

Report of the FUTURE Scientific Steering Committee

The FUTURE SSC met from 9:00 to 18:00 h on Friday, October 18 and 18:00 to 21:00 h on Wednesday, October 23, 2019 at PICES-2019 in Victoria, Canada. FUTURE Co-Chairs, Drs. Steven Bograd (USA) and Sukyung Kang (Korea) led the meetings.



FUTURE SSC meeting participants, back row, from left: Ryan Rykaczewski, Hiroaki Saito, Hal Batchelder, Sukyung Kang, Guangshui Na, Thomas Therriault; front row, from left: Emanuele Di Lorenzo, Vyacheslav Lobanov, Steven Bograd, Mitsutaku Makino, Jackie King, Ian Perry, Sinjae Yoo, Toyomitsu Horii, Fangli Qiao. Missing from photo: Oleg Katugin.

October 18, 2019

AGENDA ITEM 1

Introductions and nomination of a rapporteur

Self-introductions were made (*FUTURE SSC Endnote 1*), Drs. and Sukyung Kang (Korea/FUTURE SSC Co-Chair) and Ryan Rykaczewski (USA) agreed to serve as rapporteurs.

AGENDA ITEM 2

Adoption of agenda

The agenda was adopted without modification (*FUTURE SSC Endnote 2*).

AGENDA ITEM 3

Volunteers for award committees for 2019

Volunteers were sought to serve on award committees to select the FUTURE awards for Best Oral Presentation by an early career scientist during PICES-2019. Drs. Jackie King (Canada) and Ryan Rykaczewski (USA) agreed to judge oral presentations. This year's selections were made from Topic

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Sessions S6 and S15 (ten oral presentations in competition). No posters were presented by early career scientists.

The best oral presentation was given to Natasha Hardy “*Trait-based modeling for albacore tuna predator-prey interactions under climate change in the NE Pacific*” (S6).

AGENDA ITEM 4

FUTURE SSC activities since last PICES Annual Meeting

Dr. Bograd provided a briefing to SSC members on the activities of the FUTURE SSC since PICES-2018.

- *FUTURE SSC Inter-sessional Meeting*: A FUTURE inter-sessional meeting was held April 15–17, 2019 in Yokohama (see PICES Press, Summer 2019, Vol. 27, No. 2, [pp. 5–6](#)). In addition to discussions on the outreach strategies for the FUTURE science program and next PICES integrative science program, significant efforts were put into the synthesis paper and FUTURE video.
- *FUTURE Synthesis Paper*: FUTURE SSC published a peer reviewed paper titled “Developing a Social-Ecological-Environmental System framework to address climate change impacts in the North Pacific” in *Frontiers in Marine Science*, 2019, [Vol. 6, Article 333](#). This paper will enhance an understanding of processes ranging from climate through ecosystems to human societies.
- *FUTURE presence on the PICES website*: FUTURE SSC acknowledged PICES Secretariat for their hard work on expanding the FUTURE presence on the [PICES website](#). The revised version provides more prominence to this flagship science program and gives scientists more access to FUTURE activities and products.
- *FUTURE video*: To develop outreach strategies for the FUTURE science program, FUTURE SSC produced [a short video](#) describing the goals and structure of FUTURE and the North Pacific Social-Ecological-Environmental System (SEES) framework it has implemented. It is now available on the PICES website and it has the QR code at the end of the video to direct people to the general FUTURE page.
- *Early career scientist SEES competition*: FUTURE SSC discussed SEES competition for early career scientists to encourage recognition and application of the SEES approach, and to engage early career scientists in PICES activities. One Early Career Award recipient on the SEES approach will be supported with travel funding and an invited S1 plenary talk at PICES-2020 (see FUTURE SSC Endnote 3).
- Participation in a Regional Planning Workshop for the North Pacific and Western Pacific Marginal Seas, July 31–August 2, 2019, Tokyo, Japan. Dr. Bograd participated in this workshop and led a discussion on “How should PICES and FUTURE collaborate with other organizations on delivering useful information about the North Pacific for the United Nations Decade of Ocean Science for Sustainable Development” (see pp. 48–50, PICES Press, Winter 2020, [Vol. 1, No. 1](#)).

AGENDA ITEM 5

Status reports of FUTURE parenting/co-parenting Expert Groups

Dr. Sinjae Yoo (Korea, Co-Chair of WG 35; WG on *Third North Pacific Ecosystem Status Report*) gave an update of WG 35 activities. The main goal of this expert group is to publish NPSER 3. Due to the delay in writing, WG 35 asked for a one-year extension. Thus the timing of the publication of the NPSER 3 has

been adjusted. The synthesis report will be completed by March 1, 2020 and the regional chapter by August 2020. FUTURE SSC will need to review the synthesis report and provide feedback by next March.

