IMBeR REPORTING FORM

Please return completed form to john.claydon@hi.no by 30th April.

REPORTING PERIOD:

What you have done since your last report submitted for the SSC meeting in Brest, June 2019

Past reports can be found at the following link:

Reports submitted for Brest SSC meeting 2019 (Google Drive folder)

Thank you.

Ecosystem Studies of the Subarctic and Arctic Seas (ESSAS)



Authors:

Franz Mueter (University of Alaska, USA) Naomi Harada (Japan Agency for Marine-Earth Science and Technology, Japan) Benjamin Planque (Institute of Marine Research, Norway)

1. Ongoing activities, in line with the IMBeR Grand and Innovation Challenges (Among other uses, information will be used to update the Grand Challenge Factsheets)

1.a. Grand Challenge I

Understanding and quantifying the state and variability of marine ecosystems

Understanding variability in high-latitude marine ecosystems in response to climate variability and change is a central goal of ESSAS. A major initiative by ESSAS to further this goal was the Resilience and Adaptive Capacity of Arctic marine ecosystems (RACArctic) project, which was supported by the Belmont Forum. The project has wrapped up and is culminating in a special issue with four synthesis papers to be published in the ICES Journal of Marine Science.

A number of national programs endorsed by ESSAS monitor marine ecosystems and conduct research in both the Pacific Arctic and Atlantic Arctic, in particular the northern Bering Sea / Chukchi Sea (Japan, USA, Korea), the Barents Sea / Fram Strait (Norway, Russia), the waters around Iceland, and the Northwest Atlantic (Canada, Greenland). Planning for 2020 field work for many of these programs had been underway prior to the COVID-19 pandemic but many of the projects are on hold and field work in 2020 is likely to be scaled back substantially.

To foster a better understanding of high-latitude changes and their consequences for humans, ESSAS had been planning an Annual Meeting in Sapporo, Japan, in June 2020 under the theme of *"Linking past and present marine ecosystems to inform future fisheries and aquaculture"*. A total of 47

abstracts were submitted by the deadline in early 2020, but the meeting was postponed due to the COVID-19 pandemic.

1.b. Grand Challenge II Improving scenarios, predictions and projections of future ocean-human systems at multiple scales

As part of the RACArctic project (see 1a), we have focused on developing plausible scenarios for anticipated changes in high-latitude marine ecosystems, and in particular its consequences for fish populations and fisheries, based on a review of available literature, including qualitative predictions and available projections. Three manuscripts are being prepared for submission in June 2020, as well as an informational sheet for stakeholders.

1.c. Grand Challenge III

Improving and achieving sustainable ocean governance

One of three RACArctic synthesis papers will assess the ability of current management structures in the Pacific and Atlantic Arctic to address challenges associated with the effects of climate change on marine systems.

1.d. Innovation Challenge 1

To enhance understanding of the role of metabolic diversity and evolution in marine biogeochemical cycling and ocean ecosystem processes

N/A

1.e. Innovation Challenge 2

To contribute to the development of a global ecosystem observational and modelling network that provides essential ocean variables (EOVs) and to improve marine data and information management

ESSAS-endorsed national projects provide observations of EOVs in high-latitude marine ecosystems. For example, the Arctic Marine Biological Observation Network (AMBON), an ESSAS endorsed project, is developing a long-term observing program in the Chukchi Sea to monitor EOVs and biodiversity at all trophic levels, from microbes to whales. Several Japanese programs routinely contribute to sampling standard transect lines in the northern Bering Sea and Chukchi Sea that together form the 'Distributed Biological Observatory'.

Former ESSAS co-chair S.-I. Saitoh and current co-chair F. Mueter participated in workshops on the development of an 'Integrated Ecosystem Assessments (IEA)' for the Central Arctic Ocean, and several AMBON researchers took part in a preliminary meeting on setting up a working group for an IEA for the Chukchi Sea. Co-chair B. Planque is involved in IEAs for the Norwegian and Barents seas.

