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Canada		
Dr. Jennifer L. Boldt (MONITOR, WG-36, WG-43) *Pacific Biological Station* Fisheries and Oceans Canada	**Prof. Francis Juanes (WG-43)** *Department of Biology* University of Victoria	**Dr. Chris Rooper (WG-43)** *Pacific Biological Station* Fisheries and Oceans Canada

Japan			
Dr. Sachihiko Itoh (WG-38, WG-43) *Atmosphere and Ocean Research Institute* The University of Tokyo	**Dr. Toshihide Kitakado (WG-43)** **represents NPFC in WG-43** *Department of Marine Biosciences* Tokyo University of Marine Science and Technology	**Dr. Haruka Nishikawa (WG-43)** *Research Institute for Value-Added-Information Generation* Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	**Dr. Motomitsu Takahashi (BIO, S-CCME, WG-43)** *Pelagic Fish Resources Division, Fisheries Stock Assessment Center, Fisheries Resources Institute* Japan Fisheries Research and Education Agency (FRA)
Prof. Akinori Takasuka (WG-40, WG-43) **WG-43 PICES Co-Chair** *Graduate School of Agricultural and Life Sciences* The University of Tokyo	**Dr. Shinichiro Nakayama (WG-43)** *Highly Migratory Resources Division, Fisheries Stock Assessment Center, Fisheries Resources Institute* Japan Fisheries Research and Education Agency (FRA)		

China			
Dr. Fei Chai (WG-40, WG-43) *Second Institute of Oceanography* Ministry of Natural Resources	**Prof. Xianshi Jin (FIS, SB, WG-43)** **FIS Chair** *Yellow Sea Fisheries Research Institute* Chinese Academy of Fishery Science (CAFS)	**Prof. Yongjun Tian (WG-43)** *College of Fisheries* Ocean University of China	**Prof. Hui Zhang (WG-43)** Institute of Oceanology *Chinese Academy of Sciences (CAS)*
Dr. Kui Zhang (WG-43) South China Sea Fisheries Research Institute *Chinese Academy of Fishery Science (CAFS)*			

Korea		
Dr. Sukyung Kang (FIS, FUTURE-SSC, S-CCME, SB, WG-43) **FUTURE-SSC Co-Chair** *Fisheries Resources Management Division* National Institute of Fisheries Science (NIFS)	**Prof. Dohoon Kim (WG-43)** *Marine & Fisheries Business and Economics* Pukyong National University	**Dr. Jung Jin Kim (WG-43)** *Fisheries Resources Management Division* National Institute of Fisheries Science (NIFS)

Russia
Dr. Oleg N. Katugin (FUTURE-SSC, HD, WG-43) represents NPFC in WG-43 *Division for International Scientific Cooperation* Pacific Scientific Research Fisheries Center (TINRO-Center)

United States			
Dr. Matthew Baker (WG-35, WG-43, WG-44) North Pacific Research Board (NPRB)	**Dr. Noelle M. Bowlin (WG-43)** *Fisheries Resources Division, Southwest Fisheries Science Center* National Oceanic and Atmospheric Administration (NOAA)	**Dr. Isaac C. Kaplan (WG-43)** *Ecosystem Science Program, Northwest Fisheries Science Center* National Oceanic and Atmospheric Administration (NOAA)	**Dr. Ryan R. Rykaczewski (CREAMS-AP, FUTURE-SSC, WG-40, WG-43) WG-40 Co-Chair (CLIVAR), WG-43 PICES Co-Chair** *Ecosystem Sciences Division, Pacific Islands Fisheries Science Center* National Oceanic and Atmospheric Administration (NOAA)
Dr. Ric Brodeur *Retired (Fish Ecology Division, Northwest Fisheries Science Center)* National Oceanic and Atmospheric Administration (NOAA)			

Australia

Dr. Jason Everett
School of Mathematics and Physics
The University of Queensland

NPFC

Dr. Alex Zavokokin
Representing the North Pacific Fisheries Commission


Jung Jin Kim
Ryan Rykaczewski (NOAA Fisheries)
Noelle Bowlin
Toshi Kitakado
Akinori Takasuka
Sukyung Kang(NIFS)
motomitsutakahashi
Jennifer Boldt
chris rooper
Alex Zavolokin
Yongjun Tian
Shuyang Ma (OUC)
Jason Everett
Vera Trainer
Francis Juanes
Haruka Nishikawa
Ric Brodeur
Shin-ichiro Nakayama
PICES
PICES Secretariat
Alexander Bych...
Alexander Bychkov
Ric Brodeur
Ric Brodeur
Hui Zhang
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2. Review of WG43 Terms of Reference

1. Review recent progress on understanding how various drivers (environmental / anthropogenic) impact the population dynamics of SPF in different ecosystems and whether and how potential drivers shift with changes in ecosystem state;

2. Create a networking environment for international and multidisciplinary collaboration to foster the establishment of similar study frameworks and comparative analyses of SPF across different social-ecological systems based on updated timeseries data sets of climate indices, environmental factors and tipping points, fisheries biology and ecophysiological information (feeding, growth and survival), and inter-model comparisons;

3. Identify, prioritize, and coordinate research most needed to advance our knowledge and capacity to predict the population dynamics of SPF at both short (seasonal to inter-annual) and long (decadal to centennial) time scales;

4. Provide recommendations for strategies of marine ecosystem monitoring and fisheries management of SPF which will contribute to sustainable ecosystem-based fisheries management, through biophysical, ecosystem and/or socio-economic models;

5. Organize a joint ICES/PICES symposium on SPF, tentatively scheduled for ~~late 2021~~ ~~early 2022~~ late 2022, that builds on the 2017 symposium in Victoria, Canada, and showcases integrative analyses of this working group. Additionally, working group members will propose, coordinate, and convene PICES & ICES topic sessions.

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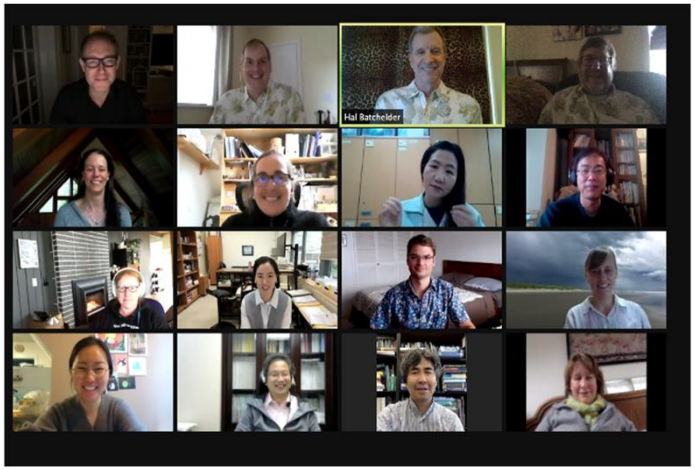
FUTURE Science Program

Forecasting and **U**nderstanding **T**rends, **U**ncertainty and **R**esponses of North Pacific Marine **E**cosystems

Updates – Fall 2021



FUTURE SSC Liaison Report, September 2021

FUTURE Science Program

Forecasting and **U**nderstanding **T**rends, **U**ncertainty and **R**esponses of North Pacific Marine **E**cosystems

