

발간등록번호

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북태평양  
해양과학기구  
연차총회  
참가보고서

2018. 12.

2018



해양수산부



한국해양과학기술원



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# I . 개요



# I. 개 요

□ 기간 : 2018.10.25(목) ~ 11.4(일)

□ 장소 : 일본 요코하마/워크피아 요코하마 컨벤션

□ 대표단 구성 (총 46명)

○ 수석대표: 해양수산부 오행록 해양개발과장

○ 교체수석: 한국해양과학기술원 심원준 책임연구원

○ 대 표 단: 해양수산부 김선하 사무관, 외교부 김민정 사무관, 분과별 위원회 위원 및 자문단 등 44명

□ 주요 의제

○ (동해편 제2판 발간) 과학평의회('16.6)를 거쳐 PICES 사무국의 최종 편집 완료된 ('16.10.) 동해편 제2판 발간 여부를 집행이사회에서 논의

○ (PICES 의장 선출) 現 의장의 임기가 '18년 10월 만료됨에 따라 PICES 의장 선출 규정 에 따라 연임

○ (PICES 특별프로젝트 추진) 한국이 제안한 PICES 특별프로젝트의 심의

○ (PICES 연회비 상승) 사무국 인력 부족 및 연금 미납금 해결을 위한 2019년 및 2020년 이후 연회비 상승 논의

**참고**

**대표단 명단**

역 할	성 명	소속/직급	참가부문	출장기간
수 석 대 표	오행록	해양수산부/해양개발과장	GC	2018.11.02~05
대 표	김선하	해양수산부/사무관	F&A, GC(Advisor)	2018.10.29~11.05
	김민정	외교부/사무관	GC(Advisor)	2018.11.02~05
	권정노	국립수산과학원/연구관	TCODE	2018.10.24~11.02
	강수경	국립수산과학원/연구관	FUTURE-SSC, SB, S-CCME	2018.10.24~11.04
	김현우	국립수산과학원/연구사	S-MBM	2018.10.27~11.01
	박태규	국립수산과학원/연구사	S-HAB	2018.10.26~11.01
	심정희	국립수산과학원/연구관	S-CC	2018.10.25~11.03
	이준수	국립수산과학원/연구사	TCODE, SB,	2018.10.24~11.04
	임월애	국립수산과학원/연구관	MEQ, S-HAB, AP-NIS	2018.10.27~11.01
	정희동	국립수산과학원/연구관	POC, AP-CREAMS	2018.10.25~11.02
	최민규	국립수산과학원/연구사	MEQ, WG-35	2018.10.25~11.03
	한인성	국립수산과학원/연구사	MONITOR, WG-30	2018.10.25~11.01
	김희진	한국해양과학기술원/선임행정원	F&A	2018.10.29~11.01
	심원준	한국해양과학기술원/남해연구소장	GC	2018.10.23~11.05
분과 위원장	주세종	한국해양과학기술원/책임연구원	BIO, SB, WG-37	2018.10.24~11.04
분과별 위원회 위원	박원규	부경대학교/교수	BIO	2018.10.27~11.01
	남성현	서울대학교/교수	POC, WG-35, AP-CREAMS	2018.10.25~11.03
	류종성	안양대학교/교수	HD, WG-36	2018.10.25~11.03
	김태원	인하대학교/교수	BIO	2018.10.27~11.03
	정석근	제주대학교/교수	FIS, S-CCME	2018.10.27~11.03
	홍성진	충남대학교/교수	MEQ	2018.10.28~11.01



역 할	성 명	소속/직급	참가부문	출장기간
분과별 위원회 위원	김성용	한국과학기술원/교수	MONITOR, WG-38, AP-NPCOOS	2018.10.25~11.03
	권석재	한국해양과학기술원/책임연구원	HD	2018.10.27~31
	유신재	한국해양과학기술원/책임연구원	FUTURE-SSC. WG-35	2018.10.25~11.03
	장찬주	한국해양과학기술원/책임연구원	POC, WG-40	2018.10.26~11.03
	최상화	한국해양과학기술원/책임연구원	TCODE	2018.10.28~11.01
전문가 그룹 위원	이충일	강릉원주대학교/교수	WG-40	2018.10.25~11.03
	김미란	국립공원연구원/책임연구원	S-MBM	2018.10.26~11.02
	문혜원	국립해양생물자원관/연구원	WG-32	2018.10.25~11.02
	김승규	인천대학교/교수	SG-MMP	2018.10.25~11.02
	최광식	제주대학교/교수	WG-32	2018.10.28~11.03
	최근형	충남대학교/교수	AP-NIS, WG-33	2018.10.24~10.31
	이기택	포항공과대학교/교수	S-CC	2018.10.25~11.03
	현정호	한양대학교/교수	WG-33	2018.10.27~11.01
	강정훈	한국해양과학기술원/책임연구원	WG-37	2018.10.27~11.02
	박영규	한국해양과학기술원/책임연구원	WG-38	2018.10.26~11.02
	백승호	한국해양과학기술원/책임연구원	S-HAB	2018.10.29~11.03
	신경순	한국해양과학기술원/책임연구원	AP-NIS	2018.10.28~11.3
	우선옥	한국해양과학기술원/책임연구원	WG-32	2018.10.26~11.03
	이재학	한국해양과학기술원/책임연구원	AP-CREAMS, AP-NPCOOS	2018.10.25~10.29
	홍상희	한국해양과학기술원/책임연구원	SG-MMP	2018.10.25~10.28
	남정호	한국해양수산개발원/연구위원	WG-41	2018.10.25~11.03
	자 문	강현주	한국해양과학기술원/책임행정원	GC(Advisor)
문중호		한국해양과학기술원/연구사업인력	F&A(Advisor)	2018.10.28~11.02
김새슬		한국해양과학기술원/연구사업인력	GC(Advisor)	2018.11.02.~05

**참고**

**'18 북태평양해양과학기구(PICES) 총회 일정**

10월 25일(목)							
09:00~12:30	W1 Gelatinous Zooplankton	W3 Data Management	W5 Common Reference Points	W7 Birds and mammal diets	W2 Central Arctic Assessment		
14:00~18:00					W6 Secondary Production		
10월 26일(금)							
09:00~12:30	AP-Creams Bus. Mtg	WG-39 (Central Arctic) Bus. Mtg.	WG-36 (Common Ref Pts) Bus. Mtg	WG-40 (Clim/Ecos Pred) Bus. Mtg	SG-MMP Bus. Mtg		
14:00~18:00							
10월 27일(토)							
09:00~12:30	WG-35 (NPESR3) Bus. Mtg	WG-32 (Biog. Hab) Bus. Mtg	WG-38 (Meso/submeso Processes) Bus. Mtg.	AP-NIS Business Meeting	S-CC Bus. Mtg	W8 WG-41 (MES)	
14:00~18:00						WG-41 (MES) Bus. Mtg	
10월 28일(일)							
09:00~12:30	과학평의회 Bus. Mtg	SG-PICES/ NPFC Bus. Mtg	W4 S-CCME	AP- NPCOOS Bus. Mtg	WG-41 (MES) Bus. Mtg	S-MBM Bus. Mtg	
14:00~18:00	FUTURE Bus. Mtg		S-CCME Bus Mtg		WG-33 (Carbon Flux) Bus. Mtg		WG-37 (Zoopl Prod.) Bus. Mtg
18:00~20:00	HD Bus. Mtg.	MEQ Bus. Mtg.	MONITOR Bus. Mtg.	POC Bus. Mtg	TCODE Bus Mtg		BIO Bus. Mtg
10월 29일(월)							
08:45~10:10	개회식						
10:30~12:30	과학평의회 심포지움(S1)						
14:00~16:00							
16:20~18:20							
18:30~21:00	환영리셉션						
10월 30일(화)							
09:00~10:30	기조연설						
10:50~12:50	S12/FIS (HMS)	S4/BIO (Biogenic Hab)	S7/FUTURE (Ecol Responses)	S9/HD (Science Policy)	S5/POC (Meso/ submeso)	재정 행정위원회 (part 1)	
14:00~16:00	과학평의회 심포지움(S1)						
16:20~18:00	MEQ-P (part 1)						

18:00~ 21:00	S-HAB Bus. Mtg.		FUTURE SSC Bus. Mtg		Sporting Event		
10월 31일(수)							
09:00~ 10:30	S6 FUTURE PLENARY (FUTURE—Next Steps)						재정 행정위원회 (part 2)
10:50~ 12:50							
14:00~ 18:00	HD Bus. Mtg	MEQ Bus. Mtg	FIS Bus. Mtg	MONITOR Bus. Mtg	POC Bus. Mtg.	TCODE Bus. Mtg.	BIO Bus. Mtg
18:00~ 21:00	포스터 세션						
11월 1일(목)							
09:00~ 10:30	기조연설						
10:50~ 12:50	S11/MON (part 1) (Pelagic/Forage Fish)	S2/FIS (Fish Prod)	S3/FUTURE (Science Comm)		S10/BIO (OA)	S8/POC (Mixing/Tides)	
14:00~ 16:00			MEQ-P (part 2)				
16:20~ 18:00							
18:00~ 21:00	포스터 세션						
11월 2일(금)							
09:00~ 10:20	BIO-P	FIS-P	S11/MON (part 2)	POC-P	HD-P	MAFF Meeting	
10:40~ 12:40							
12:50~ 13:50	폐회식						
14:00~ 18:00	과학평의회 (part 1)			MAFF Meeting			
18:30~ 21:00	의장만찬						
11월 3일(토)							
09:00~ 18:00	과학평의회 (part 2)			집행이사회 (part 1)			
11월 4일(일)							
09:00~ 18:00	집행이사회 (part 2)						



## **Ⅱ . 부문별 회의경과 및 결과**



## II. 부문별 회의결과

### 1 F&A 및 GC

#### □ 정부대표

참가부문	성명	소속/직급
GC	오행록	해양수산부/해양개발과장
GC	심원준	한국해양과학기술원/책임연구원
F&A	김선하	해양수산부/해양개발과 사무관
F&A	김희진	한국해양과학기술원/선임행정원

#### □ 개요

○ 일시: F&A: 2018년 10월 30일(9:00~18:00), 10월 31일(9:00~18:00)

GC: 2018년 11월 3일(09:00~18:00), 11월 4일(09:00~18:00)

○ 참석자

- F&A: Carmel Lowe(F&A 의장), 박철(PICES 의장), Robin Brown(사무국) Lesley MacDougall(캐나다), Michael Seki(미국), 김선하, 김희진, 문중호(한국), Nobuaki Suzuki, Chieko Kondo, Ichiro Kogam Kazuki Ueda, Tomowo Watanabe(일본), Antao Wang, Fangli Qiao(중국), Igor Shevchenko(러시아)
- GC: 박철(의장), Laura Richards(전의장), Hiroaki Saito(SB의장), Robin Brown(사무국장), Harold Batchelder(사무부국장), Carmel Lowe, Lesley MacDougall(캐나다), Enrique Curchitser, Cisco Werner, Michael Seki(미국), 오행록, 심원준, 김선하, 김민정, 강현주, 김새슬(한국), Toshiaki Kobayashi, Tomow Watanabe, Testuo Fuji, Chieko Kondo, Suzuki Nobuaki(일본), Fangli Qiao, Antao Wang(중국), Oleg Bulatov, Oleg Katugin, Igor Shevchenko(러시아)

#### □ 주요 결과

○ 모두발언 주요내용

- 미국에서는 PICES를 통한 중점 협력분야로 중기적, 계절별 규모의 기상관측과 그에 따른 생태계 변화, 극지 변화 연구 등을 언급하였으며, PICES가 UN Decade에 참여하는 데 지지함을 발언함. SB 의장으로 진출 예정인 Dr. Trainer는 해양과 인간의 건강,

- 해양경제 분야에 기여한 바 있는 저명한 연구학자라 소개하며, 회원국에게 지지를 요청함. 또한, PICES의 장기 프로그램인 FUTURE 프로그램의 이후단계에 대해서 미국은 WG 40, WG 38 등 기후변화에 대한 연구가 계속되어야함을 강조함
- 러시아에서는 IOC, ICES, NOWPAP 등 관련 국제기구 활동에 적극 참여하고 있음을 강조하고 젊은 러시아 과학자들의 연구프로그램 참여를 독려하고 있으며, FUTURE 프로그램 참여 지지를 발언함
  - 일본에서는 태풍과 관련하여 태평양지역에 나타나는 유사한 현상에 대한 연구 중요성과 UN 지속가능한 발전목표 14 중 해양환경 보호를 위한 연안관리의 중요성을 강조하였음. 금번 PICES 연차총회 주제인 생태계 변화 및 기후변화의 영향과 관련하여, 회원국과 북태평양 해양생태계 변동성 연구협력에 일본이 기여할 의사를 밝혔음. 지속가능한 해양의 활용에 대하여 논의하고 발언함
  - 중국에서는 해양이 지구에서 가장 큰 생태시스템을 가지고 있는 만큼 해양이 지구온난화에 중요한 영향을 미치고 있음을 강조하면서 이와 관련된 수산량 변화와 지역 기후변동연구 등 과학자 간 연구교류를 통하여 중국 내 해양관련 정책 수립에 기여하고자 함을 발언함. 회원국 간 지식 격차를 줄임으로써 회원국 간 상호호혜적인 발전을 도모함. UN 지속가능한 발전 목표와 이의 달성을 위한 논의가 이루어지길 바란다고 발언함
  - 캐나다에서는 생물학적 자원의 변화의 중요성을 강조하여 이러한 변하지 않는 북태평양 해양이 가지고 있는 추세에 대한 관측 및 연구의 필요성을 언급함. 아울러 PICES는 북태평양 경계를 포함하는 특별하고도 강력한 국제기구이며, 이를 통해 성공적인 연구 수행과 회원국 간 지식격차를 줄이는데 기여할 수 있음을 강조함. 향후 사회과학자의 참여를 도출하여 국내외 정책입안에 영향을 미칠 수 있도록 하는 것이 PICES가 당면한 과제이며, 이는 북태평양소하성어류기구(NPAFC)의 사례를 참고하러 발전시킬 수 있을 것이라 언급함. 아울러 UN 지속가능한 발전 목표 달성을 위해 이 자리에서 논의하고자 한다고 발언함

○ 타국제기구와의 협력

- PICES는 IOC/WESTPAC, NOWPAP 등과 2019년도 지역워크숍(Regional Workshop)을 공동개회 예정이며, Working Capital Fund에서 CAD 30,000 지원 예정임
- 캐나다 정부대표는 동 지역워크숍이 PICES에 어떠한 이점을 주는 지, 전략적으로 접근해야할 필요성이 있음을 언급함
- PICES 사무국장은 UN Decade 로드맵 및 구성 자체가 PICES 구조를 많이 차용하였으