1.f. Innovation Challenge 3

To advance understanding of ecological feedbacks in the Earth System

1.g. Innovation Challenge 4

To advance and improve the use of social science data for ocean management, decision making and policy development

Alan Haynie (NOAA, USA), chair of the working group on Human Dimensions, continues to be active at the national and international levels to develop better approaches to using economic data for supporting decision making in fishery management. Activities include:

- Participation in the Climate Fisheries Initiative, which is working to plan how NOAA and partners couple ocean modeling and fisheries management over the coming decade. Alan's experiences in ESSAS and RACARctic were valuable experiences for his contributions in this effort.
- Co-PI of the Alaska Climate Integrated Modeling (ACLIM) Project, an effort that partners NOAA and university partners to make fisheries management in the North Pacific "climate ready." ESSAS and the IMBER Open Science meetings have been valuable contributors to this work

2. Selected highlights

2.a. Selected scientific highlights since last report (1-3) Last report was submitted to Brest SSC meeting, June 2019

A major science highlight from the marine systems of both the Pacific Arctic and the Atlantic Arctic continues to be the increasing 'Borealization' of the Arctic, as evident in the northward expansion of boreal species into Arctic regions, including zooplankton, fish and mammals. These shifts were particularly stark in the Pacific Arctic, where a key Arctic fish species, the polar cod (*Boreogadus saida*) has retreated northward (e.g. Marsh et al. 2020, see section 2.b below) as larger, commercial species such as Pacific cod (*Gadus macrocephalus*) and walleye pollock (*G. theragrammus*) have shifted the center of their distribution into the northern Bering Sea.

2.b. Publications since last report

Please add all publications since last report to the table below (see notes for details on "Class" and "Activity" fields).

Publication with DOI	Class 1, 2, 3	Activity*
LeBlanc, M., Geoffroy, M., Bouchard, C., Gauthier, S., Majewski, A., Reist, J.D., Fortier, L., 2019. Pelagic production and the recruitment of juvenile polar cod Boreogadus saida in Canadian Arctic seas. Polar Biol. 10.1007/s00300-019-02565-6	<mark>1</mark>	ESSAS Annual Meeting
Eriksen, E., Huserbråten, M., Gjøsæter, H., Vikebø, F., Albretsen, J., 2019. Polar cod egg and larval drift patterns in the Svalbard archipelago. Polar Biol. 10.1007/s00300-019-02549-6	<mark>1</mark>	ESSAS Annual Meeting
Marsh, J.M., Mueter, F.J., Quinn, T.J., 2019. Environmental and biological influences on the distribution and population dynamics of polar cod (<i>Boreogadus saida</i>) in the US Chukchi Sea. Polar Biol. 10.1007/s00300-019-02561-w	1	ESSAS Annual Meeting