WG 36 (WG on *Common Ecosystem Reference Points across PICES Member Countries*) provided a power point presentation to review their progress. The group held a 1-day workshop at PICES-2019 (W13: *Common Ecosystem Reference Points*) and a 1-day Topic Session (S6: *Identifying thresholds and potential leading indicators of ecosystem change: The role of ecosystem indicators in ecosystem-based management*). WG 36 requested a one-year extension for writing final report.

Dr. Rykaczewski (USA, Co-Chair of WG 40; (WG on *Climate and Ecosystem Predictability*) gave an update of WG 40 activities. The WG held an inter-sessional workshop on “*Toward an integrated approach to understanding ecosystem predictability in the North Pacific*” in May 2019 (see PICES Press, Winter 2020, Vol. 28, No. 1, [pp. 51–53](#)) and a Topic Session (S15) on “*Advances in North Pacific marine ecosystem predictions*” at PICES-2019. A journal special issue will be developed based on the inter-sessional workshop presentations and on the contributions to this topic session.

AGENDA ITEM 6

The next integrated science program: Beyond FUTURE

The FUTURE SSC had a discussion on the next PICES integrative science program (or the continuation of FUTURE) and on proposed changes to the FUTURE Science and Implementation Plans. Since the current FUTURE Science Program shares many of the goals of the UN Ocean Decade, linkage to the UN Decade of the Ocean was included in the draft FUTURE Science and Implementation Plans. These Plans will be completed in 2020.

Furthermore, PICES has the aspiration and capacity to be a key regional partner of the UN Ocean Decade. Next Science Program (could be FUTURE Phase III) will provide the scientific and organizational infrastructure to implement the activities of the Ocean Decade in the North Pacific. It is anticipated that the SSC will have significant discussion of this issue at its proposed 2020 inter-sessional meeting.

AGENDA ITEM 7

Planning for PICES-2020

The FUTURE SSC proposes several activities at PICES-2020 in Qingdao, China. The SSC will request 8 hours of business meeting at the next Annual Meeting, and two FUTURE oral presentations (one for an Early Career Scientist awardee on the SEES approach and one for an invited speaker on an overview of the UN Ocean Decade) in the Opening Session (S1) and 1.5 hours of plenary time on Tuesday to discuss PICES role in UN Ocean Decade.

Having an inter-sessional meeting of FUTURE SSC was also discussed and proposals for an 2020 inter-sessional meeting (*FUTURE SSC Endnote 4*) and participation at PICES-2020 (*FUTURE SSC Endnote 5*) were submitted to Science Board and Governing Council for approval.

AGENDA ITEM 8

Proposals for new FUTURE-parented working groups, study group and special projects

The SSC reviewed four working group proposals but thought that the FUTURE SSC is not the right body to be a parent for all proposed working groups. Feedback for each proposal is as follows:

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- PICES/ICES WG on Small Pelagic Fish:
 - general support, but leave to FIS to parent,
 - should look into regular SPF symposia similar to zooplankton symposia.
- PICES/ICES WG Ocean Negative Carbon Emissions:
 - proposal too vague, recommend better articulation of ToR, clearer description of implementation, difference from WG 33,
 - leave to BIO to parent.
- PICES/ICES EBFM Evaluation Group:
 - general support and approval.
- Bering/Chukchi Sea IEA WG:
 - general support but concerns on Russian participation,
 - do not feel comfortable to parent,
 - strong ICES/PICES connection.

AGENDA ITEM 9

Plans for the next FUTURE Open Science Meeting

It has been 5 years since the FUTURE Open Science Meeting (OSM) was held April 2014 in Kona, Hawaii. FUTURE SSC recommends the next FUTURE OSM occur in the near future, with early 2021 being the earliest realistic option. Logistics and budget for an upcoming FUTURE OSM were discussed as follows:

The motivation for holding a 2nd FUTURE OSM is:

1. To highlight and synthesize the accomplishments of the FUTURE Phase II (2014–2020) Science Program and related activities, including from other international organizations;
2. General theme of the Meeting is the application of Social-Ecological-Environmental (SEES) frameworks to marine issues;
3. Focus is also on the beginning of the UN Ocean Decade of Ocean Science for Sustainable Development, particularly within the North Pacific;
4. Results from Meeting will help set the course of North Pacific marine science over the UN Ocean Decade (2021–2030).

