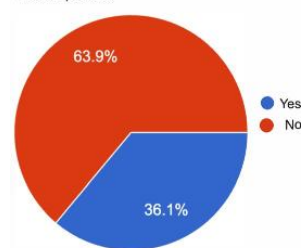
Age range

156 responses



Are you an Early Career Ocean Professional (ECOP = less than 5 years since finishing graduate school or postdoctoral training, whichever comes later, and less than or equal to 38 years of age)?

155 responses



What is your area of scientific study?

148 responses

Ecology/Biology/Fishery: 109

Physical Oceanography: 12

Chemical Oceanography: 8

Oceanography(broad): 8

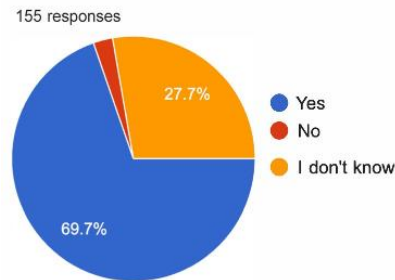
Polar ocean: 2

Social science/management: 7

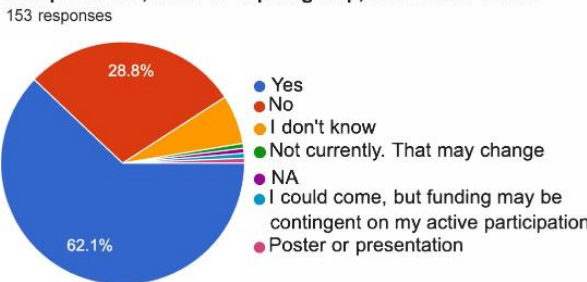
Annual Meetings

Most respondents felt that they would be allowed to attend the Annual Meeting in person (70%), even if there was a virtual option. However, for in person attendance, most people felt that their employer would require them to have a role, such as oral presenter, committee, or expert group chair. Approximately 60% of respondents stated that they would pay a registration fee to attend the PICES Annual Meeting virtually and would be willing to attend virtually (50%) if the meeting was outside their normal working hours.

1. If there is a virtual option for a PICES Annual Meeting, will you be allowed to travel to attend the in-person meeting?



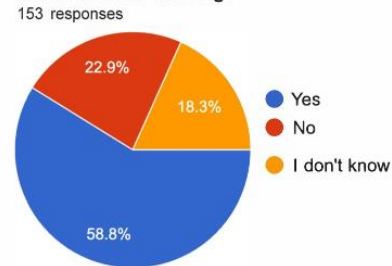
2. For in-person attendance, would your employer require you to have a role at the PICES annual meeting, such as oral presenter, chair of expert group, committee chair?



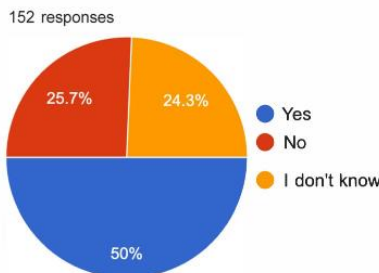
4. What parts of the PICES Annual Meetings should be held in person?



3. Will you pay a registration fee (less than the in-person registration fee) for virtual participation at a PICES Annual Meeting?



5. Will you attend the Annual Meeting virtually if the meeting schedule is outside of your normal working hour, e.g. very early morning or at night?



6. What approximate hours are you willing to attend the meeting?

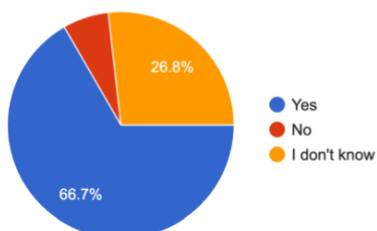
Most participants prefer: 9:00-20:00 (local time)

Carbon Offset

There were strong feelings about carbon offsets, including 67% stating that PICES should provide recommendations on purchase of reliable carbon credits. Some respondents felt that a carbon offset fee should be included in the PICES registration fee (47%) while others felt that this fee should be paid by PICES as part of their annual operating costs (38%). Over 71% stated that they would like carbon offset recommendations to be a topic for a PICES expert group, which is why SG-GREEN members currently are writing a proposal for a new Study Group on this topic.

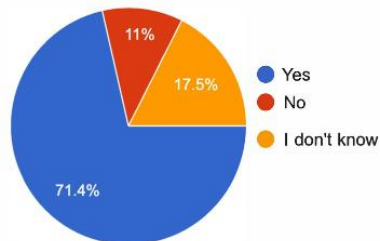
8. Should PICES provide recommendations on purchase of reliable carbon credits to offset the greenhouse gas emissions associated with PICES meetings? (carbon credit = a reduction, avoidance or capture of greenhouse gas emissions achieved by a certified project. One carbon credit represents the reduction or removal of one tonne of carbon dioxide or its equivalent in other greenhouse gases)

153 responses



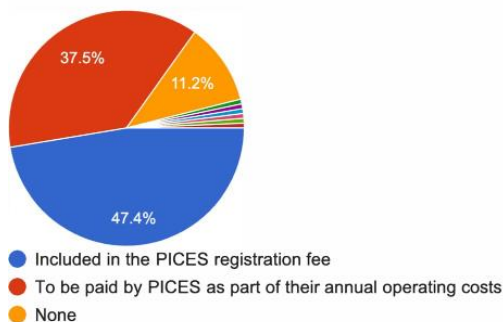
9. Would you like to see carbon offset recommendations (effectiveness, cost, etc.) a topic for a PICES Expert group to research?