- FUTURE SSC Activities 2020-21
  - Product Matrix
  - OSM 2023 Planning
- SG-ECOP Updates
- SG-UNDOS Updates
- WG Proposal on 'Climate Extremes'

FUTURE SSC Liaison Assignments

(Revised 29 April 2021)

	Committee	WG	Section	AP/SG
Jacquelynne King	FIS	WG-45*	S-CCME*	SG-SciCom
Guangshui Na	MEQ	WG-42*	S-HAB	
Fangli Qiao	TCODE*, POC	WG-40	S-CC	CREAMS
Mitsutaku Makino	HD*	WG-41*, WG-44		SG-SciCom*
Tetsuo Fujii	MEQ	WG-45	S-HAB*	
Sukyung Kang	FIS*	WG-48*	S-CCME	
Hanna Na		WG-46		NPCOOS*, SG-ECOP
Oleg Katugin	FIS, HD		S-MBM*	
Vyacheslav Lobanov	MONITOR*			CREAMS*/NPCOOS
Emanuele Di Lorenzo	POC*	WG-40, WG-46*		SG-UNDOS*
Steven Bograd	POC	WG-44*	S-CC*, S-MBM	
Ryan Rykaczewski	BIO*, TCODE	WG-40*, WG-43		
Tom Therriault	MEQ*			NIS*. SG-ECOP*
Jennifer Boldt	MONITOR	WG-43*, WG-47*		
	*Primary liaison members			

FUTURE Phase II → Phase III

1. Momentum developed during FUTURE Phase II to be maintained;
2. Overall objectives & key questions of FUTURE program still relevant and reflective of the needs of PICES integrative science;
3. New Phase III of the FUTURE program will exploit recent accomplishments (SEES approach), leverage & provide leadership to UN Decade for Ocean Science;
4. FUTURE to evaluate Phase II progress towards objectives, determine which objectives cannot be resolved or are now of lower priority, & identify new activities needed to accomplish objectives (Final Report);
5. FUTURE will continue to facilitate trans-disciplinary research and communication, although PICES should maintain traditional disciplinary activities;
6. PICES integrative science will encourage and facilitate participation of early career scientists (e.g. SEES travel award);
7. PICES will enhance inter-sessional & remote expert group activities & cross-WG meetings at Annual Meeting.

FUTURE SSC 2020-21 Activities

- Finalized FUTURE *Phase III* Science & Implementation Plans [**APR 2020**]
- Developed joint ICES-PICES proposal for Study Group on the UN Decade of Ocean Science [**AUG 2020**]
- Virtual FUTURE SSC 2020 Annual Meeting [**OCT 2020**]
- 2021 InterSessional virtual SSC Business Meeting [**APR 2021**]
- Completion of FUTURE Product Matrix [**APR 2021**]
- Progress on FUTURE *Phase II* Final Report [**OCT 2021**]
- Progress on 2023 Open Science Symposium [**OCT 2021**]
- Proposal for Working Group – Climate Extremes [**OCT 2021**]

FUTURE Product Matrix

	What determines an ecosystem's intrinsic resilience and vulnerability to natural and anthropogenic forcing?						How do ecosystems respond to natural and anthropogenic forcing, and how might they change in the future?							How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?				
	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.4	2.5	2.6	2.7	3.1	3.2	3.3	3.4	3.5
PICES Scientific Reports																		
No. 39 Expert Group: SG-HD Mitsutaku Makino and David L. Fluharty (Eds.) 2011. Report of the Study Group on Human Dimensions. PICES Sci. Rep. No. 39, 40 pp.																		x
No. 40 Expert Group: WG-20 Michael G. Foreman and Yasuhiro Yamanaka (Eds.) 2011 Report of Working Group 20 on Evaluations of Climate Change Projections. PICES Sci. Rep. No. 40, 165 pp.	x						x	x	x								x	
No. 41 Stewart M. McKinnell, Enrique Curchitser, Cornelius Groot, Masahide Kaeriyama and Katherine W. Myers PICES Advisory Report on the Decline of Fraser River Sockeye Salmon Oncorhynchus nerka (Steller, 1743) in Relation to Marine Ecology. PICES Sci. Rep. No. 41, 149 pp.	x	x	x					x	x						x			
No. 42 Expert Group: WG-22	x	x					x											

PROGRESS:

Saeseul Kim (Secretariat) has completed a draft!

FUTURE Product Matrix

NEXT STEPS:

- **Request all current Expert Groups map products on FUTURE matrix when preparing final report**
- Put Product Matrix on the FUTURE website
- Add as Appendix to *Phase II* FUTURE final report
- Prepare peer-reviewed manuscript (subgroup formed)
  - Highlights of questions well addressed by FUTURE
  - Gaps in FUTURE science (what and why?)
  - Implications for large-scale science programs

Plans for next FUTURE Open Science Symposium

2nd FUTURE OSM Plan:

1. Aim for **FEB 2023**
2. Aim for **Hawaii** (perhaps Kona again); Jeju, Korea an alternative
3. FUTURE SSC will serve as OSM Organizing Committee; Co-Conveners would be FUTURE SSC Co-Chairs & potential representatives from co-sponsors
4. PICES will be principal sponsor; may seek co-sponsorship from ICES, IOC/WESTPAC, APN, CLIVAR, IMBER
5. Meeting format:
   a. 'Ideation' workshops to create solution roadmaps
   b. ECOP activities and events
   c. Plenary sessions
6. Aim for ~200 participants

Plans for next FUTURE Open Science Symposium

Proposed Draft Agenda:

DAY 1 PM: Initial Gathering, Social Activities, Setting of Meeting Goals

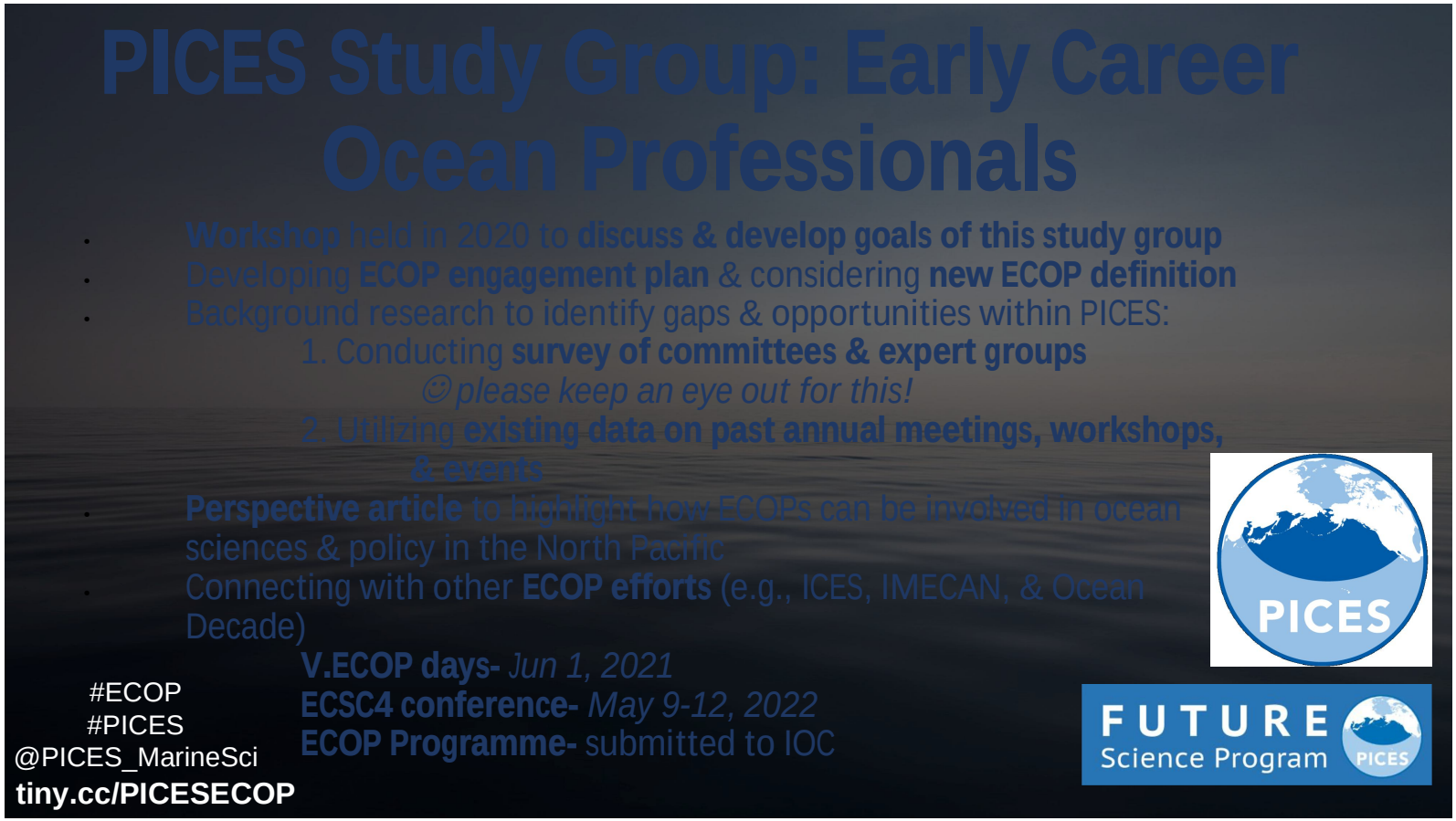
DAYS 2-3: IDEATION WORKSHOPS

DAY 2 AM/PM: Interviews & Talks, Idea Discovery

DAY 3 AM: Group Discussions, Co-Creation

DAY 3 PM: Synthesis, Development of Roadmaps

DAY 4 AM/PM: Public-Facing Hybrid Events (Keynotes, Summaries)

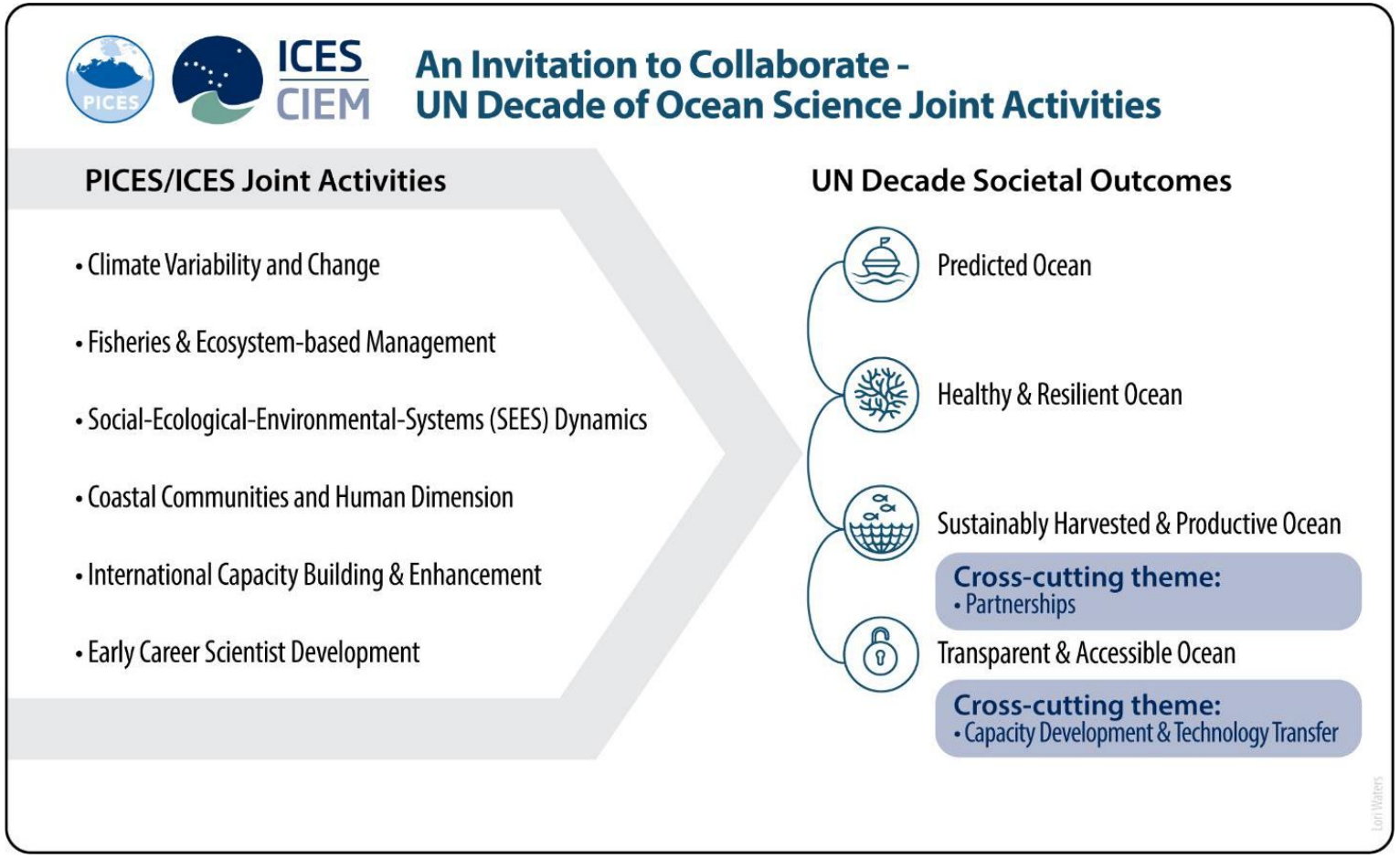

PICES Study Group: Early Career Ocean Professionals
Workshop held in 2020 to discuss & develop goals of this study group
Developing ECOP engagement plan & considering new ECOP definition
Background research to identify gaps & opportunities within PICES:
1. Conducting survey of committees & expert groups
☺please keep an eye out for this!
2. Utilizing existing data on past annual meetings, workshops, & events
Perspective article to highlight how ECOPs can be involved in ocean sciences & policy in the North Pacific
Connecting with other ECOP efforts (e.g., ICES, IMECAN, & Ocean Decade)
V.ECOP days- Jun 1, 2021
ECSC4 conference- May 9-12, 2022
ECOP Programme- submitted to IOC
PICES
FUTURE Science Program
#ECOP
#PICES
@PICES_MarineSci
tiny.cc/PICESECOP