We propose the OSM structure and logistics to be comparable to the 1st FUTURE OSM:

1. Aim for January–March 2021;
2. First option is Hawaii (perhaps Kona again); Jeju, Korea is a second option; Monterey, California is a third option;
3. FUTURE SSC will serve as the OSM Organizing Committee; Co-Conveners would be FUTURE SSC Co-Chairs in addition to one representative each from ICES and IOC;
4. PICES will be the principal sponsor; will seek co-sponsorship from ICES, IOC, (CLIVAR);
5. Similar meeting format (4 days, topic sessions), number of participants, and general costs as OSM 2014;
6. Seek support from Science Board, Governing Council and PICES Secretariat.

AGENDA ITEM 10

Prepare 2019–2020 Action Plans

During the meeting, a list of items was drawn up for Science Board approval (*FUTURE SSC Endnote 6*), and action items for the next year were developed (*FUTURE SSC Endnote 7*).

AGENDA ITEM 11

Other business

New ECS award (Zhu and Peterson ECS Award)

The SSC generally supports the Zhu and Peterson ECS Award. However we believe that PICES needs to create a consistent definition of Early Career Scientist.

Update of FUTURE liaison table

The FUTURE liaison table was updated. Dr. Toyomitsu Horii (Japan) was recommended as a liaison to Working Group on *Indicators of Marine Plastic Pollution* (WG 42).

October 23, 2019

AGENDA ITEM 4 (CONTINUED)

FUTURE SSC activities since last PICES Annual Meeting

▪ *New PICES SEES Case Studies: Coordination amongst WG 36, 40, and 41*

The FUTURE SSC and scientists from 3 expert groups (WGs 36, 40, 41) undertook a discussion of additional SEES case studies that reflect important issues in the North Pacific and that are amenable to our SEES framework. Therefore, the FUTURE SSC proposes a 2-day workshop at PICES-2020 on “*Drivers and impacts of extreme events around the North Pacific*”, with a focus on direct and indirect drivers of HABs (*FUTURE SSC Endnote 5*).

FUTURE SSC Endnote 1

FUTURE participation list

Members

Steven Bograd (USA, Co-Chair)
 Sukyung Kang (Korea, Co-Chair)
 Emanuele Di Lorenzo (USA)
 Toyomitsu Horii (Japan)
 Oleg Katugin (Russia)
 Jacquelynne (Jackie) King (Canada)
 Vyacheslav Lobanov (Russia)
 Mitsutaku Makino (Japan)
 Guangshui Na (China)
 Ian Perry (Canada)
 Fangli Qiao (China)
 Ryan Rykaczewski (USA)
 Thomas Therriault (Canada)
 Sinjae Yoo (Korea)

Observers

Antonietta Capotondi (Co-Chair, WG 40)
 Elliott Lee Hazen (WG 36)
 In-Seong Han (MONITOR)
 Dan Lew (Co-Chair, WG 41)
 Tom Okey (Canada)

PICES

Hiroaki Saito (Science Board Chair)
 Harold (Hal) Batchelder (PICES Secretariat)
 Robin Brown (PICES Secretariat)

FUTURE SSC Endnote 2

FUTURE meeting agenda

October 18, 2019, 9:00–18:00 and October 23, 2019, 18:00–21:00

1. Introductions and nomination of a rapporteur
2. Adoption of agenda
3. Volunteers for award committees for 2019
4. Review of FUTURE SSC activities since last PICES Annual Meeting
 - Published FUTURE review paper in *Frontiers in Marine Science*
 - Developed new priority SEES Case Studies (*)
 - Developed FUTURE outreach video (link)
 - Discussed plans for future PICES integrative science programs (*)
 - Revised FUTURE Science and Implementation Plans (*)
 - Guided revisions to FUTURE web presence at www.pices.int
 - Discussed updated FUTURE Product Matrix and Dissemination (*)
 - Developed Early Career Scientist SEES implementation proposal (*)
 - Participated in UN Ocean Decade North Pacific Planning Workshop (Tokyo, July–August 2019)
 - Began planning for next FUTURE Open Science Conference (*)
5. Status Reports of FUTURE parenting/co-parenting Expert Groups
 - WG 35 update of activities
 - WG 36 update of activities and 1 year extension
 - WG 40 update of activities
 - WG 41 update of activities
6. The next integrated science program: Beyond FUTURE
7. Planning for PICES-2020 (Qingdao, China)
8. Proposals for new FUTURE-parented working groups, study groups and special projects
9. Discussion of plans for the FUTURE Open Science Conference
10. Prepare 2019-2020 action plans
11. Other business
 - New ECS award: Zhu and Peterson ECS Award