Marsh, J.M., Mueter, F.J., 2019. Influences of temperature, predators, and competitors on polar cod (<i>Boreogadus saida</i>) at the southern margin of their distribution. Polar Biol. 10.1007/s00300-019-02575-4	1	ESSAS Annual Meeting
Smé, N.A., Lyon, S., Mueter, F., Brykov, V., Sakurai, Y., Gharrett, A.J., 2019. Examination of saffron cod Eleginus gracilis (Tilesius 1810) population genetic structure. Polar Biol. 10.1007/s00300-019-02601-5	<mark>1</mark>	ESSAS Annual Meeting
Gjøsæter, H., Huserbråten, M., Vikebø, F., Eriksen, E., 2020. Key processes regulating the early life history of Barents Sea polar cod. Polar Biol. 10.1007/s00300-020-02656-9	1	ESSAS Annual Meeting
Forster, C.E., Norcross, B.L., Mueter, F.J., Logerwell, E.A., Seitz, A.C., 2020. Spatial patterns, environmental correlates, and potential seasonal migration triangle of polar cod (Boreogadus saida) distribution in the Chukchi and Beaufort seas. Polar Biol. 10.1007/s00300-020-02631-4	1	ESSAS Annual Meeting
Copeman, L., Spencer, M., Heintz, R., Vollenweider, J., Sremba, A., Helser, T., Logerwell, L., Sousa, L., Danielson, S., Pinchuk, A.I., Laurel, B., 2020. Ontogenetic patterns in lipid and fatty acid biomarkers of juvenile polar cod (Boreogadus saida) and saffron cod (Eleginus gracilis) from across the Alaska Arctic. Polar Biol. 10.1007/s00300-020-02648-9	1	ESSAS Annual Meeting
Bouchard, C., Fortier, L., 2020. The importance of Calanus glacialis for the feeding success of young polar cod: a circumpolar synthesis. Polar Biol. 10.1007/s00300-020-02643-0	<mark>1</mark>	ESSAS Annual Meeting
Spencer, M.L., Vestfals, C.D., Mueter, F.J., Laurel, B.J., 2020. Ontogenetic changes in the buoyancy and salinity tolerance of eggs and larvae of polar cod (Boreogadus saida) and other gadids. Polar Biol. 10.1007/s00300-020-02620-7	1	ESSAS Annual Meeting
Liu, Y., Tian, Y., Saitoh, SI., Alabia, I. D., and Mochizuki, KI., (2020) Impact of Climate Extremes on Suitability Dynamics for Japanese Scallop Aquaculture in Shandong, China and Funka Bay, Japan, Sustainability 2020, 12, 833; doi:10.3390/su12030833	2	
Alabia, I. D., Saitoh, SI., Igarashi, H., Ishikawa, Y., and Imamura, Y., (2020) Spatial Habitat Shifts of Oceanic Cephalopod (Ommastrephes bartramii) in Oscillating Climate, Remote Sensing, 12(3), 521; doi: 10.3390/rs12030521	2	
Waga, H., T. Hirawake, A. Fujiwara, J. M. Grebmeier, S-I. Saitoh (2019) Impact of spatiotemporal variability in phytoplankton size structure on benthic macrofaunal distribution in the Pacific Arcitc. Deep-Sea Research II, 162, 114-126. doi: 10.1016/j.dsr2.2018.10.008	<mark>3</mark>	
Abe, H., M. Sampei, T. Hirawake, H. Waga, S. Nishino, A. Ooki (2019) Sediment-associated phytoplankton release from the seafloor in response to wind-induced barotropic currents in the Bering Strait. Frontiers in Marine Science, 6, 97. doi: 10.3389/fmars.2019.00097	<mark>3</mark>	
Yamashita, Y., Yagi, Y., Ueno, H., Ooki, A., Hirawake, T., 2019, Characterization of the water masses in the shelf region of the Bering and Chukchi Seas with fluorescent organic matter, Journal of Geophysical Research: Oceans 124, 7545-7556, doi: 10.1029/2019JC015476	3	
Waga, H., T. Hirawake, J. M. Grebmeier (2020) Recent change in benthic macrofaunal community composition in relation to physical forcing in the Pacific Arctic. Polar Biology, 43, 285-294. doi: 10.1007/s00300-020-02632-3	3	
Waga, H., T. Hirawake (2020) Changing occurrences of fall blooms associated with variations in phytoplankton size structure in the Pacific Arctic. Frontiers in Marine Science, 7, 209. doi:10.3389/fmars.2020.00209	<mark>3</mark>	

*If appropriate, please list the IMBeR activity through / by / from / during which the publication arose

****<u>Notes on publications</u>****

Publications are logged in the IMBeR Zotero library which is publicly accessible online - https://www.zotero.org/groups/2448334/imber_library_2/library

[Due to space limitations, publications from 1999-2018 are in a separate Zotero library - https://www.zotero.org/groups/38770/imber_library_1/library]

Publications are categorised by "Class" and linked to "Activities":

<u>Class 1 publications</u> are specifically generated through/by/from/during <u>IMBeR activities</u> - for example, arising from IMBIZOs and IMBeR conferences such as the IMBeR open science meeting and the IMBeR CJK symposia and from the activities of the working groups, regional programmes and the SPIS scoping teams.

<u>Class 2 publications</u> are on topics relevant to the IMBeR Science Plan that benefitted from some interaction with IMBeR or <u>IMBeR activities</u>, for example by IMBeR symposium attendees, past and present SSC members, working group, regional programme and endorsed project members, or national contacts.

<u>Class 3 publications</u> are on topics relevant to the IMBeR Science Plan but for which there is no direct link to or benefit from an IMBeR activity. These might include publications by SSC members, working group, regional programme or endorsed project members or members of the IMBeR international community that were written as part of the normal scientific activity of the authors and would have occurred irrespective of IMBeR's existence. You can report Class 3 publications, but they will no longer be logged in the IMBeR database.

[See https://drive.google.com/open?id=10QWn41KJvQ-LyWJlkiYnc5qZ2IuNQOrg for further information on "What is an IMBeR publication?".]

<u>Why list 'Class' and 'Activity'?</u> This helps us to declare authentically which publications IMBeR has helped to generate, and it makes it easier for us to demonstrate the value of the Regional Programmes, the Working Groups, and IMBeR in general, and it helps us to justify support for IMBeR activities when we can list tangible outputs.

2.c. Events, Meetings, and Workshops

List all international and national events, meetings and workshops. Describe the level of participation: e.g. chairing session/workshop, organising meeting. Include Regional Programme / Working Group committee meetings and workshops.