- 며, PICES가 Regional Workshop 개최 파트너로 적합한 기구임을 강조함
- 지역워크숍 개최비 지원과 같이 재정과 관련된 사안은 F&A에서 논의 후 최종적으로 GC에서 논의하기로 함

○ 신임 사무국장 채용 관련

- Robin Brown 사무국장의 임기가 2020년 2월부터 만료됨에 따라 신임 사무국장 채용 추진
- 채용준비 일정(안)

일 시	내 용
2018/11	선정위원회(Search Committee) 구성
2018/11~12	(선정위원회) 사무국장 자격조건 공고문 검토, 확인
2019/1	채용공고 게재(PICES 홈페이지)
2019/1~3	(선정위원회) 채용공고를 국내전문가에 회람
2019/6/15	지원마감
2019/6/15~7/5	(선정위원회) 지원서류 검토, 인터뷰 대상자 최종 선정
2019/7/5	선정위원회 의장(PICES 의장)이 대상자에 인터뷰 일정 안내
2019/10	(선정위원회) 지원자 인터뷰 * 인터뷰는 연차총회 개막식 전 캐나다에서 진행
2020/1~2	신임 사무국장 근무(업무 인수인계)

- 인터뷰 장소/일정은 차기 총회 개최지인 캐나다 빅토리아에서 개막식 전 토요일/일요일 중 진행될 예정임.  
※ 상기 일정을 고려하여 GC 멤버중 1인 추천 필요
- 사무국 요청사항: 각 회원국 GC 대표 중 한명을 선정위원회 위원으로 추천

○ PICES 연회비 상승 논의

- 2019년 연회비는 인상하지 않기로 결의됨
- 연회비 상승에 대하여 러시아에서만 반대하였으므로, 러시아 정부의 입장을 11월말까지 사무국에 통보할 것  
※ 러시아에서는 1999년 GC 결의안에 따라 캐나다 물가상승률에 따른 연회비 상승(1.5% 대)에 대해서도 반대함
- 2020년 연회비 인상 관련해서도 합의에 이르지 못함. 의장은 시나리오 00번(연간 CAD 25,000 인상)에 대해 회원국이 가장 많이 찬성하였으므로, 회원국에 내부적인 과정을 거쳐 결과를 연말까지 사무국에 통보할 것을 촉구함. 만일 연말까지 합의에 이르지 못할 경우 2019년 GC 중기회의(IGC)를 개최하여 PICES 재정난 해결방안에 대해 논의해야 함

- 예산에 맞춰 활동을 줄이는 방안은 작년에 거부되었기 때문에, 더 이상 논의하지 않기로 함
- PICES 연차회의 등록비 인상
  - 기존 연차총회 등록비를 CAD \$325로 인상(조기 등록 시 CAD \$250)
    - ※ 2019년 총회부터 적용되며, 학생 및 배우자의 등록비는 CAD \$50으로 동결
- 국내전문가 주도의 PICES 특별프로젝트
  - SB 검토 결과 통과되었으며, 이후 PICES 사무국장과 F&A 의장이 재정적인 면 검토 이후, GC에 제안서 등 회람 예정(이후 GC 승인 필요)
  - 승인 후 프로젝트 운영팀(Project Steering Team) 멤버 추천 필요
    - ※ 모든 국가가 필수적으로 프로젝트에 참여해야하는 것은 아니며, 필요시 초청되거나 추가될 수 있음
- 북태평양해양생태계상태보고서 2판(NPESR-2) 발간 한일 양자협약의 결과보고
- 전문가그룹 위원 교체
  - AP-CREAMS 공동의장인 김경렬 교수(광주과기원)가 사퇴함에 따라 이재학 박사(KIOST)가 공동의장으로 교체됨
- 기타
  - PICES-IPHC(*the International Pacific Halibut Commission, 국제태평양넙치위원회*) MOU 문제
    - : SB에서 권고한 대로 MOU 갱신(Renewal)
  - PICES 발전 방안에 대한 논의(중국추가 안건)
    - : 중국은 GC에 올라온 안건에 정부대표들이 단순 승인이나 동의만 하는 것이 아닌, 좀더 유익하고 활발한 논의가 이루어지기를 바라는 차원에서 기타안건 상정을 요청함. PICES의 활동을 통해 미래를 어떻게 개선할 수 있을지 논의가 필요함. 특히 한 국가에서 연구하기 어려운 주제 - 기후변화, 기후예측-에 대해서 협의하고자 함
    - : 캐나다에서는 중국의 의견에 지지의사를 표명하였으며, 관련 지침이나 scope of work의 필요성을 언급함
  - PICES 규약(convention) 이외의 지역에 대한 연구활동 참여 가이드라인 필요성 대두
    - : PICES 규약에 명시된 지역과 연계성이 있는 지역으로 확장하는 것은 이미 PICES/ICES/PAME WG 승인 시 이미 논의하여 확정된 사안임
- F&A 의장 연임
  - Carmel Lowe 의장 연임(2018~2020)

- PICES 의장/부의장 연임
  - 박철 의장 연임(2018~2020)
  - Enrique Curchitser 부의장(미국) 연임(2018~2020)
- 신규 전문가그룹 승인
  - 1) 바다양식이 연안생태계에 미치는 영향에 대한 스터디그룹(Study Group on The Impacts of Mariculture to Coastal Ecosystems, SG-IMCE) ToR 일부 수정 조건으로 승인
  - 2) 해양 플라스틱 오염 지표 워킹그룹(WG on Indicators on Marine Plastic Pollution) 승인
- \* 미승인 전문가그룹
  - 북베링해-чук치해 통합생태계평가(Integrated Ecosystem Assessment, IEA)에 대한 스터디그룹(Study Group on IEA of the Northern Bering-Chukchi Seas, SG-NBCS)
    - : 사유: 러시아에서 동 스터디그룹 제안서 상 내용과 WG-39(PICES/ICES/PAME 공동 워킹그룹, 3년 연장)과의 연구내용 중복을 이유로 반대
    - : 관련 워크숍을 먼저 개최하고 스터디그룹 신규개설에 대해서는 이후에 논의하는 것으로 결의
- 전문가그룹 활동기간 연장
  - SG-PICES-NPFC 1년 연장
  - 중간규모, 준중간규모 프로세스에 대한 워킹그룹(WG-38) 1년 연장
  - PICES/ICES/PAME 중앙북극해 통합생태계평가 워킹그룹(WG-39) 3년 연장
  - PICES 회원국 일반생태계 기준점 워킹그룹(WG-36)은 ICES와의 공동 워킹그룹 연장을 요청하였으나 ICES 측에서 승인하지 않음
- 활동종료예정 전문가그룹
  - WG 30, 31, 32, 33: 보고서 제출 후 활동 종료
- 주요 행사개최 계획(안)
  - PICES ISB(과학평의회 중기회의), FUTURE-SSC 미팅, NPESR-3 워크숍, 추가로 WG-36\* 워크숍(ISB와 동시진행, 미확정): 2019년 봄, 일본 개최 예정
    - ※ 일시 및 장소는 일본 주관기관 내 협의 후 알릴 예정
  - WG-40\*\* 워크숍: 2019년 봄, 미국 혹은 중국 개최 예정
    - ※ 참석자는 일부 초청자를 제외하고는 소속 정부/기관 예산으로 출장비 총당할 것을 권장
    - \* WG-36: Identifying the existence of thresholds in marine ecosystem driver-response relationships
    - \*\* WG-40: Towards an integrated approach to understanding ecosystem predictability in the North Pacific

- 차기 SB 의장 선출 보고
  - 미국의 Dr. Vera Trainer가 SB 의장으로 선출됨
- 수상내역
  - 젊은과학자 우수 프레젠테이션/포스터 수상자(명단 추후 공개)

## □ 후속조치

- NPESR-2 발간 관련
  - NPESR-3 발간(온라인 게시) 일정을 고려하여, 2019년 1월까지 한일 양자 간 협의를 통해 합의점을 찾기 위해 관계 부처 간 대응방안 검토 및 대응
- PICES 신임 사무국장 선정위원회 위원 지정, 송부
  - 2018년 11월 중 GC 멤버 중 1인을 선정위원회로 지정, PICES 사무국에 송부
- PICES 신임 사무국장 모집 관련 국내전문가에 공고
  - 2019년 1월~3월(예정) 각 회원국 선정위원회를 통해서 공고
- PICES 특별프로젝트 연구비 송금 및 국내전문가 활동지원
  - 2018년 말까지 송금완료 필요
- 인턴프로그램, PICES Summer School 등 PICES 능력배양 프로그램에도 적극적인 지원 필요
  - 2019년 PICES 인턴 파견 준비 필요(2019년 5월경부터 근무시작)



PICES-2018 재정행정위원회 회의사진



PICES-2018 집행이사회 정부대표 단체사진

## 2 SB

### □ 정부대표

참가부문(역할)	성명	소속/직급
SB(한국대표)	주세종	한국해양과학기술원/책임연구원
SB	강수경	국립수산과학원/연구관
SB	이준수	국립수산과학원/연구사

### □ 개요

- 일시: 2018년 10월 28일(09:00~12:30), 10월 30일(12:40-14:00)  
11월 2일(14:00~18:00), 11월 3일(09:00~18:00)

#### ○ 참석자

- Hiroaki Saito(의장), Emanuele Lorenzo(부의장, POC의장), 주세종(BIO의장), Xianshi Jin(FIS의장), Chunlian Huo(MEQ의장), Jennifer Boldt(MONITOR의장), 이준수(TCODE 의장), Keith Criddle(HD의장), Steven Bograd(FUTURE SSC공동의장), 강수경 (FUTURE SSC공동의장), Motomitsu Takahashi(일본대표), Igor Shevchenko(러시아대표)
- PICES 사무국: Harold Batchelder, Rosalie Rutka
- 초청자: Cornelius Hammer(ICES), Alexander Zavolokin(NPFC), David Wilson, Josep Planas(IPHC), Vladimir Radchenko(NPAFC), Kentaro Ando(WESTPAC) 등

### □ 의제 및 논의 결과

- 2018 과학평의회 주관 행사(개회식, SB 심포지움, 포상, 폐회식) 및 절차 점검
  - 젊은 과학자 우수발표 포상 내역 및 선정 절차 재점검
  - 연차보고서를 위해 각 토픽세션과 워크숍 진행자는 사무국에 발표 및 토론 요약 보고
  - SB 산하 전문가그룹은 그룹 활동 상황을 SB에 보고
- 과학평의회 산하 각 위원회 활동/결과보고 양식(excel templete) 점검 및 작성 요령 설명
- 타 국제기구와의 협력활동 보고 및 전략적 협력 논의
  - ICES(International Council for the Exploration of the Sea)
  - NPAFC(North Pacific Anadromous Fish Commission)
  - IOC(Intergovernmental Oceanographic Commission of UNESCO)

- IPHC(International Pacific Halibut Commission): 현재 체결된 MOU 개정 논의
  - NOWPAP(Northwest Pacific Action Plan)
  - 그 외 기구 또는 프로그램(SCOR, IMBeR, SOLAS, IODE, IOCCP, WESTPAC, NPFC, IWC, FE-KAN, NPRB)와의 협력활동에 대한 경과보고 및 계획에 대해 보고함(영문 보고서 원문 참조)
- 진행 중인 전문가그룹 중간 활동 및 계획보고: SG-NPFC, SG-MMP, WG-39, WG-35 (활동 보고서 참조)
  - FUTURE SSC 분과위원회 활동 및 계획 보고 및 FUTURE 후속프로그램 논의(활동 보고서 참조)
  - 분과위원회 활동 및 계획 보고: BIO, FIS, MEQ, POC, MONITOR, TCODE, HD(각 분과 활동 보고서 참조)
  - 차기 과학평의회 의장(Vera Trainer: 미국) 및 MEQ 의장(Guanshui Na: 중국), 부의장(Andrew Ross: 캐나다) 선출 보고
  - 새로운 전문가그룹 또는 활동 연장 요청 그룹 제안서 심의
- (1) 양식관련 스터디 그룹(SG-on the impacts of mariculture to coastal ecosystem)
    - 모 위원회: 과학평의회(SB)
    - 기간: 1년
    - 의장 후보: Zengjie Jiang(중국)
    - 멤버 후보: Kristi Miller-saunders(캐나다), Kyle carver(캐나다), Kevin Lafferty(미국), 조미영(한국), Igor Sukhin(러시아), Galina Gavrilova(러시아), Xianhong Meng(중국), 일본 추후 추천, Mike Rust(ex-officio멤버, ICES)
  - (2) 해양미세플라스틱 워킹 그룹(WG on Indicator of Marine Plastic Pollution)
    - 모 위원회: MEQ & BIO
    - 기간: 3년
    - 멤버 후보: Sarah Dudas, Chelsea Rochman, Peter Ross, S. Avery-Gomm(캐나다), Chengjun Sun, Daoji Li, Juying Wang, Weiwei Zhang, Connie Ng(중국), Hideshige Takada, Haruhiko Nakata, Shuhei Tanaka, Yutaka Watanuki(일본), 심원준, 홍상희, 김성규, 김미란(한국), Nikolai Kozlovskii(러시아), Jennifer Lynch, Matthew Savoca, David Hyrenbach, Michelle Hester, Amy Uhrin(미국)
    - TOR 2와 5의 FUTURE 관련된 내용 수정 필요

(3) NPFC-PICES 공동 스터디그룹(Joint SG PICES-NPFC)

- 모 위원회: 과학평의회(SB)
- 본 스터디그룹의 활동기한이 2018년 10월까지이나 2019년 2월말 최종 연구체계가 완성될 예정임으로 2019년 10월(또는 2019년 7월)까지 연장 요청

(4) WG39(Joint PICES/ICES/PAME WG) 활동기한 연장

- 모 위원회: 과학평의회(SB)
- 본 전문가그룹의 활동기한은 2016.11~2018.10까지이나, WGICA 보고서 발간이 2019년 4월로 예정되어 있는 등 추가 활동사항이 있어 2019~2022년까지 연장을 요청함 (승인)
- TOR 추가  
Continue to identify priority research issues and monitor how identified knowledge gaps(needed to improve IEA and management effectiveness) are being addressed and filled.