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

PICES

ICES CIEM

FUTURE SSC Liaison Report, September 2021


ICES
CIEM
An Invitation to Collaborate -
UN Decade of Ocean Science Joint Activities
PICES/ICES Joint Activities
• Climate Variability and Change
• Fisheries & Ecosystem-based Management
• Social-Ecological-Environmental-Systems (SEES) Dynamics
• Coastal Communities and Human Dimension
• International Capacity Building & Enhancement
• Early Career Scientist Development
UN Decade Societal Outcomes
Predicted Ocean
Healthy & Resilient Ocean
Sustainably Harvested & Productive Ocean
Cross-cutting theme:
• Partnerships
Transparent & Accessible Ocean
Cross-cutting theme:
• Capacity Development & Technology Transfer

Proposal for a Working Group on
'Climate Extremes and Coastal Impacts in the Pacific'
(WG-Extremes)

Potential Parent Committees: FUTURE, POC, BIO, HD
Potential Term: October 2021 – October 2024

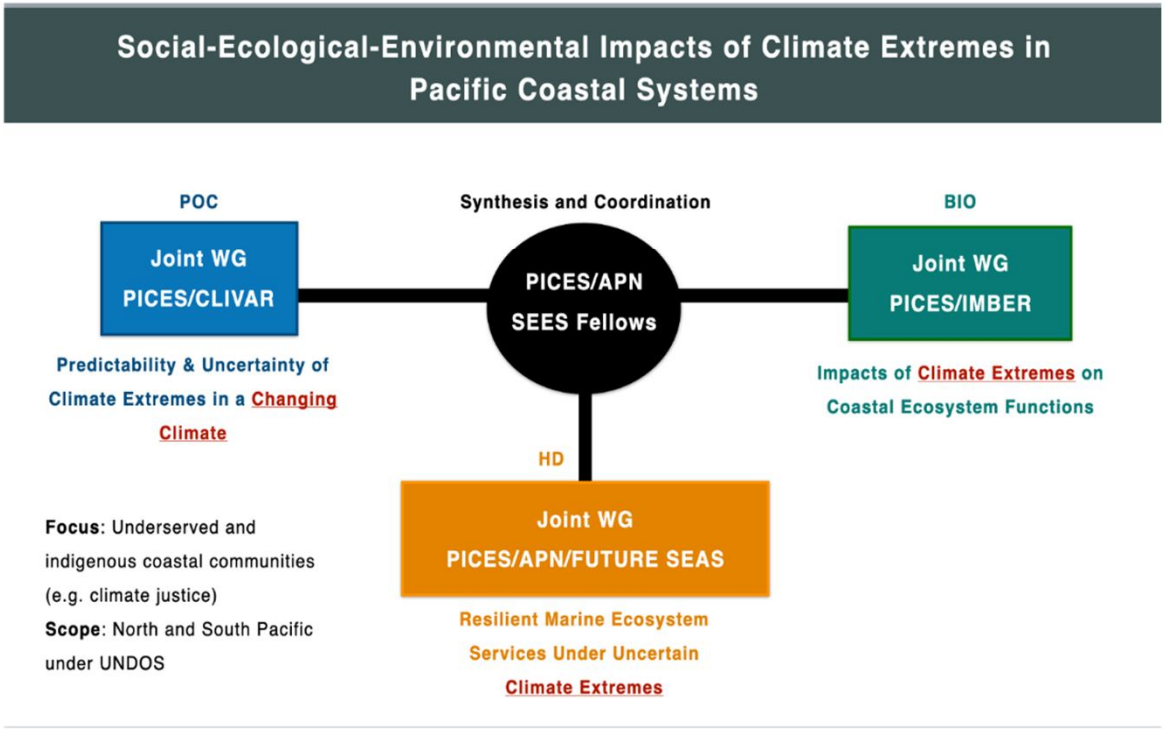
GOALS

(1) Develop a PICES proposal for a Working Group on '*Coastal Impacts of Climate Extremes*' with a focus on understanding the drivers, predictability, and the impacts on coastal communities and marine ecosystem services of climate extremes.
(2) Facilitate partnerships between PICES, APN, CLIVAR and other organizations in the Pacific.
(3) Contribute to PICES activities supporting the UN Decade of Ocean Science for Sustainable Development, including the SMARTNET Program.

(WORKSHOP: 23 June 2021)

Extras

Proposal for a Working Group on
‘Climate Extremes and Coastal Impacts in the Pacific’
(WG-Extremes)



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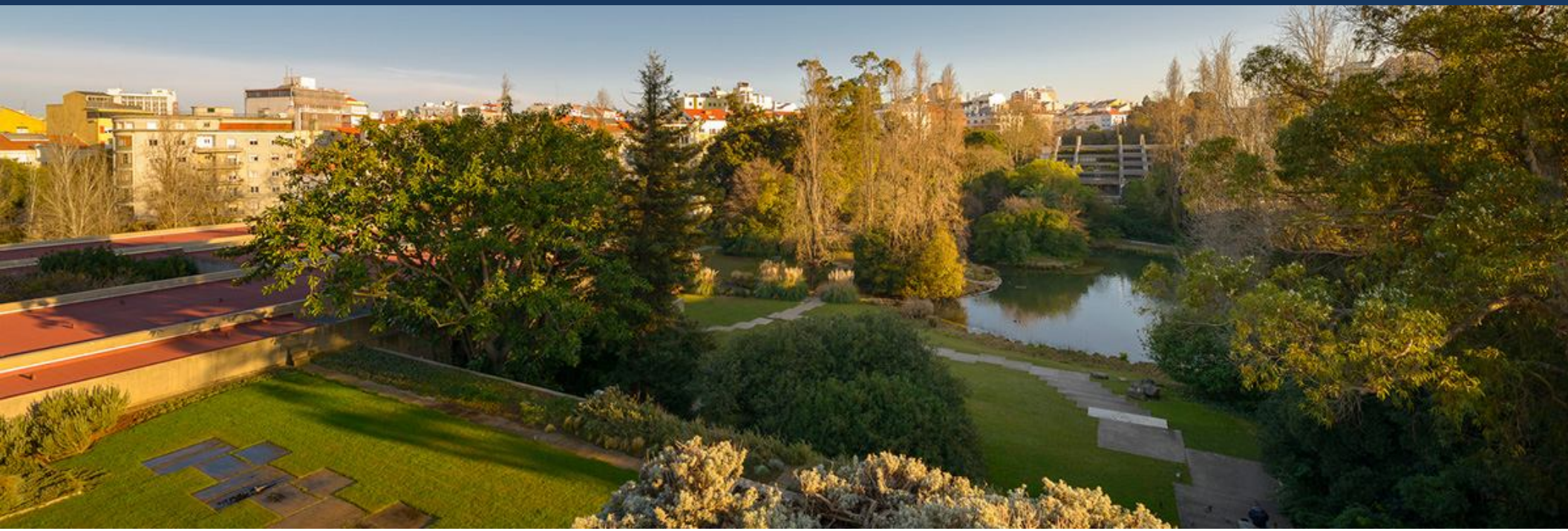
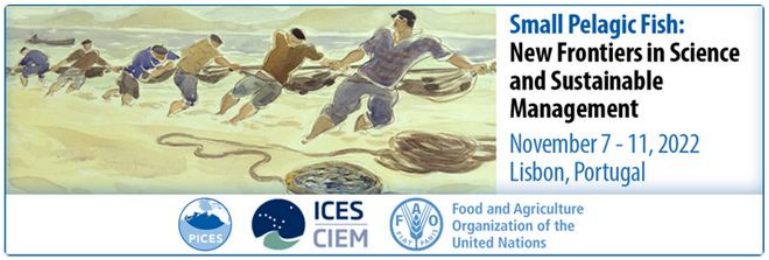
4. Update on the status of the ICES/PICES/FAO International Symposium on SPF



International symposium “Small Pelagic Fish: New Frontiers in Science for Sustainable Management”

~~February 21-24, 2022, Lisbon, Portugal~~
November 7-11, 2022, Lisbon, Portugal

In the heart of Lisbon, the Calouste Gulbenkian Foundation is housed in a modernist architectural complex that includes a museum, an art library, a state-of-the-art auditorium and is surrounded by one of the most emblematic modern gardens of Portugal.