Adjourn

(*) indicates an agenda that needs further discussion at the FUTURE business meeting

FUTURE SSC Endnote 3

**Early Career Travel Award and Invited Presentation Highlighting
the SEES Framework**

Objective:

Encourage recognition and application of the SEES approach, and engage early career scientists in PICES activities

Strategy:

Provide some travel support to an early career scientist (or scientists) who demonstrate application of the SEES approach in the framing of his or her research and are willing to present this work at the Science Board (or other plenary) Symposium

Blurb to advertise this opportunity:

PICES provides a forum for young scientists from around the North Pacific to share knowledge and build collaborations that cross both disciplinary and international boundaries. The goal of the scientific

program of PICES is to understand and communicate present conditions and projected future states of North Pacific ecosystems and the potential responses to human use and climate change.

To further increase the capacity of the PICES community to understand and communicate the processes that link climate processes and human activities to multi-scale ecosystem responses, a Social-Ecological-Environmental Systems (SEES) framework has been developed and highlighted in a recent manuscript ([Bograd *et al.*, 2019](#)).

The FUTURE Scientific Steering Committee (SSC) seeks to inspire early career scientists to consider the application of the SEES approach in their work. We encourage PICES scientists to bear in mind the following questions as they consider research to be shared at the next PICES Annual Meeting:

How has your work spanned disciplinary boundaries?

How does the issue addressed by your research incorporate understanding of the climate system, ocean physical or biogeochemical processes, and characteristics of the marine ecosystem?

What are resulting impacts on coastal communities, and how might these consequences influence management strategies?

The FUTURE SSC will provide funds (~3,000 CAD) to support the travel costs of early career scientist(s) to participate in the following PICES Annual Meeting. The young scientist (or team of young scientists) will be invited to present the work in the Science Board (or other plenary) Symposium to highlight the application of the SEES approach. This travel award is independent of the standard PICES pool of travel support offered to early career scientists.

To apply for this travel award, you must be an early career scientist (*under 38 years of age OR less than 5 years from reception of PhD*) conducting inter-disciplinary research on marine ecosystems.

Selections will be made based on a (a) submitted abstract and (b) brief description (~1 page) of the proposed SEES approach submitted online (www.pices.int) by the Annual Meeting abstract deadline.

FUTURE SSC Endnote 4

Proposal for a 2020 Inter-sessional meeting and Workshop on “(P)ICES in the UN Decade of Ocean Science”

FUTURE SSC has met inter-sessionally for the past four years, for a 2- to 3-day meeting permitting significant progress to be made in developing products and addressing our terms of reference. We request an inter-sessional combined business meeting and workshop in spring 2020 in order to make progress on several activities:

1. Continued planning for the next phase of FUTURE and PICES integrative science (ToR 8)
2. Finalize draft revision of FUTURE Science and Implementation Plans
3. Prepare draft roadmap for FUTURE/PICES relationship to UN Ocean Decade
4. Prepare SSC video on FUTURE and the UN Ocean Decade
5. Finalize FUTURE Product Matrix and dissemination plan
6. Planning for activities at PICES-2020

We propose a 3-day meeting at a time and location to be determined: a 1-day FUTURE SSC business meeting and a 2-day Workshop on “(P)ICES in the UN Decade of Ocean Science”, with participation by

FUTURE SSC, other PICES members, ECS, and ICES representatives. The target is 20–25 participants for the workshop. The meeting could occur in conjunction with, and just prior to, the ISB-2020. However, we would consider meeting separately prior to ISB-2020 at a central location that would be optimal for workshop participation. Costs could be covered through FUTURE budget.

FUTURE SSC Endnote 5

Proposal for FUTURE activities at PICES-2020

FUTURE SSC proposes several activities at the 2020 Annual Meeting in Qingdao, China:

1. One-day (8 hr) business meeting(s)
2. Two FUTURE oral presentations at S1:
 - a. Early Career Awardee on SEES approach
 - b. Overview of UN Ocean Decade
3. Plenary discussion session on PICES' role in UN Ocean Decade (Tuesday am, 1.5 hr)
Workshop on “*The social-ecological-environmental dynamics of climate extremes in Pacific coastal systems*”; jointly with WG 36, WG 40, WG 41 (see below).