(5) SG on IEA of the Northern Bering-Chukchi Seas

- 모 위원회: 과학평의회(SB)
- 베링해 북부와 척치해에서의 해양 및 자원조사를 실시하고, 결과분석을 위한 스터디 그룹을 추진하였으나, WG39 활동과의 중복성이 제기됨, GC회의에서 불승인됨

(6) WG 30, 31은 최종보고서 완성을 위해 1년 기한 연장 요청

(7) WG on impact of shipping: 구체적인 TOR이 없어 검토 어려움

(8) WG38은 2019년까지 활동기한이나 1년 연장 요청(추후 논의예정)

○ 새로 제안된 특별 프로젝트(Sea Turtle Ecology in Relation to Environmental Stressors in the Northwest Pacific Regions) 심의

- 제안된 특별 프로젝트가 BIO 산하 S-MBM 외엔 적극적인 수행 지지가 없지만 수행 필요성엔 이의가 없어서 진행토록 의결

○ 2018 PICES에서 GC와 과학평의회 결정 및 권고사항 보고

○ 2018년 PICES 총회 이후 컨퍼런스/심포지움, summer school/capacity building 지원 계획

- OceanObs'19(미국, 2019.9), IMBeR OSM(프랑스, 2019.6), NPAFC-IYS 워크숍(미국, 2019.5), 4차 GOA-ON 국제 워크숍(중국, 2019.4), SOLAS OSM(일본, 2019.4.), PEEC 2019 컨퍼런스(캐나다, 2019.2), PACON(러시아)



- PICES AP-CREAMS Summer School(중국, 2019.08)
- 위원회/전문가그룹 멤버 교체 및 추가 추천
  - FIS는 Nobuaju Suzuki(일본), 강수경(한국), Zhuojun Ma(중국), Steve Lindley(미국)를 교체 멤버로 보고함
  - MEQ는 신임의장으로 Guanshui Na(중국), 부의장으로 Andrew Ross(캐나다)를 선출함
  - AP-NIS 의장으로 Thomas Therriault(캐나다) 선출
  - S-HAB는 Pengbing Wang(중국), Andrew Ross(캐나다)를 멤버로 추가 추천함
  - MONITOR는 홈페이지에 있는 Jeff Napp(미국) 명단 삭제 요청, 중국 Jilong Li의 은퇴로 인한 후임 선임 요청
  - AP-NPCOOS의 Yingze Sun(중국)은 멤버에서 물러남
  - AP-CREAMS는 공동의장이자 멤버인 김경렬 교수의 사임에 따라 남성현(한국) 박사를 새 멤버로 추천하고, 기존 멤버인 이재학 박사를 공동의장으로 추천. Ryan Rykaczewski(미국)은 새 멤버가 됨
  - WG35는 Kirill Kivva(러시아)를 새로운 멤버로 추천하고, 강정훈 박사는 사임
  - TCODE는 새로운 멤버로 Jeanette Gann(미국)과 Yutaka Michida(ex-officio IODE)를 영입
  - MEQ는 미국 멤버의 적극적인 활동참여를 요청함
  - BIO는 러시아 멤버의 적극적인 활동참여와 새로운 부의장을 선출함
- PICES 수행 특별 프로젝트(FisGIS) 활동 보고
  - 활동기간: 2017~2020
  - 활동내용: 연안어업인의 활동 조력 및 인력양성(탁도, 식물플랑크톤, 해양쓰레기 조사 및 사진을 통한 불법어업활동 단속 및 새로운 어종 파악)
- PICES-2019 준비사항 보고
  - 개최지 및 일정: 캐나다 빅토리아 2019.10.16~10.27
  - 주요 테마 ‘Connecting Science and Communities in a Changing North Pacific’로 동의.
- PICES-2019 비즈니스 회의 추천(안): 각 전문가그룹에 비즈니스 회의 일정 할애함

○ PICES-2018 토픽 세션 선정 목록

Topic Sessions for PICES Annual Meeting	
1	Habitat Restoration of Marine Ecosystems
2	Marine heatwaves in the North Pacific: Predictions and impacts in coastal regions
3	Coastal ocean modelling in the North Pacific
4	The impacts of marine transportation and their cumulative effects on coastal communities and ecosystems
5	Trends in ocean and coastal ecosystems and their services and its future
6	Identifying thresholds and potential leading indicators of ecosystem change: the role of ecosystem indicators in ecosystem-based management
7	Environmental indicators of plastic pollution in the North Pacific
8	Creating More Effective Integrated Ecosystem Assessments (IEAs) in PICES Countries
9	Coastal Ocean Observing Systems, Essential Biological Variables, and Community based monitoring
10	Linking changes in climate, nutrient distribution, phytoplankton ecology, and production of algal exudates in the North Pacific
11	Incorporating Climate Variability and Change into Fisheries Management Advice
12	Impacts of meso-/submeso- scale processes on heat/material transport and on marine ecosystems
13	Implications of prey consumption by marine birds, mammals, and fish in the North Pacific
14	Integrating economic and social objectives in marine resource management
15	Advances in North Pacific marine ecosystem prediction
16	Application of EBFM in the 21st century: progress and challenges in pelagic systems

○ PICES-2018 워크숍 선정 목록

Workshops for PICES Annual Meeting		Remarks
1	Learn to Effectively Communicate Your Science	
2	The Pacific halibut: Integrating biological research, fisheries science and management across the North Pacific	
3	Let's Play the GAME! (to achieve sustainable fisheries development in the PICES regions)	
4	Circulation, biogeochemistry, ecosystem, and fisheries of the western North Pacific marginal seas: Past and future of CREAMS (Circulation Research of East Asian Marginal Seas)	
5	Celebrating two decades of North Pacific CPR sampling, and future directions	
6	Assessing Marine Ecosystem Services: A Comparative View Across the North Pacific	
7	PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Third)	
8	Synthesis of bio-acoustics programs for monitoring zooplankton and fisheries in the North Pacific	

Workshops for PICES Annual Meeting		Remarks
9	Monitoring Non-indigenous Species in PICES Member Countries: Towards Best Practices	
10	PICES/ICES collaborative research initiative: Toward regional to global measurements and comparisons of zooplankton production using existing data sets	
11	The influence of environmental changes on the potential for species distributional shifts and subsequent consequences for estimating abundance of Pacific saury	
12	Potential food competition between top predators and fisheries in the North Pacific	
13	Common Ecosystem Reference Points	
14	New frontiers: the application of molecular approaches in marine ecology and fisheries science	
15	Application of Machine Learning to Ecosystem Change Issues in the North Pacific	
16	Developing a collaborative, integrated ecosystem survey program to determine climate/ocean mechanisms affecting the productivity and distribution of Salmon and associated pelagic fishes across the North Pacific Ocean	
17	Scoping an IEA of the Northern Bering-Chukchi Seas LME	W7과 같은 날 개최
18	Economic effects on HABs: Recommended Practices	연례회의 장소에서 개최
19	The impacts of mariculture on coastal ecosystems	

○ 2019년 회기간 회의 목록: 2019 ISB와 연계하여 2~3개의 회의를 개최하는 방안 논의됨

Inter-sessional PICES Workshops/business meeting		Remarks
1	Identifying the existence of thresholds in marine ecosystem driver-response relationships	WG36
2	NPESR3 Synthesis Workshop	WG35
3	Towards an integrated approach to understanding ecosystem predictability in the North Pacific	WG40, 중국
4	FUTURE SSC	



과학평의회 회의 장면

### 3 BIO

※ Biological Oceanography Committee

#### □ 정부대표

참가부문(역할)	성 명	소속/직급
BIO(한국대표)	주세종	한국해양과학기술원/책임연구원
BIO	김태원	인하대학교/교수
BIO	박원규	부경대학교/교수

#### □ 회의개요

- 일시: 2018년 10월 28일(18:00~20:00), 31일(14:00~18:00)
- 참석자: 의장-주세종(KIOST/한국), 김태원(인하대/한국), 박원규(부경대), 문혜원(국립 해양생물자원관) (이상 한국), Jinhui Wang, Zijun Zu(이상 중국), Motomitsu Takahashi (일본), Akashi Sastri, Janelli Curtus, Angelica Pena(이상 캐나다), R. Rivkin, Jennier Fisher(이상 미국)

#### □ 의제 및 논의 결과

- 멤버 변경
  - Drs. Jinhui Wang and Zijun Xu are new members of BIO Committee replacing Profs. Song Sun and Yingjie Liu and representing PR China.
  - Dr. Zhuojun Ma and Mrs. Shu Wang(PR China) stepped down as a member of WG-32.
  - Mr. Chao Song(PR China) stepped down as a member of S-MBM.
  - Drs. Hyung-Ku Kang and Min-Chul Jang(Korea) are new members of WG-37
- BIO 연간활동 검토: NPFC/FAO workshop, International Symposium on Pacific Transitional Area, PICES/ICES/IOC 제4차 기후변화 심포지움, S-CCME 워크숍, 보고서 출판 현황
  - 2018 Inter-sessional symposia/sessions/workshops/meetings
    - NPFC/FAO Workshop on “Protection of Vulnerable Marine Ecosystems in the North Pacific Fisheries Commission Area: applying global experiences to regional assessment”(March 12-15, 2018; Yokohama, Japan). PICES(BIO and WG-32) co-sponsoring and participated in the workshop.
    - International Symposium on Pacific Transitional Area “Understanding Changes in

Transitional Regions of the Pacific”(Apr 22-26, 2018; La Paz, Mexico). SSC member or convenor from PICES contributed the symposium.

- PICES/ICES/IOC 4th Climate Change Symposium on “Effects of climate change on the world’s oceans”(June 4-8, 2018; Washington, DC, USA). Dr. Agelica Pena (a member of BIO) & Dr. Anne Hollowed(chair of SSC)
- S-CCME workshop on “Political, economic, social, technological, legal and environmental scenarios used in climate projection modelling”(June 9, 2018; Washington, DC, USA)
- 2018 PICES summer school: Coastal Ocean Observatory Science(July 9-13, 2018; Victoria BC, Canada): Dr. Akash Sastri

- 출판

- PICES Scientific Report of WG28 on “Motomitsu Takahashi & Ian Perry): under review
- PICES Special Publication(S-CC) on “Ocean Acidification and Deoxygenation in the North Pacific Ocean”): under review

○ BIO 산하 WG 그룹의 세션별 발표 심사위원 위촉

- 2018 PICES BIO Paper/Topic Sessions and Workshop and selection of judges for BIO Early Career Scientist Best Presentation(from S4,S10, BIO paper session) and Poster Award(from S4, S10, BIO paper session and W6)

Title	Convenors	Invited speakers	Duration (day)	Date	Committees (Sponsors)
S2: Fish production through food web dynamics in the boundary current systems	Motomitsu Takahashi(Japan) Yuji Okazaki(Japna) Ryan Rykaczewski(USA) Akash Sastri(Canada)	Chih-hao(Zac) Hsieh(Taiwan)	3/4	Oct.30	FIS/BIO
S4:	Anya Dunham(Canada) Hye-Won Moon(Korea)	Yves-Marie Bozec (Australia)	3/4	Oct.30	BIO
S10:	Jim Christian(Canada) Tsuneo Ono(Japan) Silvana Birchenough(ICES)	Christopher Harley (Canada)	1	Nov. 1	POC/BIO
BIO Contributed Paper Session	<b>Se-Jong Ju(Korea)</b> Debora Iglesias-Rodriguez(USA)		1/2	Nov. 2	BIO
W1:	Shin-ichi Uye(Japan) Chaolun Li(China) Brian Hunt(Canada) Richard Brodeur(USA)	Russell Hopcroft (USA) Dhugal Lindsay (Japan)	1	Oct.25	BIO

Title	Convenors	Invited speakers	Duration (day)	Date	Committees (Sponsors)
W4: Synthesizing projected climate change impacts in the North Pacific	Ann Holloed(USA) Shin-ichi Ito(Japan) Jacquelyne King(Canada) Myron Peck(ICES)	William Cheung (Canada) Taketo Hashioka (Japan)	1	Oct.25	POC/FIS/BIO
W6:Regional evaluation of secondary production observations and application of methodology in the North Pacific	Akash Sastri(Canada), Toru Kobari(Japan)	Koichi Ara(Japan)	1/2	Oct. 25	BIO
W7:	Andrew Trites(Canada) TsutomuTamura(Japan) YutakaWatanuki(Japan) RobertSuryan(USA)		1	Oct. 25	BIO

- Progressive reports and future plans of BIO active groups 발표(S-CCME, S-CC, S-MBM, WG-32, WG-33, WG-37) (\* Business meeting for EGs should not be longer than one day.)
  - a) S-CCME and S-CC will report to FIS and POC, respectively.
  - b) S-MBM: Section on Marine Birds and Mammals(K. Hattori or P. O'Hara): ?
  - c) WG32: Working Group on
  - d) WG33: Joint PICES/ICES Working Group on R. Rivkin or N. Jiao): Present on Wed.
  - e) WG37: Working Group on Zooplankton Production Methodologies, Applications and Measurements in PICES Regions(A. Sastri or T. Kobari) - One year extension requested
- Relation with other international organizations/programs?
  - ICES, SCOR, NOWPAP, CLIVAR, IMBeR, IWC, Pacific Seabird Group, Future Earth FE-KAN
- Progressive report on WG 35 'North Pacific Ecosystem Status Report'(Sinjae Yoo)
  - Region 17 & Climate Sections have been reviewed by Editorial Board members
- Review proposals of new Expert Groups(if any proposals submitted)
  - New WG(proposed by J. Curtis)
- Planning PICES 2019 Annual Meeting(Victoria, Canada; Oct. 29, 2019)
  - Theme title: "Connecting science across communities in a changing North Pacific"
  - BIO related sessions and workshops: discuss ranking and sponsorship(still no workshop proposed)

- Proposed inter-sessional workshops: ranking & sponsorship(still none of workshops proposed)

- Funding and prioritizing invited speakers. Provide feedback to SB

※ Please keep in mind the deadline of the submission of session and workshop proposals for 2019 is Oct. 29, 2018.

○ PICES-sponsored conference/symposia in 2018 and beyond

a) MSEAS II

b) OceaObs'19

c) ICES International Shellfish Symposium

d) NEOBIOTA 2018

○ Capacity Building

a) Summer school - PICES/AP-CREAMS physical processes for 2019 being considered by China, PICES contributed for PEEC 2018, PICES provided travel support for ECSs participating IMBeR ClimEco6 & SOLAS 7<sup>th</sup> Summer School.

b) Training Workshop - a practical workshop in 2018 on “Production methodologies and measurements for in situ zooplankton” organized by WG37, Phase 2 workshop(the estimation of zooplankton production) in 2019 also proposed by WG37.

○ Documenting business meetings, topic sessions and workshops

a) Business meeting summary(S-CCME, S-CC, S-MBM, WG-32, WG-33, WG-37): Chairs should submit the summary reports to secretariat within a month after the annual meeting.

b) Topic Session/workshop summary: Conveners should submit outcome/summaries of their session/workshop to secretariat(hbatch@pices.int)bylate-October.

○ Other business

a) SB chair election at PICES 2018(a year before completing the term of the current chair).

b) Special Project Proposal(Title: Sea turtle ecology in relation to environmental stressors in the North Pacific Regions)

## □ 의견/평가

○ BIO 연차 활동 검토는 큰 이견 없었음

○ 세션별 발표 심사는 BIO 위원이 분담하여 실시

- Bio위원회는 지속적으로 PICES에서 한국이 주도할 수 있는 해양생물학분야를 지원하고 적극 홍보해야 할 필요가 있음.
- Special Project로 제안한 바다거북에 관한 프로젝트는 기존에 PICES에서 지원이 되지 않던 분야로 북태평양 회원국 대다수의 국가에서 참여할 수 있으며 우리나라가 주도권을 짊 수 있는 분야임. 따라서 적극 지원하고 관심을 가질 필요가 있음.