STRUCTURE

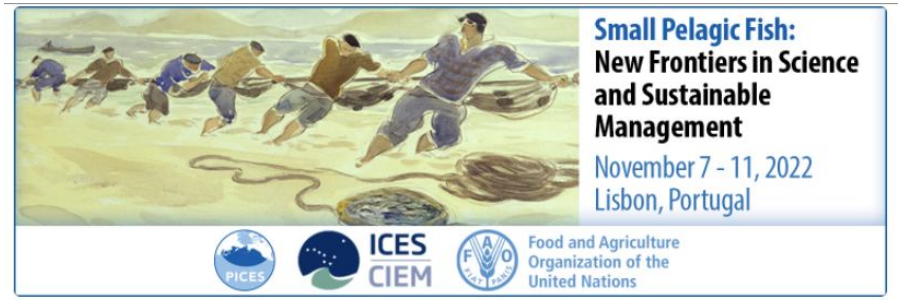
- **Concurrent half-day workshops** proposed by the scientific community scheduled on November 7 (a Monday), immediately **prior to the main 4-day program**;

- **Morning plenary sessions** on November 8-11 to provide **overarching keynote presentations** and to **introduce topics for the concurrent sessions to be convened on the same day to a broader audience, and an afternoon summary plenary session/panel on November 11**;

- **Concurrent topic sessions (starting in the late morning)** on November 8–11; these topic sessions, identified by the Scientific Steering Committee, will include invited and contributed papers selected for oral or poster presentation;

- **Posters on display for the entire symposium** along with a dedicated **evening poster session/reception** on November 8 or 9 when poster presenters are expected to be available to answer questions, **if this would be possible in the post-COVID world**.

Status of the 2022 SPF Symposium



SCOPE

Small pelagic fish (SPF) account for more than 30% by weight of the total landings of capture fisheries around the world. SPF populations of both marine and inland ecosystems are crucial for ensuring global food security. SPF also play an important role in the transfer of energy in food webs through mid-trophic levels, so understanding processes affecting the dynamics of their populations, their role in marine ecosystems and how these shape robust management practices continues to be a high priority. During the last four decades, coordinated, global research efforts (see tab on History of Global Collaboration on SPF) have targeted these and other topics, yielding important comparative analyses and highlighting key gaps in our knowledge. For example, global analyses revealed oscillations in the productivity of SPF populations linked to climate variability on various (seasonal to multi-decadal) scales that have resulted in dramatic consequences for ecological and human communities. The exchange of information and ideas drawn from comparing populations across the globe can be particularly insightful as we seek to improve management strategies.

Substantial scientific progress continues to be made on understanding the drivers and dynamics of SPF in ecosystems across a range of spatial and temporal scales. The integration of numerical models with ever-growing data from monitoring efforts and stock assessments has enabled more comprehensive consideration of hypotheses describing SPF population variability. Additionally, the rapid development of new methods like eDNA, machine learning, and genome analysis to ascertain population structure can offer new insight to long-standing questions. The application of various regional management strategies and approaches to studying coupled social-ecological systems in collaboration with industry and other stakeholders is ripe for comparative research.

The international symposium on "Small Pelagic Fish: New Frontiers in Science for Sustainable Management" will highlight the state-of-the-art in these and other topics related to the ecology and sustainable management of SPF. The symposium complements collaborative research conducted by the joint ICES/PICES Working Group on Small Pelagic Fish and is relevant to the goals of the UN Decade of Ocean Science for Sustainable Development, particularly "to bolster scientific research for a sustainably harvested ocean ensuring the provision of food supply."

This symposium is endorsed by

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

- IMPORTANT NEWS / UPDATES
- Scope
- Global Collaboration on SPF
- Organizers
- Plenary and Invited Speakers
- Symposium Structure
- Scientific Program
- Poster Session
- Schedule
- Book of Abstracts
- Presentations
- Registration
- Registration Summary
- Abstract Submission
- Submitted Abstracts
- Financial Support
- Publication
- Venue

https://meetings.pices.int/meetings/international/2022/pelagic/scope




Special thanks to Susana Garrido!

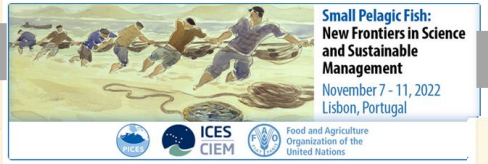
Thanks to the symposium coordinators,
A. Bychkov (PICES) and J. Kellner (ICES)

WGSPF 1st Annual meeting.

Status of the 2022 SPF Symposium

Sessions

Topic Sessions	
Concurrent Topic Sessions every day, following a morning plenary session	
Session 1: Trophodynamic Processes	Act. 1
Session 2: Life Cycle Closure: Advances in Process Understanding	Act. 2+5
Session 3: Understanding Population- and Ecosystem-level Shifts: From Seasonal Timing to Tipping Points	Act. 3
Session 4: Responses to Climate Variability and Change at Decadal to Centennial Time Scales	Act. 4+7
Session 5: Progress in Pelagic Surveys: From Biomass Estimates to Monitoring Ecosystems	Act. 6
Session 6: Reconciling Ecological Roles and Harvest Goals: Development and Testing Management Strategies to Safeguard Marine Ecosystem Services	Act. 7-8
Session 7: Advancing Social-ecological Analyses and Sustainable Policies for Dependent Human Communities	Act. 9-10