154 responses



10. Would you be in favor of a carbon offset fee to be (select one option)

152 responses

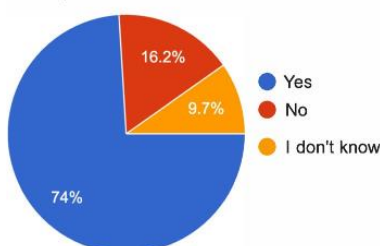


Ocean Preservation

A strong majority (74%) wanted to see a beach cleanup activity (and would participate in this activity) or other restoration activity as part of the PICES Annual Meeting, which is why SG-GREEN members currently are working with the PICES Secretariat to organize a beach clean-up activity in Honolulu during PICES-2024. 88% of the respondents are in favor of PICES eliminating plastic products (name tags, plastic bottles, cups etc.) at the annual meeting. Over 72% felt that PICES member nations should contribute an annual fee toward carbon offsets or another green project, such as habitat restoration.

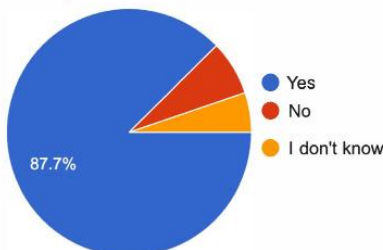
12. Would you participate in a PICES-sponsored beach cleanup or other restoration activity during the Annual Meeting?

154 responses



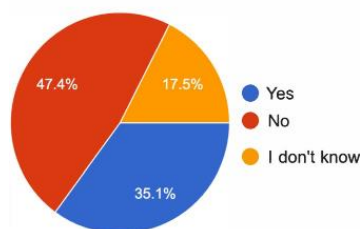
13. Are you in favor of PICES eliminating plastic products (name tags, plastic bottles, plastic coffee cups etc.) at its annual meetings?

154 responses



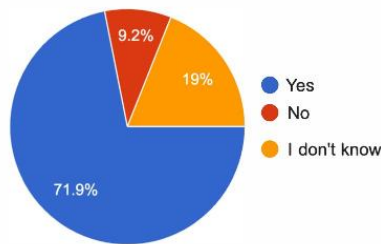
14. Should PICES continue to provide meeting bags, stationery, and souvenirs, etc. at its annual meetings?

154 responses



15. Would you be in favor of member nations contributing an annual fee for carbon offsets or another PICES green project (habitat restoration, etc.)?

153 responses



In addition to the survey at PICES-2023, we have written to several of our partner organizations to ask how they are dealing with these questions. To date, we have heard:

- The Northwest Pacific Action Plan (NOWPAP) and the United Nations Environment Programme (UNEP) are compliant with the current UN carbon footprint reduction program relating to travel and plastic reduction. The travel policies include transitioning (where practical) to online/virtual meetings; travel by most direct routing, and other measures. UNEP collects and assesses all information in relation to the carbon footprint. UNEP purchases Certified Emission Reductions (CERs) from projects in Developing Countries as mandated by the United Nations Framework Convention on Climate Change (UNFCCC). UNEP has been climate neutral for the past 12 years. The UNEP greenhouse gas (GHG) management and reporting program can be found at <https://www.unep.org/about-un-environment/sustainability/environmental-performance>
- The Asia-Pacific Network for Global Change Research (APN) reports that they have moved to online/virtual meetings (where practical) and holding face-to-face meetings back-to-back to minimize the travel GHG footprint. APN has not yet introduced carbon offsets.

We are still awaiting responses from several other organizations (ICES, NPAFC, NPFC, ISC, SOLAS and SCOR).

Clearly, the PICES community has strong feelings about working toward climate mitigation activities as part of the PICES Annual Meetings. The SG-GREEN would like us all to continue the discussion to find ways to offset the cost of meeting in person to lead the way in collaboration with other international organizations.

Acknowledgments

Our thanks are extended to Mitsutaku Makino and the PICES Human Dimensions Committee for helping create the SG-GREEN survey.



Vera Trainer is the Aquatic Sciences Director of the Olympic Region Harmful Algal Bloom (ORHAB) program at the University of Washington's Olympic Natural Resources Center in Forks, WA. She is the recent Science Board Chair of PICES from 2019-2022, the co-chair of SG-GREEN, and has been a member of the Section on Harmful Algal Blooms (HABs) since 2003. Her current research on HABs focuses on the assessment of climatic factors that influence toxic bloom development and intensity and impact the resilience of coastal economies and marine wildlife health.



*Hiroya Sugisaki
(SG-GREEN Co-Chair)
Fisheries Resources Institute, Japan*



*Robin Brown
SG-GREEN ex-officio representing PICES
Canada*



*Sung Yong Kim
(AP-NPCOOS, MONITOR, SB, SG-GREEN, WG-47, WG-49, WG-50)
MONITOR Chair, AP-NPCOOS Co-Chair
Environmental Fluid Mechanics Laboratory (EFML), Republic of Korea*



*Jae-Hyoung Park
Affiliation: Pukyong National University, South Korea
Area of Interests: Physical oceanography, dynamics of ocean currents, air-sea interactions, in-situ ocean observation*