## 4 FIS

※ Fishery Science Committee

### □ 정부대표

참가부문(역할)	성명	소속/직급
FIS(한국대표)	정석근	제주대학교/교수
FIS	이재봉	국립수산과학원/연구소
FIS	강수경	국립수산과학원/연구소

### □ 회의개요

- 일시: 2018년 10월 28일(18:00~20:00), 10월 31일(14:00~18:00)
- 참석자
  - Xianshi Jin(Chairman, China), Jacquelynne J. King(Vice-chair, Canada), E.A. Logerwell (미국), 정석근, 강수경, 김수암(Korea), Jacquelynne J. King(Canada), Naoki Tojo (Japan)과 대학원생 3명, Nobuaki Suzuki(Japan), Hirota Masahito(Japan), Mikhail Stepanenko(Russia), Xiujuan Shan(China), Zhuojun Ma(China)
  - Observers: 김수암(Korea), Anne Hollowed, Gerard DiNardo(USA), Xianhong Meng (China), Hiroaki Saito(SB 의장, 일본), Gordon H. Kruse(미국)

### □ 의제 및 논의 결과

- 참가자 소개
  - 비자 문제로 미국측 E.A. Logerwell(미국, 의장)와 J. Field(미국) 참석못하고, X. Jin (중국, 부의장)이 회의 주재
- 회원 변동
  - Dr. Nobuaki Suzuki(Japan) is a new member of FIS Committee, replacing Dr. Tetsuichiro Funamoto.
  - Dr. Sukyung Kang(Korea) is a new Committee member replacing Prof. Chang-Ik Zhang.
  - Dr. Zhuojun Ma(PR China) is a new member of FIS Committee replacing Dr. Jiahua Cheng

- 시상 심사위원 Volunteers for Award Committees
  - FIS Best Presentation Award
  - S2 Thr oral: Gordon,
  - S12 Tue oral:
  - FIS Fri oral:
  - FIS Best Poster Award
  - Poster: Libby, 11 posters, TojoWorking group 35
  
- FIS가 지원하는 전문가그룹 현황 보고
  - Ecosystem(SG-IMCE) (발표자: Dr. Xianhong Meng)
    - 1년 기한, FUTURE에 기여. FUTURE 주제 3.
  - WG 24(Lead: Liu YSFRI, Dr. Mike Rust)
    - \* Collaboration on aquaculture
      - Do you support Dr. Mike Rust as an ex-officio member on the proposed Study Group to aid in the discussion on the “collaboration with other organizations” Term of Reference. Mike Rust is Chair of the Steering Group of ICES, Expert Groups in the Aquaculture Steering Group, cover:
        - Environmental interactions of aquaculture
        - Scenario planning for aquaculture
        - Ecological carrying capacity in aquaculture
    - 각국 대표 2명 필요. 한국 수과원 조미영 박사 mycho69@korea.kr
    - 일본 관심 많아 접촉중. 우선 FRA에서. 대학. 지역 연구소 접촉중 Seto Inland Sea near Hiroshima
    - 러시아 관심 있음. Dr. Igor Skin, and other
    - WG Human Dimension과 관련되므로 정보 공유
  
- 다른 프로그램이나 기구와 관계
  - Updated MoU between IPHC and PICES. Dr. David Wilson, Executive Director of the International Pacific Halibut Commission Speaking 10.31
  - Updated(Attachment 2)
  - ICES proposal for collaboration on some sort of Central Arctic Fisheries data compilation activity(TCODE, FIS and WG 39)
    - Robin : I understand that Prof. Jin(along with Professor Saitoh) with was at the 5th FisCAO meeting where some aspects of this were discussed. This is not really a proposal yet. Please put this on TCODE, FIS and WG 39 agenda for discussion, provid-

ing feedback at Science Board. I realize that there are insufficient details available to support a really strong discussion. It would particularly useful to understand: Do you support(in concept) PICES engagement on this activity, should this issue evolve intersessionally? If so, who would be the best primary point of contact on your Committee?

- Libby a request for PICES to support an International Conference on the Ecosystem Approach(EA) to management in Arctic ecosystems. We are asking PICES to provide support for the Conference in two ways: Provide a PICES member for the planning group Provide funding for an invited speaker or Early Career Scientist
- By Libby(10.31 speaking) Proposal for Study Group TORs ready.
- Success is heavily dependent on Russian participation(Gordon and Mikel)
- GC has different process. Out of PICES domain(Saito)

#### ○ PICES 2019

- Victoria, BC, Canada October 16~27, 2019
- The theme is “Connecting science and communities in a changing North Pacific”
- FIS committee rankings of Topic Sessions and Workshops.(10.31)
- Please review proposals online before our meeting.
- <http://www.pices.int/meetings/annual/PICES-2018/2018theme.aspx>
- Click “Submit topic session/workshop proposal here”
- Login, Update, then scroll to bottom of page and click on “View Session submissions” and “View Workshop submissions”
- Proposers are encouraged to submit proposals online before September 1. The online system closes at midnight September 26. We will review any later submissions during the FIS meeting.
- Action Item: Which proposals does FIS support? Suggest revisions to proposals, if necessary

#### ○ Proposals for new FIS Working Groups, Study Groups and Special Projects

- Action Item: Does FIS support the new Mariculture Study Expert Group(s)? Suggest revisions to proposal, if necessary
- High priority projects and activities with financial/policy implications
- Proposed publications(PICES Scientific Report series and primary journals)

## □ 의견/평가

### ○ 중국에 비교해서 우리나라 참여가 저조함

- 중국측 수산분야 젊은 과학자들 참석이 크게 늘고, 발표 수준이 크게 향상됨
- 우리나라 국립수산과학원에 대응하는 중국 황해수산연구소에서 젊은 과학자들 참가자가 많았으나, 국립수산과학원은 FIS 분야에서 강수경 박사만 참가
- 우리나라 대학교 FIS 관련 분야 구두 발표는 FIS 한국 대표인 정석근과 함께 온 제주대 대학원생 2명만 발표하고 다른 대학에서는 발표가 전무했음
- 우리나라 대학교 FIS 분야 포스터는 몇 편 볼 수 있었으나, PICES 개막식때만 발표자들이 얼굴만 비취고 나머지 기간 동안에는 보기가 힘들었음
- 그렇지 않아도 국내에서 폐쇄적이라는 비판을 받는 수산분야 연구는 앞으로 더욱 세계 추세에서 뒤떨어질 것으로 전망

### ○ FIS 한국 대표 교체 필요

- 이재봉(수과원) 박사는 내부 사정으로 4년 연속 불참



FIS 회의 장면(2018.10.28)



FIS 회의 장면(2018.10.31)



FIS 참석자 기념 사진(2018.10.31)

## 5 HD

※ Human Dimension Committee

### □ 정부대표

참가부문(역할)	성 명	소속/직급
HD	권석재	한국해양과학기술원/책임연구원
HD	정명화	한국해양수산개발원/전문연구원
HD	류종성	안양대학교/교수

### □ 회의개요

- 일시: 2018년 10월 28일(18:00~20:00), 10월 31일(14:00~18:00)
- 참석자: 류종성(HD 위원, WG-36 한국 대표), Keith Criddle(HD 의장, 미국 대표), Natalie Ban(HD 캐나다 대표), Jingmei Li(HD 중국 대표), Mitsutaku Makino(HD 부의장, 일본 대표), Aoi Sugimoto(HD 일본 대표), Shion Takemura(HD 일본 대표), Ekaterina Kurilova(HD, 러시아 대표), Ron Felthoven(HD, 미국 대표)

### □ 의제 및 논의 결과

- 1차 회의 의제
  1. 참석자 소개
  2. HD 배경 설명 및 주요 업무 소개
  3. WG-41의 경과 보고
- 1차 회의 주요 논의사항
  - 참석자 자기 소개(각자 3~5분 정도)
  - HD 의장인 Keith Criddle이 Human Dimension Committee의 배경 및 발족 역사에 대해 설명함
  - WG-41의 공동의장인 Dan Lew로부터 PICES-2018 기간 동안 W8 성과와 WG-41 비즈니스 미팅의 결과를 브리핑 받음
- 2차 회의 의제
  1. 2018-2019년 사업계획 논의
  2. PICES-MAFF 프로젝트 결과 보고

3. HD와 관련이 높으며 2019년에 개최되는 국제 학회 소개
4. NPESR3 보고서 작성 지원
5. 기타 사항
6. 폐회

○ 2차 회의 주요 논의사항

- PICES-2019에 신청된 session과 workshop에 대한 HD Committee의 우선순위 결정
- 일본 수산성이 지원하는 PICES-MAFF 프로젝트의 결과 보고(Mitsutaku Makino 발표)
- HD 활동과 관련이 깊은 국제 학회 소개(Wakefield Fisheries Symposium, NAAFE, IMBER, ICES-2019, PICES-2019, MSEAS II)
- NPESR3 보고서의 Human Dimension 파트는 지역해 별로 작성하지 않고 국가별로 작성하여 별도의 소책자에 합치기로 함

□ 의견/평가

- HD의 비즈니스 미팅은 28일과 31일에 분리 개최되어 28일 미팅에서는 워밍업 차원에서 참가자 소개 및 HD의 미션에 대한 설명, HD에서 지원하는 WG-41의 경과보고 등이 간략하게 논의되었음

## 6 MEQ

※ Marine Environmental Quality Committee

### □ 정부대표

참가부문(역할)	성명	소속/직급
MEQ	임월애	국립수산과학원/연구관
MEQ	최민규	국립수산과학원/연구사
MEQ	홍성진	충남대학교/교수

- 일시: 2018년 10월 28일(18:00~20:00), 10월 31일(14:00~18:00)
- 참석자: Thomas Therriault(부의장, FOC/캐나다), 최민규(NIFS/한국), 임월애(NIFS/한국), 홍성진(충남대/한국), Chunhou Li(SCSFRI/중국), Guangshui Na(SOA/중국), Toyomitsu Horii(NRIFS/일본), Ichiro Imai(홋카이도대/일본), Hideaki Maki(NIES/일본), Olga Lukyanova(PSRFC/러시아) 등 observer 포함 총 16명 참석

### □ 의제 및 논의 결과

- 각 나라의 기존 위원 및 새 위원 자기 소개, MEQ 회의 의제 소개
- MEQ 신임 의장 및 부의장 선출
  - 신임 의장(Dr. Guangshui Na, 중국), 부의장(Andrew RS Ross, 캐나다)
  - \* 전 의장 및 부의장 임기 만료: Dr. Chuanlin Huo(중국, 2012-2018), Dr. Thomas W. Therriault(캐나다, 2017-2018)
- MEQ 전문가그룹 활동 보고(HAB/AP-NIS/S-WG30/WG31)
  - HAB: 2018년 활동 및 2019년 계획 보고
  - AP-NIS: 2차년도 진행현황 보고 및 2019년 계획 보고
  - WG30(후쿠시마 방사능, 2013-2017): 최종결산을 위해 1년간 활동 연장했으며, 최종보고서는 작성 중, 일본측과 미국측 data report 미제출에 따라 지연되고 있음
  - WG31(해양오염, 2014-2017): 최종결산(최종보고서 및 Brochure 등 제출) 완료
- MEQ 신규 전문가그룹(SG, WG 등) 제안 평가
  - WG-IMPP(Indicators of Marine Plastic Pollution) 신설(한국측 제안: 통과)
    - SG-MMP 1년간 운영 및 활동보고(한국 심원준 박사)
    - 주요내용: 미세플라스틱의 환경 내 분포와 생태적 영향에 대한 연구 한계점을 바탕



으로 우선순위 도출

- Members 구성: 한국(3)/중국(3)/일본(3)/캐나다(3)/미국(3)/러시아(1)
- Terms of references(TOR): 1) 북태평양 및 주변해역의 micro 및 mesoplankton 오염현황 리뷰(분포, 밀도, 조성, 위해성 등), 2) 플라스틱 오염의 생물적 및 비생물적 지시자 및 그 영향(관련 화학물질 포함), 3) 환경 모니터링을 위한 가이드 라인 개발, 4) EcoQOs 개발
- SG-IMCE(The Impacts of Mariculture to Coastal Ecosystem) 신설(중국측 제안: 미통과)
  - Member 구성: 중국(2명, Yellow Sea Fisheries Research Institute)/그 외 국가(0)
  - Terms of references(TOR): (i) 양식장에서 기인하는 독소 및 유해생물의 영향과 관련된 최신연구활동 및 우선순위 리뷰, (ii) 이와 관련하여 다른 국제기구와 자료공유 및 공동연구, (iii) 이와 관련하여 전문가그룹(Working group)의 TOR 작성, (iv) 제안된 전문가그룹의 TOR에 언급되지 않는 양식장 영향에 대한 이슈에 대한 논의
- PICES-2019 Proposals(workshop, session) 평가
  - MEQ/BIO/FIS/POC/HD/MONITOR/TCODE 우선순위 결정
    - \* Session 18개/workshop 22개 제안됨
- PICES-Project Proposals 평가
  - Sea turtle ecology in relation to environmental stressors in the North Pacific Regions (한국측 제안): 예산 5만 달러 이상의 과제는 SB 및 GC 승인사항으로 특별한 의견 없음으로 결론
  - 거북이에 GPS를 달아 이동반경 및 생태, 서식처 등 정보 획득 목적
- WG-35의 활동 및 추진계획 소개(유신재 박사)
  - NPESR3(North Pacific Ecosystem Status Report, Third edition) 일정: 분야별 책임 전문가의 Regional assessments 리뷰 및 편집(2018년 12월), 편집위원 Regional assessments 리뷰(2019년 3~4월), Regional assessments 발간(18년 spring), 워크숍 및 NPESR3 작성(19년 4~5월), 편집위원 NPESR3 검토 및 Monitor 및 Future에 제출(19년 summer), NPESR3 발간(19년 fall, PICES 연례회의)
- NOWPAP CEARAC의 사업현황 및 계획 소개(Dr. Takafumi Yoshida)
  - 해양생물 다양성보전에 대한 중기전략: (i) 해양 생물다양성 평가, (ii) 유해외래종, (iii) 특정 이동하는 생물종, (iv) 갯벌, 염습지, 해조류 생육장을 포함한 생물학적 서식지, (v) 양식장 및 수산생물과 관련된 플랑크톤, (vi) 환경 DNA
  - 신규 추진 과제: (i) 미세플라스틱 오염도의 모니터링 및 평가방법(Chinese Research

Academy of Environmental Science 제안), (ii) NOWPAP 지역에서 생물다양성 변화에 따른 중요 지시종과 생태계 분류(National Scientific Centre for Marine Biology of the Far East Branch of the Russian Academy of Science 제안)