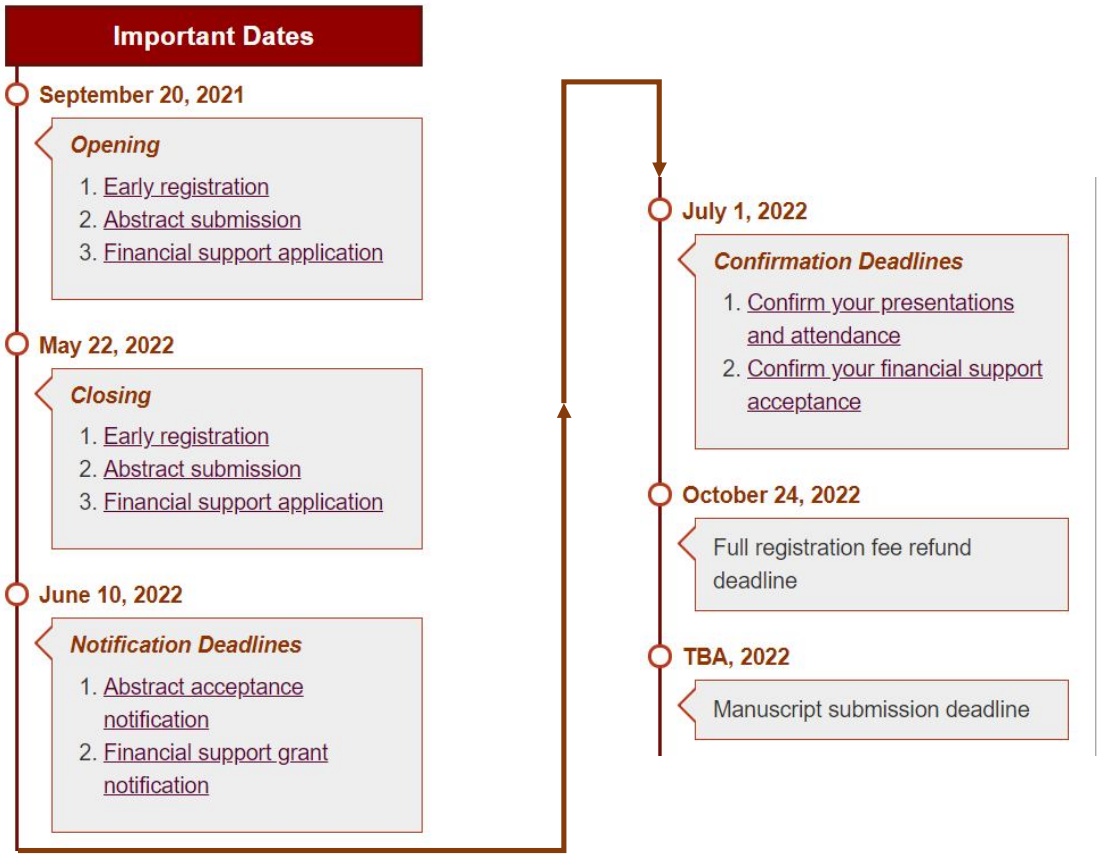
https://meetings.pices.int/meetings/international/2022/pelagic/scope

Workshops

Concurrent Workshops
All workshops will be half-day and held concurrently on November 7
Workshop 1: Application of Genetics to Small Pelagic Fish
Workshop 2: The Devil's in the Details of Using Species Distribution Models to Inform Multispecies and Ecosystem Models
Workshop 3: Small Pelagics for Whom? Challenges and Opportunities for the Equitable Distribution of Nutritional Benefits
Workshop 4: Evaluating Inter-Sectoral Tradeoffs and Community-Level Response to Spatio-Temporal Changes in Forage Distribution and Abundance
Workshop 5: Recent Advances in the Daily Egg Production Method (DEPM): Challenges and Opportunities
Workshop 6: Small Pelagic Fish Reproductive Resilience

WGSPF 1st Annual meeting.

Status of the 2022 SPF Symposium



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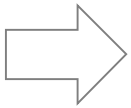
Task Force 1: Ecological Process Knowledge (EPK)

Task Force 2: Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

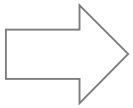
Task Force 3 : Social-Ecological Approaches (SEA)

For each activity, we will use 1/2 slides, compiled by the Co-chairs. Each Task leader to intervene



Activity Main actions/results

All general discussion points are summarized **by Task force at the end of each block if they have been raised by more than one activity.** Otherwise, they are discussed after each activity



Ideas Proponents

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.1 Critical review, evaluation and testing of hypotheses. Leaders: A.Takasuka & M.Peck.

22 members

Objective 1: Literature review to evaluate and test hypotheses related to biology, ecology, and management of SPF.

Objective 2: Providing the ideas of hypotheses to be tested to the other Activity groups.

Main actions/results

1) Setting up key questions as the first step. (a)What hypotheses have been proposed for mechanisms of population dynamics, recruitment, roles in ecosystems, etc. so far?. (b) What are advantages/disadvantages of the existing hypotheses? (c) Any new hypotheses in your mind? (d)How to test the hypotheses? Literature review, modelling approach, and/or meta-analysis? (e) Any other ideas to proceed with Activity 1.

2) Collecting hypotheses to be reviewed and tested from the members. A methodology has been developed, and a table initiated.

3) Structure of a paper proposed.

Task Force 1. General points for WG meeting

Ideas

Activity 1 wants to confirm that the framework and direction of A.1. is OK. Comments?

Activity 1 unsure that it is possible to extend the coverage of hypotheses to management topics.

Some comments made during the meeting--

1. Exploring hypotheses regarding key processes that influence SPF population variability is an effort that is distinct from exploring how environmental information can be incorporated into management.

2. There is no shortage of conceptual hypotheses regarding variability in SPF. However, the *testable* hypotheses are few and far between. We, as a community, should better recognize the distinction between those two types of hypotheses and strive towards testable hypotheses (or at least an outline of the data needed to test some of the currently untestable hypotheses). Akinori responded that yes, this is something that the group is considering and is already incorporated into the table of ideas.

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.2 Life cycle closures– bottlenecks and gaps in knowledge. Leaders: I.Catalán & N.Bowlin.

27 members


The goal of the activity is to analyze spatial processes responsible for life cycle closure. Process-based., IBMS, etc.

Missing the development of initial ideas including comparing processes across systems explaining life-cycle closure (IBMs etc.)

Main actions/results

Discussed many potential topics in the first meetings, but 2 crystallized by now.

1) "Spatiotemporal Variability in Key Life History Processes of SPF: A Global GAP Analysis". (Catalán et al., collaborative). Data being collected and processed.

2) Review paper on Adaptation/SDM across regions/species and how this information may be integrated on the adequate management (Silva et al. Collaborative)

Plus: Theme Session (S2) in the SPF symposium 2022: Life Cycle Closure: Advances in Process Understanding (together with Activity 5)

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.3 Drivers of Spatial Distribution and Phenology in Small Pelagic Fishes. Leaders: R. Asch & M. Moyano

Other activities: Organization of Session 3 ("Understanding Population- and Ecosystem-level Shifts: From Seasonal Timing to Tipping Points") at SPF symposium

Main actions/results

1) Phenology paper (R. Asch et al.; collaborative). Research question: What biotic and abiotic factors influence SPF spawning phenology trends and variability?

2) Species distribution paper (Moyano et al. Collaborative). Research question: How stable are SPF environmental response curves?

3) Research goals, methods, and datasets have been identified for both papers, but data collection and analysis has been delayed from initial plans. The goal is to have data in hand by end of the year and analysis ready by spring 2022.

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.4 Food-web dynamics (links to prey, predators and competitors). Leaders: S. Garrido (ICES) & R. Brodeur (PICES).

27 participants

Main actions/results

Topic 1 - **Testing the wasp-waist hypothesis**, in collaboration with Activity 1. What is the changing role of SPF in food webs?

Topic 2.1 - **Analyzing/Compiling information of temporal and spatial variability of predation pressure**, which can offer some information of natural mortality of SPF (review paper of the predation impact on SPF, maybe a meta-analysis if sufficient data is available).

Topic 2.2 - **Study SPF through predators' diets** (abundances, distributions, is it the fast or slow growers that get eaten?).

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.4 Food-web dynamics (links to prey, predators and competitors). Leaders: S. Garrido (ICES) & R. Brodeur (PICES).