**Proposal for a Workshop on
“*The social-ecological-environmental dynamics of climate extremes in Pacific coastal systems*”
at PICES-2020**

Convenors: Jennifer Jackson (Canada); Tetjana Ross (Canada); Tom Okey (USA); Emanuele DI Lorenzo (USA); Thomas Therriault (Canada)

Co-sponsor: Ocean Networks Canada

Duration: 2 days

Invited speakers: TBD

Over the last 5–10 years the North Pacific has experienced a sequence of extreme events associated with the consecutive occurrence of land and marine heatwaves, acidification and hypoxia events, and tropical storms. While there is a growing level of certainty that these extremes will become more frequent and intensify, their impacts on the social-ecological-environmental dynamics of coastal communities around the Pacific rim remain uncertain. Yet these communities are most vulnerable and many aim to develop and implement effective resilient and adaptation strategies. In 2019, the FUTURE science program published a Social-Ecological-Environmental System (SEES) framework to address climate change impacts in the North Pacific. Building on this framework, and recognizing how this framework is useful to understand, predict, and plan the response coastal communities to effects of ocean climate extremes, we propose a workshop in order whose goals are two-fold. The first goal is to gain broader understanding of the physical, biological, and chemical processes impacted by marine heatwaves in coastal regions. The second goal is to work towards applying the SEES framework to the development of the adaptation strategies in coastal communities. The specific objectives and components of this workshop are: 1) Review current progress on understanding and modeling the SEES dynamics in coastal systems around the Pacific rim. (Invited Keynotes and Contributed Talks, Day 1); 2) Develop case studies that use the SEES narrative approach developed by FUTURE to understand and describe the impact of selected coastal extremes. (*e.g.*, 2019 marine heatwave in Alaska, 2019 tropical storm in Japan, ocean acidification extremes, strong hypoxia events, and others). (Four breakout group discussion and reporting, one group per case study, Day 1); 3) Explore technical advances that allow the collection and modeling of SEES data (*e.g.*, LEO Network, machine learning approaches, mathematical modeling of systems maps, data informatics, *etc.*) to understand and predict the response of coastal SEES to extreme events and climate variability. (Invited

Technical Talks and Presentations, Day 2); 4) Draft Terms of References (TORs) for a PICES Working Group on Climate Extremes and Coastal Social-Ecological-Environmental Systems (WG-SEES) (Group discussion, Day 2).

FUTURE SSC Endnote 6

FUTURE SSC requests/recommendations to Science Board

Recommendations

- PICES create a consistent definition of Early Career Scientist;
- PICES create an Early Career Scientist “orientation” page on www.pices.int;
- PICES develop a social media presence (FUTURE (W1) on “*Learn to effectively communicate your science*” recommendation); could be ToR for proposed Early Career Scientist expert group;
- PICES hold annual science communication workshops, targeted to host nation (W1 recommendation).

Requests

- Support for 2020 Inter-sessional FUTURE SSC 3-day business meeting and workshop (FUTURE budget);
- Support for WG 36 1-year extension;
- Support for FUTURE SSC expert group proposal recommendations;
- Support for FUTURE Early Career Scientist Award;
- Confirmation of direction of FUTURE Science and Implementation Plans (including orientation to UN Ocean Decade);
- Support for PICES-2020 FUTURE SSC activities [S1 talks; FUTURE Workshop; FUTURE Plenary Discussion].

FUTURE SSC Endnote 7

FUTURE SSC 2019–2020 Action Plan

- Submit FUTURE SSC Annual Meeting report to Secretariat [Chairs; **NOV 2019**]
- Contribute to Joint ICES/PICES Strategic Document on UN Ocean Decade [Chairs, Manu; **DEC 2019**]
- Review NPESR3 synthesis chapter [All; **FEB 2020**]
- Progress on 2021 Open Science Meeting [Chairs; **JAN-JUN 2020**]
- 2020 Inter-Sessional SSC Business Meeting & Workshop [All; **APR 2020**]
- Complete FUTURE *Phase II* Final Report [All; **APR 2020**]
- Complete FUTURE *Phase III* Science and Implementation Plan revisions [All; **APR 2020**]
- Finalize FUTURE product matrix [All; **APR 2020**]
- Disseminate FUTURE product matrix for edits, plans for objectives [Chairs; **MAY-JUN 2020**]
- 2020 PICES Annual Meeting [All; **OCT 2020**]
- Business Meetings / S1 talks / Workshop / Plenary Discussion
- 2021 Inter-Sessional and PICES Annual Meeting session and workshop proposals [All; **OCT 2020**]