○ MEQ의 새로운 working group 제안 발표

- SG-MMP에서 도출된 결과를 바탕으로 새로운 WG 제안
- WG-EIMP: Environmental indicator of MP pollution
- Proposed member: Sarah Dudas, Chelsea Rochman, Peter Ross(Canada), Chengjun Sun, Daoji Lim Juying Wang(China), Hideshige Takada, Haruhiko Nakata, Shuhei Tanaka (Japan), Won Joon Shim, Sang Hee Hong, Seung Kyu Kim(Korea), Nikolai Kozlovskii (Russia), Jennifer Lynch, Matthew Sacova, Amy Uhrin(USA)
- Terms of references: 1) 북태평양 및 주변해역의 micro 및 mesoplastic 오염현황 리뷰 (분포, 밀도, 조성, 위해성 등), 2) 플라스틱 오염의 생물적 및 비생물적 지시자 및 그 영향(관련 화학물질 포함), 3) 환경 모니터링을 위한 가이드 라인 개발, 4) EcoQOs 개발 등
- 위원들 대부분 새 working group의 지정에 찬성, 수요일 회의에 최종 결정될 것

○ MEQ best presentation award 선정

- MEQ paper session에서 발표한 구두 및 포스터 논문들 중 early career scientists를 대상으로 평가
- Na(중국), Maki(일본), 최민규(한국)이 심사위원으로 참여 결정.
- 최종적으로 모든 발표가 끝난 후 평가지 합산을 통해 구두 1인, 포스터 1인을 수상자로 선정 예정

○ 새롭게 제안된 special project에 대한 MEQ 위원 의견 청취

- Sea turtle ecology in relation to environmental stressors in the Northwest pacific regions
- 한국 측에서 제안된 연구과제, 총 연구비 5억원 규모의 과제이므로 위원의 의견 청취 필요
- 거북이에 GPS 로거를 달아 이동반경 및 생태, 서식처 등 정보 획득
- 과제의 목적에 대한 전반적인 소개, 최종 결정은 수요일 미팅에서 이뤄질 것

○ 기타 새 study group 또는 working group proposal 토의

- Impact of shipping activity: 대부분의 해상 교통관련 연구는 유류유출 및 외래종 유입에 집중되어 있음. 본 제안 WG에서는 기타 다른 영향에 대한 연구 필요성을 도출하고자 함

- Impact of mariculture on coastal ecosystem: 본 study group에서는 연안양식장의 영향, 그중에서도 병원균 및 유해생물의 영향에 대해 연구하고자 함
- 주제는 좋으나 아직 study group을 만들기 위한 준비(terms of references, member, 방법 등)가 덜 된 것으로 보임. 최종 결정은 수요일 회의에 이루어 질 것임



PICES 2018 연차총회 및 회의 사진

## 7 MONITOR

※ Technical Committee on Monitoring

### □ 정부대표

참가부문(역할)	성명	소속/직급
MONITOR(한국대표)	김성용	한국과학기술원/교수
MONITOR	박희운	국립해양조사원/사무관
MONITOR	한인성	국립수산과학원/연구사

### □ 회의개요

- 일시: 2018년 10월 28일(18:00~20:90), 10월 31일(14:00~18:00)
- 참석자
  - 의장 - Jennifer Boldt(캐나다)
  - 회원 - I.-S. Han, S. Y. Kim(이상 대한민국), K. Tadokoro, S.-I. Saitoh, S. Chiba(이상 일본), V. Kulik, V. Lobanov(이상 러시아), S. Batten, T. Ross(이상 캐나다), L. Eisner, J. Barth(이상 미국)
  - 게스트 - C. Xing(중국), H. Abe(일본), T. D. Kim(한국), T. Suga(ARGO), A. Harper (CeNCOOS), M. Baker(NPRB), M. Higaki(NEAR-GOOS)

### □ 의제 및 논의 결과

- PICES 2018 정보 및 심사
  - 토포픽 세션 및 워크숍
    - S11(Influence of climate and environmental variability on pelagic and forage species)
    - Best oral presentation: Y. Zhu(중국), Best poster: M. Ishino(일본)
- PICES 그룹으로 부터의 활동보고
  - FUTURE SSC(Lobanov): PICES FUTURE 과학프로그램에 대한 목적과 최근 활동에 대한 내용을 보고 받음
  - AP-NPCOOS(Barth & Kim): 브리티시 컬럼비아, 시드니에서 개최한 썸머스쿨에 대한 내용을 소개하였고, 2020년 가을 5일간의 일정으로 요코하마 국립대학에서 개최 예정인 썸머스쿨에 대한 개요를 설명하였음. 또한 연안 해양관측 시스템에 대한 각국의 노력에 대한 발간물 준비를 소개하였고, 2019년 PICES에서 신청할 토포픽 등에 대하여

소개하였음

- AP-CREAMS(Lobanov): AP-CREAMS의 멤버 교체, 2018년 추진하였던 회의(2회) 및 공동 조사(동해 ↔ 블라디보스톡 페리박스 모니터링), EAST-II/NPESR 3 region 19 등 발간물에 대한 추진 개요를 설명하였음

\* MONITOR 멤버는 2018년 12월 17일까지 EAST-II에 대한 Review를 진행할 예정임.

○ PICES, 국제, 국가기구와 프로그램간의 관계

- CPR/SAHFOS and GACS(Batten)

- CPR(Continuous Plankton Recorder) survey: 2018년 SAHFOS의 북태평양 및 북대서양 CPR survey를 영국의 MBA(Marine Biological Association)과 통합하여 운영
- GACS(Global Alliance of CPR Surveys): 2017sus 12월 GACS의 연례회의를 계획하였음. 이 회의의 주요 내용은 마이크로플라스틱의 계측과 관련한 것이었음
- 북태평양 CPR survey: 19년차 북태평양 CPR survey를 종료하였음. 2019년 PICES에 CPR 20주년 관측과 향후 방향에 대한 워크숍을 개최할 예정임

- SCOR WG(P-obs) (Batten): “글로벌 관측 프로그램에서 플랑크톤 관측 센서 시스템의 결합” 워킹그룹에 소속되어 활동중. 주요 관측은 글로벌 해양관측 플랫폼에서 플랑크톤 관측의 최적 실험 및 기술을 발전시키는 것임

- WOA(World Ocean Assessment) II(Chiba): 2016년부터 시작된 WOA II는 2020년 평가보고서 발간을 목표로 하고 있음. WOA II의 전문가그룹 중 PICES 국가의 전문가는 총 168명이 참여중임. 하지만 러시아 전문가의 참여는 없어 이에 대한 독려가 필요함

- Ocean Obs '19 (Chiba): Ocean Obs '19는 2019년 9월 16~20일 하와이 호놀룰루에서 개최될 예정임. 10년단위로 개최되는 회의인 만큼 축적된 해양관측 기술에 대한 공유에 중요한 장이 될 것으로 판단되며 많은 참여를 독려함

○ 정보에 대한 빠른 공유

- POMA: 차년도 POMA상에 대한 후보 관심 부탁

- ISB-2018: 제5차 FiSCAO에 대한 MONITOR 위원회 스폰서 공지

- ICES ASC 테마 세션에 대한 제안서 공유

- 기타

- 10월 31일 개최되는 위원회 전까지 확인이 필요한 사항
- 차년도 MONITOR 위원장 및 부위원장에 대한 선거 예정
- PICES 2019에 제안된 토픽세션 및 워크숍 프로포잘에 대한 리뷰 필요

○ WG-35(NPESR) (Chandler)

- 현재 NPESR 3에 대한 진행 상황을 설명. ETSO에 대한 협조 부탁. 2019년 1월에 편집 위원회에 첫 번째 draft 보고서가 제출될 예정

○ PICES-2019에 대한 제안서

- 멤버간의 ranking 토의를 통하여 아래의 topic session, workshop 및 intersessional worksop에 대한 우선적 지지를 표명함

- Topic Sessions:

- 2-Marine heatwaves in the North Pacific: Predictions and impacts in coastal regions

- 3-Coastal ocean modelling in the North Pacific

- 6-Identifying thresholds and potential leading indicators of ecosystem change: the role of ecosystem indicators in ecosystem-based management

- 9,11-Coastal Ocean Observing Systems, Essential Biological Variables, and Community based monitoring

- 15-Integrating economic and social objectives in marine resource management

- Workshops:

- W1-Learn to Effectively Communicate Your Science

- W4-Circulation, biogeochemistry, ecosystem, and fisheries of the western North Pacific marginal seas: Past and future of CREAMS(Circulation Research of East Asian Marginal Seas)

- W5-Celebrating two decades of North Pacific CPR sampling, and future directions

- W8-PICES contribution to Central Arctic Ocean(CAO) ecosystem assessment(Third)

- W9-Synthesis of bio-acoustics programs for monitoring zooplankton and fisheries in the North Pacific

- W14-Common Ecosystem Reference Points

- W16-Application of Machine Learning to Ecosystem Change Issues in the North Pacific

- Intersessional workshops:

- Identifying the existence of thresholds in marine ecosystem driver-response relationships

- NPESR 3 Synthesis Workshop

- W18-Towards an integrated approach to understanding ecosystem predictability in

the North Pacific

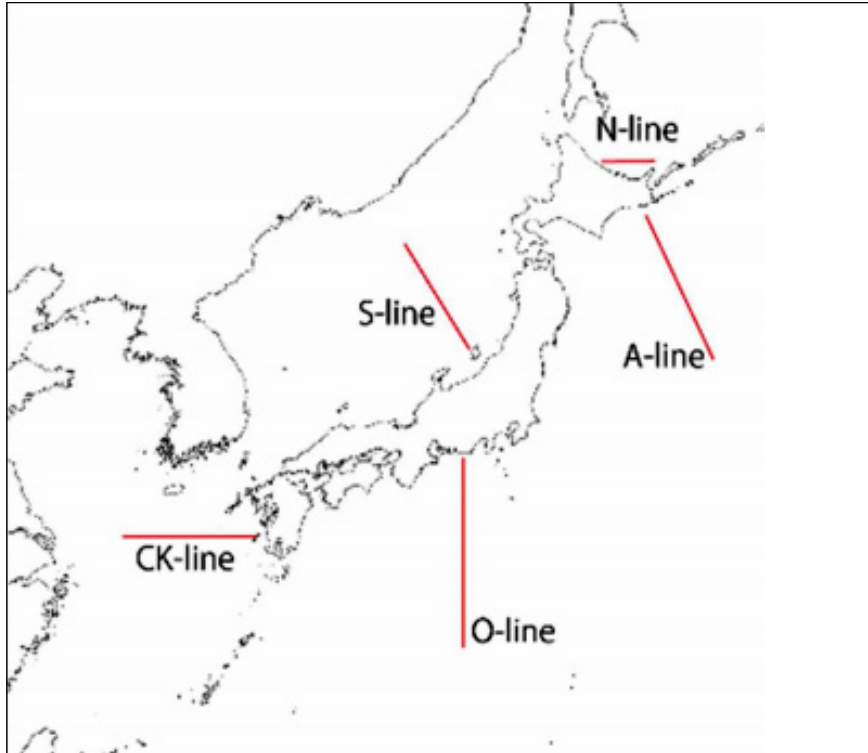
○ PICES, 국제, 국가기구와 프로그램간의 관계(계속)

- ARGO(Suga): 2018년 POMA상 수상에 대한 감사. ARGO 프로그램에 대한 종합적인 보고를 수행함. PICES 위원국 멤버들은 생지화학 ARGO float에 대한 노력을 support함
- NEAR-GOOS(Higaki): 1996년부터 진행되어온 NEAR-GOOS 전반에 관한 내용을 설명함. 그 밖에 JMA/POI의 파일럿 프로젝트, GOOS Regional Alliances 등에 대한 설명을 수행함
- CeNCOOS(Harper): 캘리포니아 연안에 대한 관측 시스템에 대한 상세한 설명을 수행함. 특히 HF radar, HABS 관련, ROV survey 등에 대한 내용을 상세히 설명함
- SCCOOS(Anderson): 해양산성화 모니터링, 수온 관측, 캘리포니아 HAB 관련 인체물, ERDDAP의 생물 자료, SCCOOS의 웹사이트 개선 등에 대한 내용을 설명함
- GOOS BIO-ECO(Batten/Chiba): 2018년 6월 개최된 플랑크톤 군집의 전지구적 융합 관측에 대한 워크숍 내용에 대한 보고서를 소개함
- NPRB(North Pacific Research Board) (Baker): NPRB의 활동 내용과 PICES 활동과의 연계 상황에 대한 설명을 수행함
- ESSAS(Ecosystem Study on the Sub-Arctic and Arctic Seas) (Saitoh): 2018년 5월에 노르웨이에서 개최된 제3차 RAC Arctic meeting에 대한 내용을 소개하였음. 또한 2018년 6월에는 미국 알래스카에서 ESSAS 연차 과학 회의를 개최하였음. 이 회의에서는 북극 및 아극지방에서 생태역학의 탐사에 대한 해양 위성의 활용에 대한 논의가 주로 되었음

○ 국가 보고서 발표

- 캐나다(Boldt)
  - 2017년 이후 특이 관측 사항: DFO(Fisheries and Oceans Canada)에서 수행된 물리, 화학 및 생물 현상에 대한 고찰
  - 관측 프로그램의 소개: Line-P, NE Pacific continental margin/Strait of Georgia에 대한 정기 조사, Georgia 해협의 동물플랑크톤 조사 등에 대한 소개가 있었음
  - Ecosystem process survey: 다양한 어종 관측 조사, 연어의 치어/성어 관측, 청어 조사 등에 대한 내용을 소개
- 일본(Tadokoro, Chiba, Saitoh)
  - JAMSTEC: 심해 생물샘플에 대한 DB에 대한 GODAC(Global Oceanographic Data Center)의 런칭에 대한 소개, 마이크로플라스틱 모니터링, ARGO, 심해 플로트

(NINJA), TAO/TRITON 프로젝트, IOMICS(Indian Ocean Moored buoy network Initiative for Climate Studies), Post-WOCE hydrography에 대한 소개를 수행함