27 participants

Main actions/results

Topic 3: **How do changes in zooplankton affect SPF?** (species biomass composition, size distributions). Oftentimes the focus is on adults, but what about the **larvae**?

Topic 4: **Changes in the flow of energy and organic matter (i.e., trophic transfer efficiencies) through SPF-dominated food webs?**

Topic 5: Is **intraguild predation** a significant factor in SPF population dynamics? What is the **spatial scale of these interactions?** What is the spatial and temporal overlap between predators and prey (potential tools include MARSS, ARIMAS; joint models)?

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.4 Food-web dynamics (links to prey, predators and competitors). Leaders: S. Garrido (ICES) & R. Brodeur (PICES).

27 participants

Main actions/results

- Convenor of the **SPF Symposium. S1. Trophodynamic processes**. Also, **local organizer**.
- **Book** on Coastal Pelagic Foodwebs. Potential chapters already delineated. Co-editors: S. Garrido, C. van der Lingen, Ric Brodeur…

Task Force 1. General points for WG meeting

Ideas

Activity 4: Suggestions on the list of topics?

Activity 4: Book: decide on articipation/chapters/coordinate with other activities.

- Find publisher
- Scheduling

Task Force 1: Ecological Process Knowledge (EPK)

Activity

A.5 Internal and external drivers of growth, reproduction and survival. Leaders: M. Huret, M. Lindegren & F. Berg. 35 people involved



What variability in the life history traits (growth, reproduction, survival) across species and regions ?

What is the relative influence of internal vs. external drivers on this variability ?

Main actions/results

1) Final list of co-leaders and sub-activities:
a)Experimental: Review and analysis of available data on traits and associated exp. Conditions. F. Berg
b)Modelling: mechanistic, bioenergetics. M. Huret. C) Statistical: Meta-analysis. Lindegren.

2) Joint Session S2 at the Symposium (A2+A5). "Life Cycle Closure: Advances in Process Understanding. Presenting results in there

3) Template to fill in data on LH traits

Task Force 1. General points for WG meeting

Ideas	Proponents
Consider mentoring event at Symposium?	A. 3
Consider increasing group visibility online? e.g., short clips from selected members / invited speakers to symposium	A. 3
Some overlap in topics and questions (A5, A2-A3), but this should be an opportunity	A. 5
Explore ways to facilitate data sharing across activities and ICES/PICES groups. Best way?	A.1,2,3,5
To a certain extent, progress is limited by time availability of project leads	A.2,3,5

→ Support from intern(s) or ECRs?

Task Force 2. Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

Activity

A.6. Survey design / monitoring (knowledge from fishers), citizen science. Leads: M. Kloppmann (ICES) & C. Rooper (PICES). 11 ICES+7PICES

Main actions/results

1) Database for SPF surveys (metadata and survey descriptions). It includes. **Survey Table:** Survey type, survey methods, survey target species, life history stages, bycatch SPF, región/área, survey timing, temporal and spatial resolution, time series duration , contact information. **Species Table:** similar information but organized by species captured (can be cross-referenced with the Survey Table). 2020 Meeting Documents\10 Task Forces and Activities\02. Task Force 2 (Activity 6-8)\Activity 6

2) Theme Session (S5) in the SPF symposium 2022: Progress in Pelagic Surveys: From Biomass Estimates to Monitoring Ecosystems

Task Force 2. General points for WG meeting

Ideas

- Ideas for making the database more useful to the other groups would be welcome

- Existing surveys driven by single species stock assessments (índices of abundance-recruitment)
- Under-utilization of data
- Inaccessibility of data
- Difficult to keep important time-series with no economic implications

- “New” technologies could use a bit more standardization-development (not as mature as bongo nets and trawls)

Proponents

A.6-> important for A2,A3+?

A.6

TF 2. Specific comments of activities

Ideas

There are many gaps
- Known surveys that are not included
- Regions that are not well covered
- Species that are not well surveyed

Most information is from NW Pacific and Atlantic
- New round of outreach to PICES members needed
- Southern hemisphere generally under-represented

Progress has been relatively slow
- Attainable goal, but not very exciting

Proponents

A.6

Task Force 2. Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

Activity

A.7. Improving short-term forecasts and/or long-term projections. Leaders: R. Rykaczewski (PICES)& S. Koeningsten (ICES) 16 participants.

Main actions/results

1) Censusing the different efforts underway to offer future forecasts of SPF populations. Several examples are given for the Canary current, California Current, Humboldt Current and Kuroshio Current. From single drivers to complex models

2) A) 2022 SPF symposium: Session 4: Responses to Climate Variability and Change at Decadal to Centennial Time Scales. **B)** Workshop 2: The Devil's in the Details of Using Species Distribution Models to Inform Multispecies and Ecosystem Models

Task Force 2. General points for WG meeting

Ideas

Discussions with those closer to management (Activity #8 and Task Force 3) would be valuable.

Question for managers:
What sorts of forecasts (and their precision) are useful?
How might we best communicate (and quantify) uncertainty in forecasts?

In what aspects of management will forecasts find the most use?
Setting quotas in time and space?
Informing stock assessments (e.g., survey locations, catchability), biological (e.g., relevant biological processes) and oceanographic research (relevant env. covariates)?
Allocation of SPF between commercial fisheries and other ecosystem needs (e.g., forecasting poor forage conditions for higher predators)?
Societal/political climate change adaptation? (e.g., feed into IPCC reports)?

Proponents

A.7

TF 2. Specific comments of activities

Ideas

Recognition that there are aspects of SPF ecology that are more predictable (e.g., distribution or phenology) and others that are less predictable (e.g., recruitment success). Should we focus on low-hanging fruit?

Challenges of modeling physical vs. ecological vs. fisheries drivers (density-dependent vs. independent processes). Can modeling highly variable SPF serve to better understand fish stock dynamics in general?

Needs and uncertainties will be different for short-term (i.e., seasonal to few years) vs. long-term projections. We have initiated an effort to summarize these different needs.

"Extreme" climate and hydrological events have been receiving a lot of attention recently. Perhaps this emphasis can be extended to SPFs.

- What conditions stimulate extreme anomalies in SPF recruitment, abundance, or distribution?
- What are the sensitivities of SPF to extreme climate events?

Proponents

A.7

Task Force 2. Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

Activity

A.8. Improvements to management.
Leaders: I. Kaplan, R. Nash, S. Lluch-Cota & A. Uriarte.

Main actions/results

Which is the best strategy to manage the highly productive and variable SPF?

1. still assembling management strategies for pelagic fish which we can test across different ecosystems. Candidates include spatial management, aggregate catch limits, size thresholds, and including ecological indicators.

2. Still assembling models (and volunteers) to test candidate management strategies.

3. Results to be submitted for presentation in SPF Symposium **Session 6**, “Reconciling Ecological Roles and Harvest Goals: Development and Testing Management Strategies to Enhance Marine Ecosystem Services”

Task Force 2. Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

Activity

A.8. Improvements to management.
Leaders: I. Kaplan, R. Nash, S. Lluch-Cota & A. Uriarte.

Main actions/results

How can CC and environmental variability be integrated into the Management Strategy Evaluation (MSE)?

1. A review of methods of incorporating realistic environmental change into assessment, advice and Management Strategy Evaluation is ongoing through a review of what has been done by regions with respect to incorporating environmental drivers into Assessments, MSEs and advice for management. Results to be submitted for presentation in SPF Symposium Session 6.