Workshop W7 (PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Third)), coconvened by Sei-Ichi Saitoh at the PICES 2019 Annual Meeting, Victoria, Canada, October 27, 2019. More details are available at https://www.arc.hokudai.ac.jp/en/28th-pices-annual-meeting/

Workshop W17 (BIO workshop: Scoping an IEA of the Northern Bering-Chukchi Seas LME) at the PICES 2019 Annual Meeting. Co-Chair Franz Mueter participated in the meeting as representative of ESSAS and two ESSAS endorsed projects.

5th WGICA (The ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment for the Central Arctic Ocean) held an online (virtual) workshop on April 27-29, 2020, co-convened by Sei-Ichi Saitoh. More details are available at https://www.arc.hokudai.ac.jp/en/5th-wgica/

3. International collaboration and links

ESSAS members are based in countries around the circumpolar North and have established working relationships among agencies and institutions within and among these countries. ESSAS Annual Science Meetings, which are the primary means of information exchange and establishing collaborations, are typically organized by one of the countries and institutions listed below, but may involve participants from many other organizations.

- Japan: Arctic Climate Centre, Hokkaido University, Sapporo, Dr. Sei-Ichi Saitoh, Dr. Irene Alabia; Graduate School of Fisheries Sciences at Hokkaido University in Hakodate, Dr. Toru Hirawake; Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokosuka, Dr. Naomi Harada.
- Korea: Korea Polar Research Institute (KOPRI), Incheon, South Korea, Dr. Hyun-Cheol Kim.
- <u>USA</u>: University of Alaska, Fairbanks, Dr. Franz Mueter; University of Washington, Seattle, Washington, Dr. George Hunt and Dr. Ben Fitzhugh; NOAA, Dr. Alan Haynie, Dr. Benjamin Laurel.
- <u>Canada</u>: Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Dr. Kumiko Azetsu-Scott.
- <u>Greenland</u>: Greenland Institute of Natural Resources (GNIR), Nuuk, Dr. Caroline Bouchard.
- <u>Norway</u>: Institute of Marine Research, Bergen, Dr. Ken Drinkwater; Institute of Marine Research, Tromsø, Dr. Benjamin Planque; Arctic University of Norway, Tromsø, Dr. Arne Eide

4. Input to management and policy (Add anything that is not covered under "1.c. Grand Challenge III")

ESSAS members Franz Mueter and George Hunt serve on the Scientific and Statistical Committee of the North Pacific Fishery Management Council, directly providing advice to fishery managers, including the setting of biological catch limits. The Council meets five times each year to review stock assessment, regulatory analyses, and other analyses in support of fishery management. Other SSC members provide advice to fishery managers in Japan (Sei-ichi Saitoh), Iceland (Olafur Astthorsson) or Norway (Benjamin Planque).

5. Education and outreach *No activities in reporting period*

6.a. Activities and Outreach (Convening sessions, meetings, etc) and how they link to the Challenges

ESSAS Activities, in particular the Annual Meeting, are currently on hold, but we anticipate to reschedule the planned 2020 Annual Meeting sometime in 2021.

6.c. Upcoming papers (Community-Position-Review-etc)

Results from RACArctic will be submitted to the ICES Journal of Marine Science as a series of three articles focusing on (1) changes in the climate - Arctic Ocean system and in the biogeochemistry of high-latitude seas, (2) the responses of biological communities in Subarctic and Arctic marine ecosystems to these changes, and (3) the ability of fishery management systems to adapt to and prepare for these changes.

7. Funding

7.a. Funding from external sources

We obtained \$7000 in funding from PICES for Annual Meeting support. We hope that the support will carry over once we are able to re-schedule the meeting. Website support is provided by the Hokkaido University Arctic Research Center.

7.b. Funding proposals in progress or planned

None at present

7.c. Funding requested from IMBeR for 2019-2020 *Include a brief budget and justify requests.*

Our goal for this coming year is to hold a successful Annual Science Meeting, which will be held in Sapporo, Japan, sometime in 2021 as this year's Sapporo meeting had to be canceled due to COVID-19. While most participants are self-funded, several ESSAS SSC members have little or no support from their home institutions or research grants to attend these meeting. Our primary request if therefore for travel support to help these members attend the Annual Science Meeting.

Based on recent years, we anticipate the following needs in support of the 2021 Annual Science Meeting in Sapporo, Japan.