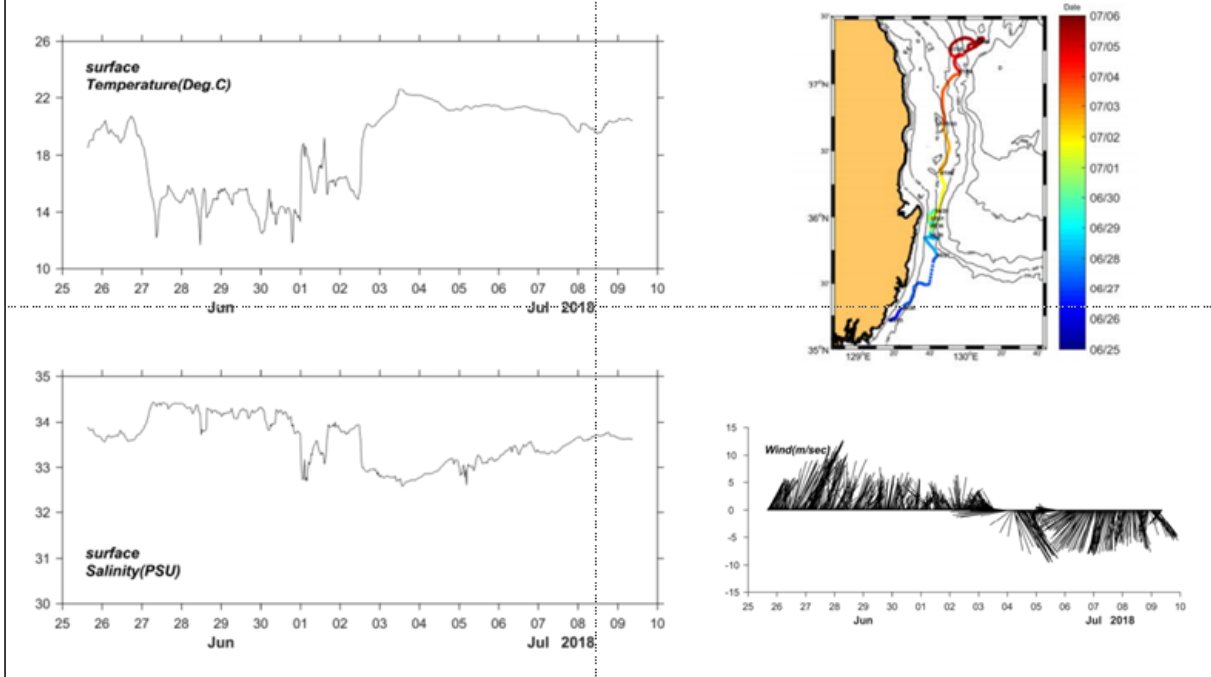


〈일본 수산총합연구센터(FRA)에서 수행중인 관측라인〉

- FRA: A-line, O-line, CK-line, S-line, N-line에 대한 관측 개요 소개. HPLC 샘플 채집 결과, 자원 평가 프로젝트의 일환으로 수행된 모니터링 결과, 동물플랑크톤 샘플 채집 등에 대하여 소개
- 북해도대학: R/V professor Multanovskiy를 이용한 북극 및 아북극 해역 모니터링 결과, T/S Oshoro-maru의 베링해 등에 관한 관측 결과, 그린랜드의 빙하 및 빙권에 관한 연구 결과를 소개함
- 대한민국(Kim, Han)
  - NIFS: 2018년 하계 및 동계 이상수온 발생 현황 및 수산 피해 현황, 웨이브 글라이드를 활용한 연안용승 발생역에서의 연속 관측 결과, 한국 연안 해역에 대한 실시간 해양환경 어장정보시스템의 구축 현황 및 확대 운영 개요를 소개함
  - KMA: 파고부이, 해양-기상 관측 요소에 대한 추가적인 사항에 대하여 소개함
  - KAIST: 한국 연안에 대한 연안 관측 시스템의 개요를 설명함



## Wave-glider survey around the coastal upwelling area



〈국립수산과학원(NIFS)에서 수행한 2018년 연안용승역 웨이브글라이더 모니터링 결과〉

- 러시아(Kulik, Lobanov)
  - TINRO-Center: 2015년부터 2017년까지 수행된 오호츠크해에서의 해양관측 결과를 소개함
  - POI: 2017~2018년 수행된 동해 북부해역에서의 모니터링, 특히 중규모 소용돌이의 메커니즘, Hypoxia, 해수교환 등 물리/화학적 현상에 대한 집중 관측 내용을 소개함
- 미국(Barth, Eisner)
  - NOAA/AFSC(Alaska Fisheries Science Center): 매년 수행되는 베링해 관측 및 격년으로 수행되는 알래스카 만에 대한 관측 내용에 대하여 소개함
  - 오레곤대학: NANOOS(Northwest Association of Networked Ocean Observing Systems)의 소개, 미국 서부 연안의 underwater 글라이더 네트워크에 대한 소개 등이 이루어짐



## 8 POC

※ Physical Oceanography and Climate Committee

### □ 정부대표

참가부문(역할)	성명	소속/직급
POC(한국대표)	정희동	국립수산과학원/연구관
POC	장찬주	한국해양과학기술원/책임연구원
POC	남성현	서울대학교/교수

### □ 회의개요

- 일시: 2018년 10월 28일(18:00~20:00), 30일(14:00~18:00)
- 참석자: Emanuele Di Lorenzo(의장), Yury Zuenko(부의장), James Christian, Jennifer M. Jackson - Rapporteur(캐나다), Fangli Qiao(중국), Shin-ichi Ito, Daisuke Hasegawa, Hiromichi Ueno(일본), 장찬주, 남성현, 정희동(한국), Vyacheslav Lobanov, Elena Ustinova(러시아), Steven Bograd(미국), observers?

### □ 의제 및 논의 결과

1. 개회 및 회의 참석자 소개
2. 물리·기후분과 신임 위원 소개
3. 의제채택 및 보고자 선임
  - 참석자의 일정을 고려하여 의제 순서 조정
  - 보고자로 Jennifer Jackson(캐나다) 선임
4. 2018 총회 물리·기후분과 주관/공동주관 세션
  - S5, S8, POC paper 세션
5. 발간물 업데이트
  - WG27(북태평양 기후변화 및 변동) 최종보고서: 지연 사항 확인
  - WG29(지역 기후모델링) 최종보고서: 완료
  - AP-CREAMS EAST-II 해역 연구보고서: 약 300페이지 분량의 초안, 위원 중 3명(Drs. Yury Zuenko, Shin-ichi Ito, and Chan Joo Chang)의 검토/심사 계획
  - S-CC 연구보고서 관련: 거의 완료되었으며 심사를 거쳐 2019년 1월경 발간 예상
6. 2018년 이후 발간물 논의: NPESR-2(North Pacific Ecosystem Status Report -2)에 누락

된 동해편 발간 필요

7. POC 관련 향후 미팅

- OceanVisions 2019 Summit(2019. 4. 1~4, Georgia Institute of Technology, 애틀랜타, 조지아, 미국)
- SOLAS Open Science Conference(2019. 4. 21~25, 삿포르, 일본)
- 2<sup>nd</sup> NPAFC-IYS Workshop on Salmon Ocean Ecology in a Changing Climate(2019. 5. 18~20, The Embassy Suite by Hilton Portland Downtown, 포틀랜드, 오레곤, 미국)
- 2019 IMBER Open Science Conference(2019. 6. 17~21, 브레스트, 프랑스)
- PACON International(2019. 7. 16~19, 블라디보스톡, 러시아)
- OceanObs'19: 2019 Ocean Observing Conference(2019. 9. 16~20, 호놀룰루, 하와이, 미국)
- PICES-2019 연차총회(2019. 10. 16~27, 빅토리아, 밴쿠버, 캐나다)

8. 젊은 과학자 발표우수자 선정위원: S5, S8, POC paper 세션의 젊은 과학자 구두 및 포스터 발표에 대하여 위원 중 각각 9명씩의 심사위원 선정

9. 전문가그룹별 활동사항 및 계획 보고

- (1) S-CCME: 회기간 활동사항 및 계획 보고(Shin-ichi Ito)
- (2) S-CC: 2016~2018 기간 중 활동사항 보고 및 2019년 출판 계획 소개
- (3) WG 38: ToR 및 활동사항 보고 및 synthesis paper 출판 계획 소개(Hiromichi Ueno)
- (4) WG 40: 목표 및 2017~2018년 연차총회 세션 결과 소개 및 2019년 intersession 워크숍 제안
- (5) AP-CREAMS(Yury Zuenko)
  - 2005년 만들어진 POC 및 MONITOR 산하 Advisory 패널
  - 2018년 활동: 5월 4~5일 intersession 워크숍(항저우, 중국), 10월 26일 연차총회(요코하마, 일본), 국가별 활동 보고, 공동승선조사 및 정기선박활용 해양관측, 출판-NPESR2 초안 작성 완료(POC 검토/심사)
  - 2019년 계획: 4월 intersession 워크숍(강릉, 한국), 10월 연차총회(밴쿠버, 캐나다), 공동승선조사(한·러 동해 joint cruise 등) 및 정기선박활용 해양관측, Summer School(2019년 여름, 청도, 중국)

10. FUTURE 갱신 skipped

11. 타 국제기구/프로그램과 협력현황 보고

- (1) ARGO(Toshio Suga)
  - 현황과 향후 계획 소개: 현재 전 세계적으로 약 4,000 플로트 투하, SOCCOM과 같은 개별 연구과제를 통해 운용 중, 2020년까지 core/deep/bgc ARGO 각각 2,500개,

1,200개, 1,000개(총 4,700개) 플롯 투하 목표/계획; “ARGO 2020”

(2) CLIVAR(Shoshiro Minobe)

- CLIVAR 핵심 프로그램 등 소개: WCRP의 대기-해양시스템 core project로서 미래 지구(future Earth)와도 협력을 더욱 증진, 조직 중 태평양 패널은 PICES와 공통의 관심사를 가짐, 특히 Eastern Boundary Upwelling System(EBUS)에 주로 미국, 캐나다 학자 위주로 참가(동아시아 국가 참가 저조)

(3) Future Earth(Emanuele Di Lorenzo) - skipped

(4) NPRB(Matthew Baker) - skipped

(5) ICES(Cornelius Hammer)

- ICES science plan: 1) assess and report on trends in ocean climate, 2) improve understanding of oceanography of semi-enclosed and shelf seas and wider North Atlantic
- ICES/PICES liaison 및 협력 방안 등

12. NPESR-3 update(Peter Chandler): 2009~2015년 기간에 대해 14개의 regional assessments 를 바탕으로 synthesis chapter를 추가, ETSO(Environmental Time Series Observation)과 web-based online system을 활용, 예상하지 못했던 1) ETSO 제출 부족, 2) 역할과 교신에 대한 불확실, 3) 부족한 ESTO 자료로부터 주저자의 추진 혼동의 사유로 당초 계획보다 지연 - 2019년 4~5월 중 intersession SB(ISB) 기간에 synthesis 워크숍 개최 후 2019년 여름 Editorial Board에 심사/검토 요청 계획으로 수정

13. 새로운 제안(전문가그룹, 회의, 워크숍)과 지원 요청

(1) new SG 제안: Submesoscale processes and marine ecosystem(Yisen Zhong) - 현재 WG 38(Mesoscale and submesoscale processes)에서는 주로 mesoscale processes 위주로 다루어 submesoscale processes 중심의 새로운 study group 필요, 다학제간의 다른 분야와 연계성 강조

(2) new session 제안: Coastal ocean modelling in the North Pacific(Susan Allen) - POC 단독일 필요는 없으나 POC 지원 필요, 1명의 invited speaker

(3) PACON International의 sponsorship 요청: 러시아 외 타국 session conveners 및 invited speakers 지원 요청

(4) new session 제안: Marine heatwaves in the North Pacific: Prediction and Impacts (Jennifer Jackson) - POC 단독일 필요는 없으나 POC 지원 필요, 1명의 invited speaker

(5) new session 제안: Trends in Ocean and Coastal Ecosystems and Services(Shin-ichi Ito)

(6) new session 제안: WG 38 Meso- and submeso-scale processes on transport and ecosys-

tem(Hiromichi Ueno)

- (7) new session 제안: WG 40/CLIVAR(Jacox) Advances in North Pacific Marine Ecosystem Prediction
  - (8) new workshop 제안: Circulation, biogeochemistry, ecosystem, and fisheries of the western North Pacific marginal seas: Past and future of CREAMS(SungHyun Nam)
  - (9) new ICES-PICES workshop 제안: Physical and biogeochemical projections for regional seas(Peck)
  - (10) Summer school 제안(AP-CREAMS): 주제 - Ocean turbulence: from Observing to Research(Lobanov)
  - (11) new workshop 제안: Application of marine learning to ecosystem change issues (Charles Hannah)
  - (12) new SG 제안: IEA of the Northern Bering-Chukchi Seas(Loggerwell)
14. 새로운 funding opportunity 소개: Belmont Forum Funding Opportunity - PICES 참가국 중에는 미국, 일본, 러시아의 3개국 이 참가, 최소 이들 3개국 이상이 참여하는 1) 지속 가능한 해양 이용 경로, 2) 전지구적 변화(기후변화, 해양 빈산소화, 해수면 상승 등)의 영향을 설명하거나 최소화하는 방안의 주제에 대한 지원 가능성 토의
  15. 물리·기후분과의 미래 방향에 대한 토의: 물리·역학·기작 중심의 생태계이해에 기여하는 수치모델링 중요성, 작은 규모의 역학 과정(submesoscale and turbulent processes) 강조, 과학적 지식과 적용 두 측면에서의 역할 등 토의
  16. New Proposals 우선 순위 결정
    - 제안된 총 17개의 세션과 19개의 워크숍에 대한 물리·기후분과 참가 위원 전원(13인)의 투표로 우선 순위 결정
  17. Adjourn

## 9 TCODE

※ Technical Committee on Data Exchange

### □ 정부대표

참가부문(역할)	성명	소속/직급
TCODE(한국대표)	이준수	국립수산과학원/연구사
TCODE	최상화	한국해양과학기술원/책임연구원
TCODE	권정노	국립수산과학원/연구관

### □ 회의개요

- 일시: 2018년 10월 28일, 18:00~20:90/ 10월 31일, 14:00~18:00
- 참석자: 의장 - 이준수(수산과학원/한국), 권정노(수산과학원/한국), 최상화(KIOST/한국), Peter Chandler(IOC/캐나다), Manchun Chen(NMDIS/중국), Wan Fangfang(NMDIS/중국), Daisuke Ambe(NRIFS/일본), Tomowo Watanabe(JFA/일본), Toru Suzuki(MIRC/일본), Yutaka Michida(ex-officio 멤버/IODE) Georgiy Moissenko(VNIRO/러시아), Igor Shevchenko(TINRO/러시아), Jeanett Gann(NOAA/미국),  
게스트 - Ryan Rykaczewski(FUTURE SSC liason), Sung Yong Kim & Jack Barth (AP-NPCOOS 공동의장)

### □ 의제 및 논의 결과

- TCODE 주관 워크숍 결과 보고(W3)
  - 워크숍 개요 및 결과
    - 제목: Development of a systematic approach to data management in PICES
    - 일시/장소: '18.10.25 09:00~18:00/요코하마 Media & Communications center
    - 내용: PICES의 체계적인 자료관리를 위해, PICES 생산자료에 대해 상세한 내용과 관리현황에 대해 검토하고, 이와 관련한 TCODE의 과거활동과 미래에 대해 논의 하였으며, 최종적으로 PICES Data Inventory 보완 및 PICES 자료정책(안)에 대한 의견수렴을 하였음.
- TCODE business meeting 결과
  - POMA(PICES 해양모니터링서비스)상 수상자 평가 결과 보고(이준수)
  - PICES 특별프로젝트 “Building capacity for coastal monitoring by local small scale