2. In addition: A complementary review of procedures for detecting changes in the patterns of recruitment series which might be attributed to environmental change.

Task Force 2. Translating Process Knowledge - Inputs and outputs to management structures and policy advice (TPK)

Activity

A.8. Improvements to management.
Leaders: I. Kaplan, R. Nash, S. Lluch-Cota & Uriarte.

Main actions/results

How can we objectively and over inter-annual scales define dynamic indicators to help management on: a) the attribution or partition biomass reductions to the influence of climate versus overfishing, and b) the relative trophic importance of small pelagics within the ecosystem?

1. **Ongoing review** paper on strategies that have being considered to detect and attribute biomass fluctuations to climate variability. There will be a section covering fisheries subjected to the MSC certification process. Results will be submitted for presentation in the SPF Symposium Session 6.
2. **Ongoing analysis** on improvements in sustainable management resulting from the MSC certification process in the Gulf of California SPF. Results will be submitted for presentation in the SPF Symposium (session/workshop TBD).

Task Force 2. General points for WG meeting

Ideas

Most of the Activity 8-related issues will be presented in the SPF Symposium Session 6. How to ensure integration of Activity 8 participants in the rest of the Symposium? One option: see **Workshop 2**: The Devil's in the Details of Using Species Distribution Models to Inform Multispecies and Ecosystem Models
Another option: see **Workshop 4**: Evaluating Inter-Sectoral Tradeoffs and Community-Level Response to Spatio-Temporal Changes in Forage Distribution and Abundance

Enhancing the cooperation in overlapping areas of research covered in other Tasks e.g. (for instance with activity 2 or 7 etc.).

A.8 has not been sufficiently successful in collecting management and unpublished data from the different fishery systems. Should we try to integrate a **single "official" data request from the entire WGSPF?** Maybe we should create a dedicated working group for data acquisition.

Across our nations and institutes, we face a challenge that fishermen and managers often focus on ~2-10 year time frames, while climate change impacts may occur over longer ~25-100 year timeframes. The challenge is how to bridge this potential gap in timeframes and engage with fishery managers on these questions?

Proponents

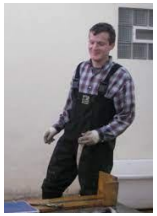
A.8

Task Force 3. Social-Ecological approaches(SEA)

Activity

A.9. Networks, vulnerability and opportunities of dependent human communities, Leads: Peck (ICES)+?

A.10. Quantifying trade-offs in goods and services (end-to-end-models), Original Leads: C. Hansen (ICES) & I. Kaplan (PICES) (but see action/ results)



A.11. Bioeconomic modelling (including stakeholder engagement).

Main actions/results

1) E-mail discussions have created a group of interested participants but concrete work has not started.
2) Symposium should act as catalyst for activities:
   - S7 – Advancing Social-ecological Analyses and Sustainable Policies for Dependent Human Communities
   - W3 – Small Pelagics for Whom? Challenges and Opportunities for the Equitable Distribution of Nutritional Benefits
   - W4 – Evaluating Inter-Sectoral Tradeoffs and Community-Level Response to Spatio-Temporal Changes in Forage Distribution and Abundance
3) Most likely combine A9-A11 into two activities. This all depends on ongoing work and finding motivated (e.g. early career?) Activity Leads.

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Reports to Parent Committee and Science Board

Membership needs?

Key products?

Timeline for completion of tasks outlined in the terms of reference?

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2021 PICES Annual Science Meeting
W2: Pelagic and forage species – predicting response and evaluating resiliency to environmental variability

Date, Time, Duration:
Mon, Oct. 18, 2021
1900-TBA (Sidney, BC, PT)

Convenors:
Matthew Baker (USA), *corresponding*
Brian Hunt (Canada)
Hui Liu (USA)
Elizabeth Siddon (USA)

W1:Can we link zooplankton production to fisheries recruitment?

Date, Time, Duration:
Mon, Oct. 18, 2021
1700-TBA (Sidney, BC, PT)

Convenors:
Toru Kobari (Japan), *corresponding*
Russ Hopcroft (USA)
Hui Liu (USA)
Karyn Suchy (Canada)

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Should we sponsor a session at the 2022 Annual Meeting?

Topic Session proposed for 2022:

"Environmental variability and small pelagic fishes in the North Pacific: Exploring mechanistic and pragmatic methods for integrating ecosystem considerations into assessment and management"

Duration:

1 day

Conveners:

Chris Rooper (Canada, chris.rooper@dfo-mpo.gc.ca), corresponding
Toshihide Kitakado (Japan, kitakado@kaiyodai.ac.jp)
Vladimir Kulik (Russia, vladimir.kulik@tinro-center.ru)
Bai Li (USA, bai.li@maine.edu)

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Planning of the Final Meeting

- The final WGSPF meeting will take place right after the 2022 SPF symposium
- We are planning the best way to do it. It will probably take place in a hotel near the Symposium Venue, during Saturday and Sunday. We have 3 rooms.
- Time will be devoted to
  - i) the organization of publications to be submitted for peer-review,
  - ii) planning the continuation of the WG (e.g., FAO interest), and
  - iii) drafting the Final Report.

Ideas for a fruitful meeting?

Needed improvements in the WG?

- How can we fund meetings?
- How to Improve efficiency on International collaboration?
- How to improve Cross-activities interaction?
- How to foster engagement in particular areas/topics?
- Are we missing key expertise in the WG/Activities?
- How to practically proceed with Data->minimum, a table linking data and provider
- How to better manage(e.g., run meetings) the WG in 2022?

Final remarks/conclusions

- Overall, good progress of several activities. Some will gain speed before the symposium
- Good involvement of activity leaders, and good attendance to meetings in most cases. High potential for many dormant ideas
- May 22, deadline for abstracts->ensure contributions to the symposium!
- Data->shared at least at the level of a table with identified contributors
- Actions on visibility needed, possibly at the level of Symposium?
- Plan for final meeting. Writing meeting before that?

Item	Time (Victoria)	Duration	WG-43 (SPF) Fall 2021 Business Meeting Agenda Items
1	5:00 pm	30 minutes	Welcome and introductions with brief updates on the SPF research of individual members
2	5:30 pm	10 minutes	Review of WG-43 Terms of Reference
3	5:40 pm	15 minutes	Update from FUTURE SSC
4	5:55 pm	15 minutes	Status of the SPF Symposium • Session descriptions • Workshop overviews • Important dates
5	6:10 pm	10 minutes	Break
6	6:20 pm	40 minutes	Overview of science activities of the broader ICES/PICES working group (i.e., summary of discussions held last week in combination with the ICES WG) • 11 “activity groups” divided into 3 “task forces”
7	7:00 pm	10 minutes	Annual WG Reports to both ICES and PICES
8	7:10 pm	10 minutes	Break (if necessary)
9	7:20 pm	5 minutes	Overview of the WG-43 related activities during the PICES Annual Meeting
10	7:25 pm	5 minutes	Discussion of potential PICES 2022 sessions (noting, though, that our symposium is scheduled for November 2022)
11	7:30 pm	10 minutes	Discussion of plans for an in-person joint meeting of the ICES/PICES working group following the 2022 SPF symposium
12	7:40 pm	up to 20 minutes	Open for discussion, as desired
13	8:00 pm	--	Adjourn