Travel to 2021 Annual Science Meeting:

K. Azetsu-Scott, Canada (SSC)	US \$ 2,000
C. Bouchard, Greenland (SSC)	US \$ 3,000
O. Astthorson, Iceland (SSC)	US \$ 2,000
S. Rastrick, Norway (WG chair)	US\$2,500
B. Planque, Norway (SSC co-chair)	US \$ 1,500
G. Hunt, USA (SSC)	US \$ 2,500
F. Mueter (SSC Co-Chair)	US \$ 2,500
Total requested	US\$16,000

Assuming funds from the previous year can be carried over, we request additional funds in the amount of about \$8,000 for 2020/2021

8. Changes to Organisational Structure (e.g. SSC) of RP / WG *None*

9. Images / Figures

Franz Mueter submitted some images for the website to Lisa Maddison

10. Update on Action Items from Brest and December virtual SSC meetings Please update the table of Action Items found as a Google sheet at https://docs.google.com/spreadsheets/d/1aUiDjwgJA8lygwdHcjH2S_Xw_rOenc2Gk1eHePtdD QI/edit?usp=sharing

- 11. Anything not covered above *N/A*
- 12. How to improve this form *Please give suggestions on how to improve this form and make it better next time.*

This works

13. Appendices

Add appropriate meeting / workshop reports and include URLs (this helps to track where online content is missing)

Appendix 1: Report from ESSAS SSC meeting in Brest, France, in June 2019

Annual Meeting of the Scientific Steering Committee of ESSAS

June 16 & June 18, 2019 Brest, France

The SSC met in conjunction with the IMBER Open Science Conference to hold an abbreviated business meeting on Sunday morning, continued on Tuesday evening, with a focus on determining the scientific focus for the next annual meeting in Sapporo, Japan. The Agenda is appended below. We did not take individual country updates at this meeting, but written reports were solicited prior to the meeting and can be found <u>here</u>. It was noted that Hyun-Cheol Kim, although unable to attend, provided a written report on Korean research activities in the Arctic.

Action Items from both 2018 and new Action Items from this meeting are listed in <u>this</u> <u>spreadsheet</u>.

Meeting Notes:

1. Review of Action Items from last year:

Several Action Items have not been completed and are highlighted in red in the Action Item sheet (defunct IMR website – Ken; Draft TORs for Co-Chairs – Franz; Letter from IMBER office to Toru Hirawake – Ken), others are in progress or done.

2. Budget: Franz presented brief budget summary for 2018 – a full budget will be forthcoming, once Franz gets information from IMBER (Lisa). For 2019, we have \$11,405, which are mostly committed to supporting travel to this meeting.

3. ESSAS membership: No changes. Ken, George, and Sei-Ichi will join us in Sapporo if possible. Olafur will stay on the SSC for at least one more year and will try to recruit a replacement from Iceland. We will continue to recruit for a Russian scientist and for a physical oceanographer to join the SSC. Franz has unsuccessfully contacted several Russian scientists from the Pacific side. Andrey Dolgov (fisheries) from Murmansk was suggested as a possibility.

3. ESSAS Program Office: Since last year's meeting, Franz approached NSF and the US Arctic Research Commission (USARC) about possible support for an ESSAS Program Office. NSF contacts were not encouraging, discussions with USARC are ongoing. Other ideas for program office support were identified, along with individuals to make contact with these groups:

- ARCUS (Franz Fairbanks office)
- PEW, Ocean Conservancy (Franz to contact individuals we know)
- Arctic Council (Benjamin Tromso office)

We also discussed the idea of having a shared program office with other groups to take advantage of existing infrastructure, for example ??

4. Website: Irene Alabia will be able to maintain the website for one more year. Sei-Ichi reported that Toru Hirawake will continue website maintenance after Irene leaves, using support from the next phase of the ARCS program.

5. Working Group reports (see <u>Annual Report Doc</u> for full reports)

We have four active working groups at present.

 PESAS (Ben Fitzhugh, Nicole Misarti) published the first set of papers for a Special Issue in *Quaternary Reports* based on the working group activities over the past 5 years. PESAS papers were presented at the Oceans Past Initiative (<u>https://oceanspast.org/</u>) congress in Bremerhaven, Germany, strengthening connections between the North Atlantic and North Pacific paleoecological communities. Ben Fitzhugh is on the OPI steering committee to plan future Oceans Past activities, including the next congress in Bruges, Belgium, and possibly a congress in Seattle in 2021 or 2022, which could be held back-to-back with an ESSAS meeting if we so desire. There was general support for the idea. Ben also suggested to start linking the work of the paleoecology group to that of the other working groups and to "neo-ecology" more generally (see 20202 Annual Meeting below).