- fishers(FishGIS)” 수행 사항 보고(이준수)
- FUTURE SSC(PICES FUTURE 과학프로그램)에 대한 목적과 최근 활동 내용 보고 (Rykaczewski)
  - AP-NPCOOS 활동사항 보고(KIM & Barth): MONITOR 위원회 보고사항과 동일
  - TCODE 주관 워크숍(W3) 결과 논의 및 Data Inventory 재검토, 자료정책(안) 및 TCODE TOR 수정
  - 타 국제기구 및 프로그램과의 연계
    - ICES 자료 및 정보그룹(DIG), ODINWESTPAC(서태평양지역위원회 해양자료정보 네트워크), IOC/IODE(정부간해양학위원회 국제해양자료정보교환)의 활동사항 및 교류 현황 설명
  - TCODE 워크플랜 2017/2018 수행 사항 확인 및 2018/2019 결정
    - PICES 메타데이터 연합 시스템 재검토를 위해 회기간에 이메일을 통해 연락 및 향후 추진방향 결정
    - 운영중인 TCODE 웹사이트에 대해 회기간 이메일을 통해 향후 추진방향 논의
    - IOC/IODE의 ADU(제휴자료유닛) 또는 AIU(제휴정보유닛) 요구사항 확인 및 지원 구비서류 작성 후 IODE에 제출(이준수)
  - 국가보고서는 이메일로 제출



# 10

## FUTURE-SSC

※ 활동기간: 2014.10~

### □ 정부대표

참가부문(역할)	성명	소속/직급
FUTURE-SSC	강수경	국립수산과학원/연구소
FUTURE-SSC	유신재	한국해양과학기술원/책임연구원

### □ 개요

- 일시: 2018년 10월 28일(14:00~17:00), 10월 30일(18:00~21:00)
- 참석자: 위원 14명 외 옵서버 다수
  - 강수경(한국-공동의장), Steven Bograd(미국-공동의장), 유신재(한국), Jackie King(캐나다), Ian Perry(캐나다), Tom Therriault(캐나다), Guanshui Na(중국), Fangli Qiao(중국), Toyomitsu Horii(일본), Mitsutaku Makino(일본), Oleg N. Katugin(러시아), Vyacheslav B. Lobanov(러시아), Emanuele Di Lorenzo(미국), Ryan Rykaczewski(미국)
  - Observer: Hal Batcheder(PICES), Robin Brown(PICES) 및 다수 과학자들

### □ 의제 및 논의 결과

- Agenda 확인/추가제안 검토
  - 참석자 소개(1, 2차에 걸쳐 FUTURE SSC 위원이 모두 참석함)
- 회의기록 작성자 지정
  - Ryan Rykaczewski(미국), 강수경 지정(한국)
- FUTURE 최고논문상 수상자 결정
  - 최고논문상 Vanessa R. Fladmark(캐나다) (S3: Citizen engagement through shoreline cleanup litter data: British Columbia case study)
  - 최고포스터상: Hiroto Abe(일본) (S7: Sediment-associated phytoplankton release from the seafloor in response to wind-induced currents in the Bering Strait)
- 2018년 연례회의 이후 Future SSC 활동 점검
  - Future product matrix 및 load map 검토(Hal 업데이트 중 → 2019.1.1. 업데이트 완료 → 전문가그룹에게 의견 청취 2019.1.15)

- Future 종합(Synthesis) 보고서 작성 현황 보고
  - 논문 내용 점검(첨부 1) 및 미작성 부분 원고 작성자 선정(Fang li가 11월 10일까지 논문의 마지막 부분을 적기로 함)
  - Frontiers in Marine Science에 11월 30일까지 투고 완료
- Future SSC의 TOR 8 첨가: PICES의 차기 종합과학프로그램 수립 및 이행을 위한 방안을 SB(과학위원회)에 권고

8. Provide recommendations to Science Board on options for implementing PICES integrative science

- 2018 연례회의 기간 중 과학 활동(Topic session 진행)
  - S1: Understanding human and natural changes in North Pacific social-ecological marine systems: The FUTURE framework 발표
  - S3: Science communication for North Pacific marine science
  - S7: Ecological responses to variable climate changes and their applicability to ecosystem predictions
  - S6: The FUTURE of PICES: Next Steps in Understanding, Forecasting and Communicating Climate Impacts on North Pacific Marine Ecosystems  
FUTURE 미니심포지엄 형태로 진행되어 6개의 전문가그룹 보고를 포함한 10개의 발표와 토의를 병행하여 회의가 진행됨(첨부 2)
- FUTURE SSC 연락관 활동 점검
  - WG-41 연락관 Makino 박사로 지정, WG-36 강수경 박사로 변경
  - 전문가그룹과 FUTURE SSC 연락관들의 더욱 긴밀한 소통이 필요함

〈표 1〉 FUTURE SSC - 위원회, WG, Section, AP 연락관 명단

	Committee	WG	Section	AP/SG
Jacquelynne King	FIS	WG-34*, WG-36	S-CCME*	
Ian Perry	BIO*, HD	WG-32, WG-37*		
Guangshui Na	MEQ	WG-31*, WG-39*	S-HAB	
Fangli Qiao	POC, TCODE		S-CC	CREAMS
Mitsutaku Makino	HD*	WG-36, WG-41*		SG-MES
Toyomitsu Horii	MEQ	WG-30*	S-HAB*	
Sukyung Kang	FIS*	WG-34, WG-36*	S-CCME	
Sinjaee Yoo	BIO	WG-33*, WG-35*		NPCOOS
Oleg Katugin	FIS	WG-32*	S-MBM*	
Vyacheslav Lobanov	MONITOR*	WG-38		CREAMS*/NPCOOS*
Emanuele Di Lorenzo	POC*	WG-38*, WG-40		
Steven Bograd	POC, MONITOR	WG-33, WG-35	S-CC*, S-MBM	
Ryan Rykaczewski	TCODE*, BIO	WG-37, WG-40*		
Tom Therriault	MEQ*	WG-39		NIS*

\*Primary liaison members

○ 전문가그룹 활동 검토

- WG-36 Common Ecosystem Reference Points across PICES countries(PICES 회원국의 공통된 생태계 관리방안 작업반): 본 전문가그룹의 활동기한은 2019년까지이나 ICES 와 공동 WG을 2018년 가을부터 승인받기를 희망하여 연장을 권고함

○ PICES 홈페이지에 FUTURE 프로그램의 노출

- FUTURE SSC 공동의장은 PICES 사무국에 홈페이지에 게재할 내용을 송부하였으나, 모든 자료가 업로드 되어 있지 않고, 대문 페이지에서 FUTURE 프로그램의 존재가 미약함
- 사무국에서는 홈페이지 개선에 많은 시간과 노력이 소요됨으로 FUTURE SSC 위원들의 이해를 요청함

○ 2018년 연례회의 이후 FUTURE SSC 활동을 위한 요청사항

- FUTURE SSC 회기간 회의(2019년 봄)
  - 연례회의 기간 외에 SSC가 모여 회의를 하는 것은 반드시 필요하며, 실질적인 과학 연구내용을 논의하는 자리여야 함
- WG-36, WG-40 회기간 워크숍(2019년 봄)
- 2019년 연례회의 기간 중 business meeting 요청
  - FUTURE 미니 심포지엄과 plenary를 개최하지 않을 예정임으로, FUTURE 전문가 그룹의 활동을 S1에서 보고할 수 있게 30분 발표 2자리를 요청함
- 2021년 또는 2022년 FUTURE 종합심포지엄 개최 고려 요청

□ 의견/평가

- PICES의 차기 과학프로그램 개발에 우리나라 과학자들의 많은 관심과 적극적인 연구 방향 개선이 요구됨
- FUTURE diagrams(SEES)에 우리나라 연구사례를 적용하여 연구성과를 널리 알릴 필요가 있음

## (첨부 1) FUTURE 종합논문 목차

1. Challenges in Characterizing Changes in the North Pacific
  - A. Documented changes in climate-ecosystem-human dimensions
  - B. Interactions between climate-ecosystem-human dimensions
  
2. The North Pacific Social-Ecological-Environmental System(SEES)
  - A. The SEES approach
  - B. The PICES-FUTURE approach
  - C. Structure of the FUTURE program
  
3. Understanding and Solutions through a SEES Approach: 4 Case Studies
  - A. Species alteration in the western Pacific
  - B. Ecosystem impact of a marine heat wave in the eastern Pacific
  - C. Jellyfish blooms in the western Pacific
  - D. Warming and distributional shifts in highly migratory species
  
4. Bridging Scales between Local Communities and Basin Scales
  
5. Lessons Learned and New Challenges

(첨부 2) 2018 연례회의 기간 중 S6 진행순서

Time	Contents	Speakers
0900-0905	Opening by conveners	Sukyung Kang
0905-1030	FUTURE SSC presentation	Steven Bograd
	WG-35	Peter Chandler
	WG-36	Xiujuan Shan
	WG-37	Toru Kobari
	WG-38	Annalisa Bracco
1030-1050	Break	
1050-1150	WG40	Antonietta Capotondi
	WG41	Dan Lew
	S-CC	Jim Christian
	How PICES fits into the UN decade of the ocean	Robin Brown
	A new integrated approaches to investigate climate impacts on fish stocks	Shin-ichi Ito
1150-1250	Discussion on the future path of PICES science in the coming years	ALL OF US

# 11

## AP-CREAMS

※ AP-CREAMS: Advisory Panel for a Program in East Asian Marginal Sea

※ 활동기간: 2005.10~2015.10.~2019.10.(갱신)

### □ 정부대표

참가부문(역할)	성명	소속/직급
AP-CREAMS	이재학	한국해양과학기술원/책임연구원
AP-CREAMS	정희동	국립수산과학원/연구관
AP-CREAMS	김규범	서울대학교/교수
AP-CREAMS	남성현	서울대학교/교수

### □ 개요

- 일시: 2018.10.26., 09:00~17:00
- 참석자: AP-CREAMS member 9명, observer 2명
- 참석자
  - 공동의장: Joji Ishizaka(일본), Vyacheslav Lobanov(러시아), Fei Yu(중국)
  - 회원: 정희동(한국), 이재학(한국), Osamu Katoh(일본), Jing Zhang(일본), Ryan Rykaczewski (미국), Yuri Zuenko(러시아)
  - 옵저버: 남성현(한국), Hiroya Sugizaki(일본)

### □ 의제 및 논의 결과

- (1) 각국(한국, 일본, 중국, 러시아) 활동 및 계획 보고
- (2) AP-CREAMS 발간 관련 보고
  - EAST-I (PICES NPESR 2003-2008 부록): 상황 점검
  - EAST-II(황해 및 동중국해 해양학 review): POC와 MONITOR에 보고 완료, Chapter별 점검(물리 1세션, 화학 2세션 미완성 부분 검토), POC, MONITOR 및 편집위원회 review/수정 후 최종 원고 제출: 2019년 4월
- (3) NPESR-3 진행 현황을 점검
  - EAST I : zooplankton, human dimension 등 담당자 선정 필요
  - EAST II : chemistry 보강 필요

(4) Capacity building 활동

- 2019년 training course 검토: 2019년 8월(청도) 개최로 PICES에 신청 완료, 일본 OMIX 사업에서 보조 가능성 타진

(5) 국제 공동 관측

- CREAMS-III Basin Scale Survey(1999-2000) 진행상황 설명
- Ferry boat monitoring 현황 발표: 동해 - 블라디보스톡 간 모니터링 시작

(6) 국제공동프로그램 협력

- NEAR-GOOS, PACON, WESTPAC WG6, GEOTRACE 활동 및 현황 발표

(7) 기타

- AP-CREAMS Workshop 개최 추진(2019 PICES 회의 기간)
- 차기 회의(2019 interim meeting): 2019년 4월 하순, 강릉

## □ 의견/평가

- 각국의 활동사항(해양조사)의 보고가 있었으며 중국의 황해 및 동중국해 해양조사가 매우 강화된 것으로 나타남. EEZ 관측의 어려움으로 각국의 자국 EEZ 동시 조사 후에 자료 교환 등의 현실적 접근이 필요할 것으로 판단됨
- NPESR 2003-2008 부록은 AP-CREAMS에서는 이미 종료되었는바 PICES의 빠른 진행을 건의하기로 함
- EAST-II 해양학 발간은 이번 회기에 PICES에 원고를 제출하였으며 PICES 내부의 검토 및 수정을 거쳐 2019년 중간 AP-CREAMS 회의 전까지 최종 원고를 제출하기로 함
- NESPER-3의 19구역(동해) 및 21구역(동중국해) 지행 주관자는 각각 Vyacheslav Lobanov (러시아)와 Fei Yu(중국)이며, 진행 상황의 설명과 토의가 있었음
- PICES 회원국 사이의 관측 협력은 잘 이루어지고 있음. CREAMS-III 광역(동해) 해양 조사를 2019, 2020년에 수행할 예정임. 선박(Ferry boat) 활용 해양감시는 동해 - 블라디보스톡 간 'Eastern Dream'호를 활용하여 시범 감시에 들어갔으며 관측망 확대 계획이 발표되었음
- 2019년 AP-CREAMS 활동으로 Summer school(Training course)은 해양혼합을 주제로 중국 청도에서 개최 예정이며, 2019년 PICES회의 기간 중 워크숍을 추진하기로 하였음
- 2019년 중간 AP-CREAMS 회의는 2019년 4월 말경 강릉에서 개최하기로 하였음

- AP-CREAMS의 한국측 공동의장 김경렬 교수의 사퇴로 이재학(한국해양과학기술원)이 공동의장을 맡기로 하였음. 또한 남성현 교수(서울대)를 대체 회원으로 추가하였음 PICES 웹사이트에 공동의장은 수정이 되었으며 남성현 교수의 추가는 아직 수정이 되지 않았음(2018년 12월)



2018 AP-CREAMS 회의 참가자



## 12 AP-NPCOOS

※ AP-NPCOOS: Advisory Panel on North Pacific Coastal Ocean Observing Systems

※ 활동기간: 2015.01~

### □ 정부대표

참가부문(역할)	성명	소속/직급
AP-NPCOOS	김성용	한국과학기술원/교수
AP-NPCOOS	이재학	한국해양과학기술원/책임연구원

### □ 회의개요

○ 일시: 2018년 10월 28일, 09:00~12:30

○ 참석자: 공동의장 - Jack Barth(OSU/미국), 김성용(KAIST/한국)

회원 - Kim Juniper(ONC/캐나다), Chalres Hannah (DFO/캐나다), 이재학(해양연구원/한국), Akash Sastri(U. of Victoria/캐나다), Naoki Yoshie(에히메대학/일본), Vyacheslaw Lobanov(POI/러시아), Sanae Chiba(JAMSTEC/일본), Chuanxi Xing(NMEMC/중국)