- The AnalogueART working group (Sam Rastrick, Kumiko Azetsu-Scott, Naomi Harada) is organizing a workshop at this meeting, following the SSC meeting, and will provide a written report after the workshop. The group has been active, following up on the initial review paper published in the ICES special issue that emerged from the Tromsø meeting.
- The Bioenergetics WG has been invigorated and broadened its focus to examine early life dynamics of Subarctic & Arctic fishes (primarily gadids) more broadly, and will update ToRs accordingly. The WG held its second workshop at this meeting with 11 presentations. The WG was also active in organizing and contributing to the Arctic Gadid workshop at last year's meeting in Fairbanks and is submitting several papers to the Special Issue.
- The Human Dimensions Group (Alan Haynie) has been an important component of RACArctic and is actively contributing to the development of socio-economic scenarios

6. 2020 Annual Meeting. We discussed the logistics, structure and possible topics for next year's Annual Science Meeting and agreed to hold the meeting immediately following MSEAS on June 1-3 at Hokkaido University in Sapporo, followed by a business meeting on June 4. We also considered the possibility of holding a public event on the evening of May 31.

Two general topics emerged from our discussions:

1. <u>Socio-economic scenarios</u> (Benjamin Planque, Alan Haynie, Mitsutaku Makino?): There was interest in developing socio-economic scenarios for high-latitude marine ecosystems to use in model projections (equivalent to the emissions scenarios widely used in projections, but considering possible socio-economic pathways). Development of socio-economic scenarios can be much more challenging because of the multiple dimensions of how humans interact with and affect the marine ecosystem (market forces, fishing regulations, marine spatial planning, etc). There was also strong interest in having a stakeholder meeting focused on fisheries and aquaculture issues, which would also be used to seek input on scenarios, but could take many flavors. It will be important to have a clear objective for the meeting. We will try to obtain funding for simultaneous translation for the workshop. Some ideas for seeking funds for translations were: IMBER (Franz to ask during IMBER SSC meeting), North Pacific Research Board (Franz will ask), NSF Int'l program (George?), PICES (Franz will ask at October meeting).

<u>2. Multi-WG workshop</u> (Ben Fitzhugh, Nicole Misarti, Samuel Rastrick, Ben Laurel): Ben suggested, and the SSC supported, a workshop to bring together the pale-ecology group with other WGs to explore how paleo-ecology can inform 'neo-ecology' and vice versa. This could be a 'hands-on' workshop to discuss how information from the past and present can be linked to inform the future and / or could feature some selected / solicited presentations as a basis for discussions. One initial goal would be to develop a shared vocabulary.

We discussed an overall theme for the working group and agreed to "Linking past and present marine ecosystems to inform future fisheries and aquaculture".

A <u>draft program</u> was developed by our Japanese hosts and we had some initial discussions about the structure of the workshops / sessions. Please send suggestions on the program to Naomi Harada by June 30, 2019.

ESSAS 2019 SSC Meeting Agenda (Le Quartz Conference Center, Petite Gallerie)

Sunday 16 June, 2019 (continue Tue evening as needed)

9:00-12:30 Review and updates

Welcome and Logistics	Franz
Adoption of Agenda	Franz
• Follow up on <u>2018 Action Items</u>	All
• Update on IMBER & Future Earth	Ken/Franz
ESSAS Budget & Funding	Franz
• Website	Irene
• SSC membership	All
• National Program Updates (See <u>Annual Report 2019</u>).	
• Brief verbal reports as needed	
• Working Group Updates (See <u>Annual Report 2019</u>).	
 Brief verbal reports as needed 	
International Program Updates	
• RACArctic	Franz
10:30 – 11:00 Coffee Break	
11:00 – 12:30 Planning and outlook	
• 2020 ESSAS meeting	Naomi/Toru
 Date: June 15-17, 2020 (following MSEAS) 	
• Venue: Creative Research Institute, Sapporo campus, Hok	kaido University
 Program: Sessions / workshops 	
• Future activities 1: Working Group plans	All
 2020 meeting 	
• Other activities	
• Future activities 2: Sessions / workshops in 2019/2020	All

• <u>2019 ICES Annual Science Conference</u> (Gothenburg, Sweden)

Franz

- <u>2019 PICES Annual Meeting</u> (Victoria, Canada)
- o <u>2019 Ocean Observing Conference</u> (Honolulu, HI, USA)
- o <u>MSEAS 2020 Symposium</u> (Yokohama, Japan)
- Other meetings?
- Wrap Up
 - Recommendations
 - Action Items