관찰자 -Alex Harper(CeNCOOS/미국)

### □ 의제 및 논의 결과

○ 2018년 국가별 연안관측 시스템 업데이트

○ 2018년 U. of Victoria에서 진행된 Summer School 업데이트

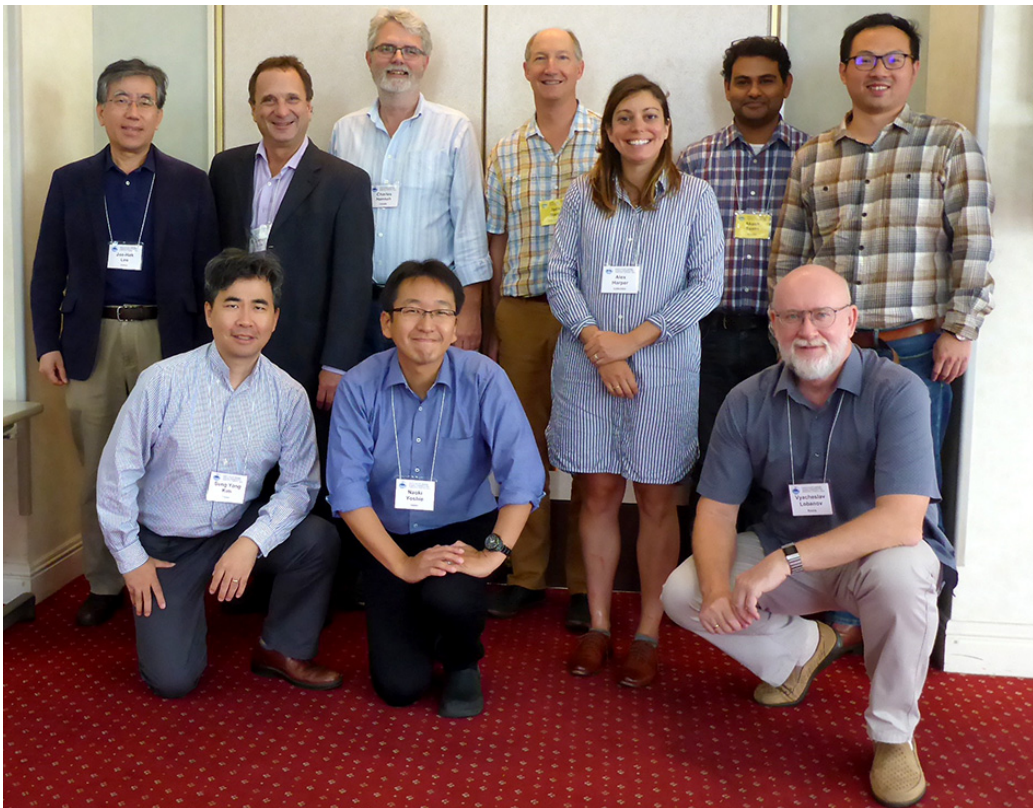
- 104 지원서 중에 14개 나라 28명의 참석자 선정(일본을 제외한 5개 PICES 참여국)

- IOS 및 ONC 에서의 자료수집 및 분석강의



2018 Summer School 단체사진 및 Cruise 샘플링 전 소그룹 사진

- Saanich Inlet에서의 Strickland를 이용한 샘플링 크루즈 및 DFO의 정점관측자료 분석
- Ferry 자료 수집 및 Van Aqua 방문을 통한 마이크로 플라스틱 강의
- 국가별 연안관측 시스템에 대한 소개 및 성공사례를 논문으로 출간준비(계속)
  - 논문준비를 위한 잠정적인 시한으로 논문의 주요 template 제공(11/1/2018), 초록, 저자, 제목 선정(11/1/2018), 논문 작성 완료(3/1/2019), 논문 취합 및 세부 조정후 투고(4/1/2019)
- 2019 연례회의중 과학세션 제안(1일): Coastal ocean observing systems & how they deliver on the recent Essential Biological and Ecological Ocean Variables(EOVs)
  - 각 PICES 국가의 연안관측 프로그램에서 진행중인 주요변수에 대한 공동논의 및 FUTURE 목표에 부합한 필수 Biological 및 Ecological 해양변수를 제안
  - 2019년 연례회의가 열리는 캐나다의 앞선 관측 기술에 대한 예제를 통해 과학세션의 공감대 형성과 AP-NPCOOS의 자문기능을 만족시킬 것으로 기대함
- 2019 연례회의중 워크숍 제안(1일): Bioacoustics
  - 생물음향학을 이용한 상위개념의 해양생물을 관측하는 기술을 공유하는 목적
  - 관측 기술 및 관측 자료의 검증에 대한 구체적인 논의가 진행될 예정



AP-NPCOOS 회의 각국대표단 사진

## 13 AP-NIS

※ AP-NIS: Advisory Panel on Marine Non-indigenous Species

※ 활동기간: 2016.06~

### □ 정부대표

참가부문(역할)	성명	소속/직급
AP-NIS	신경순	한국해양과학기술원/책임연구원
AP-NIS	임월애	국립수산과학원/연구관
AP-NIS	최근형	충남대학교/교수

### □ 회의개요

- 일시: 2018년 10월 27일(09:00~18:00)
- 참석자: 의장 Thomas W. Therriault(캐나다), (Members) 임월애(한국), 최근용(한국, 충남대), Masaya Katoch(일본), (Observers) 박태규(한국), Toyomitsu Hori(일본), Takafumi Yoshida(NOWPAP), Doding Lu(중국), Pengbin Wang(중국) 등

### □ 의제 및 논의 결과

AP-NIS 위임사항(ToR)에 대한 논의

- PICES 2018에 이어지는 AP-NIS는
  - NIS 연구 프로젝트(펀드가 있는)의 가능성을 모색
    - 향후 수년간 해양외래종에 대해 하여야 할 과제들에 대해 논의함. 첫 해에는 우선적으로 데이터베이스를 구축하는 것이고, 둘째 해에는 데이터베이스 업데이트, 그리고 기후변화를 고려한 외래종 확산모델링에 대한 연구를 함께하기로 의견을 모았음. 이와 관련 예산을 MEQ에 제안할 것으로 보임
  - NIS 국가보고서를 위한 “템플릿” 개발
    - 데이터베이스 업데이트 주기는 1년에 한 번으로 결정하였고 그 해에 발생한 주요 변화를 간략히 엑셀파일로 정리하여 취합하기로 함. 양식은 캐나다 외래종 서류 양식을 따라하기로 결정함. 이러한 과정을 통해 외래종의 확산에 대한 PICES 회원국들 사이에 정보공유를 갖기로 함
  - 다음 “Big” 이슈에 대한 글로벌 설문조사로의 링크 회람(여러 언어로 제공)

- AP-NIS는 먼저 모니터링 및 조기발견(ToR 2) 모범사례에 초점을 맞추기로 합의하였음
  - PICES-2019(ToR 4) 1일 워크숍 제안
  - PICES-2019에서 PICES-2020으로의 신속한 대응 및 제어(ToR 2)를 위한 모범사례에 중점
  - AP-NIS는 NOWPAP 회원들과의 NIS 발전에 기초하여 NOWPAP과 계속 논의하여 정보를 교환하고 캐나다와 미국에서 무료 노력을 수행하기로 동의
    - 각 국의 해양외래종 모니터링, 현황 변화, 대응방안, 외래종 관련 법령 등에 대한 논의가 있었고 한국의 법규 및 외래종 연구사례 등에 대한 발표를 하였음. 일본의 경우 아예 해양생태 모니터링 자체가 없음. 중국은 대표단이 불참하였음
- AP-NIS는 AquaNIS를 데이터베이스를 사용하여 북태평양의 NIS 정보를 교환하기로 합의함
  - 가능한 많은 정보를 WG-21 데이터베이스에서 추출하려고 함
  - 각 국가는 PICES-2019 보다 먼저 리뷰와 업데이트를 검토함
  - AP-NIS 의장은 데이터베이스 개발자와 협력하여 PICES 데이터를 업로드하고 교환할 수 있도록 세부 사항을 마무리함
    - WG-21 때 일본정부의 지원으로 만들어진 PICES NIS 데이터베이스는 미 환경국이 원래 보관하기로 했으나 실무 담당자이자 데이터베이스 개발자였던 Henry Lee가 퇴직하고 난 후 사라져 버렸음. 따라서 새로 작성하기로 하였음. 문제는 새로운 데이터베이스를 개발할건지, 이 경우 예산확보가 문제임, 아니면 기존 데이터베이스를 활용할건지 논의 한 결과 ICES가 가지고 있는 데이터베이스인 AquaNIS를 활용하기로 결론지음. 즉 우리가 자료를 AquaNIS 로 취합하여 보내주면 ICES에서 전문가 검토를 거쳐 데이터베이스에 올려주기로 함
- 기타 논의 사항
  - 공동 연구로 선체부착생물에 대한 공동연구 추진에 대한 논의가 있었으나 일본에서 이전에 시도한 결과 시료채집과 관련한 허가를 받기가 너무 어렵다는 의견이 있어 미국의 전문가들과 추가 상의해보기로 함



〈회의 장면〉

## 14 WG-32

※ WG-32: Working Group on Biodiversity of biogenic habitats

※ 활동기간: 2015.01~2017.12.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-32	문혜원	국립해양생물자원관/연구원
WG-32	우선옥	한국해양과학기술원/책임연구원
WG-32	최광식	제주대학교/교수

### □ 회의개요

- 일시: 2018년 10월 27일, 09:00~18:00
- 참석자: Masashi Kiyota, Go Suzuki, Mai miyamoto(Japan)/ Janelle Curtis, Anya Dunham, Jackson Chu(Canada)/ Aleksandr Zavolokin(Russia)/ Hye-won Moon, Seonock Woo(Korea)

### □ 의제 및 논의 결과

- 상업적으로 중요한 종과 함께 서식하는 생물 집단에 관한 논의
  - 생태계에서 Biogenic habitats의 역할 논의: 물리적 구조물을 제공, 파도나 조류의 변화를 야기하고 생지화학 순환뿐만 아니라 1,2,3차 생산에 기여함 → 다양한 생물로 하여금 먹이와 서식처를 제공
- Biogenic habitats 유형에 관한 구체적 논의

Biogenic habitat type	북태평양 내 분포
Seagrass meadows	Canada, Japan, China, Russia, Korea, USA
Kelp forests	Canada, Japan, China, Russia, Korea, USA
Coral communities(cold water)	Canada, Japan, China, Russia, Korea, USA
Sponges(glass sponge reefs)	Canada, USA
Salt marshes	Japan, Russia, Korea, USA
Mussel reefs	Canada, Japan, China, Russia, Korea, USA
Oyster reefs	Canada, China, Korea, USA
Bryozoan beds	Japan

Biogenic habitat type	북태평양 내 분포
Mangrove forests	China
Coral reefs(warm water)	Japan, China, Korea
Methane seeps	Canada, Japan, USA
Hydrothermal vents	

○ 논문투고 준비

- (주제) “Ecological value of deep water biogenic habitats for commercially(and ecologically) important fish and invertebrate species in the North Pacific”

□ 의견/평가

- 서식지 유형별 각 국가 내 분포여부 대해서 토론 하였고, 우리나라의 경우 중요한 biogenic habitats로서 제주도 남단에 잘 발달된 연산호 군락지(soft coral communities)를 추가 제안함
- 논의된 결과를 토대로 WG-32 최종 과학보고서 제출 후 신규 워킹그룹 준비
- 새로운 멤버들의 유입 및 PICES 참여독려 방안 논의됨(학회장소, 참가비, 실험실 연구진 참석독려 등)
- UN이 하고 있는 주제들과의 연관성 분석 후 PICES내의 WORKING GROUP간의 협동 및 협력이 필요하다는 의견 제시됨
- YOUNG SCIENTIST 참여시키기 위한 펀딩 마련 방안 논의됨

## 15 WG-33

※ WG-33: Climate change and biologically-driven ocean carbon sequestration

※ 활동기간: 2015.10~2018.10.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-33	권은영	서울대학교/교수
WG-33	최근형	충남대학교/교수
WG-33	현정호	한양대학교/교수

### □ 회의개요

- 일시: 2018년 10월 28일
- 참석자: 현정호(한국), Ya-Wei Luo(중국), Nianzhi Jiao(교수, 중국), Chuanlun Zhang(중국), Louis Legendre(프랑스), Angelica Pena(캐나다) 외 PICES 관계자 2인

### □ 의제 및 논의 결과

- PICES-ICES Joint WG 33 Business Meeting 참석 및 연구결과 발표  
(첨부: PICES-ICES WG 33 Business Meeting Agenda)  
(첨부: WG33\_Business meeting\_발표자료(현정호))
- WG-33 종료에 따른 활동보고(첨부: WG33\_Summary\_Final Report)
- WG-33 활동보고서 작성/제출 논의

### □ 의견/평가

- Natinal Science Review(Impact Factor 8.843) 논문 8편 포함 총 10편의 저명 학술지에 연구논문 게재 및 총 4회의 WG 모임을 통해 제안했던 Terms of Reference를 모두 소화하였음
  - Document and identify current knowledge[6 papers]
  - Standardized protocols[1 paper]
  - New experimental approaches and facilities[1 paper]
  - Numerical modeling[2 papers]
  - Annual workshops / business meetings[Hong Kong, Qingdao / Beijing, Vladivostok,



Yokohama]

- Theme sessions in science symposium[Vladivostok, Washington]
- Special issue of a scientific journal[3 Special Topics]
- Provide scientific advice to international organizations such as IPCC  
[1 IPCC Lead Author]
- Publish a final report: To come



WG-33 Final Business Meeting(October 28, 2018, Yokohama, Japan)

# 16

## WG-34

※ WG-34: Joint PICES/ISC Working Group on Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish

※ 활동기간: 2015.10~2018.10.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-35	강동진	한국해양과학기술원/책임연구원
WG-35	강정훈	한국해양과학기술원/책임연구원
WG-35	김은정	국립수산과학원/연구사
WG-35	남성현	서울대학교/교수
WG-35	유신재	한국해양과학기술원/책임연구원
WG-35	최민규	국립수산과학원/연구사

### □ 회의개요

- 일시: 2018년 10월 27일
- 참석자: 유신재, Peter Chandler, Hal Batchelder, Sonia Batten, Bill Sydeman, Yu Fei, Steve Kasperski, Matt Baker, Ivonne Ortiz, Yury Zuenko, Vyacheslav Lobanov, Kazuaki Tadokoro, Keith Criddle, Tsuneo Ono, 주세종, 강수경, 남승현, Steven Bograd 등

### □ 의제 및 논의 결과

- ToR 검토 및 수정  
ToR 중 Alaska Fisheries Science Center's Resource Ecology and Ecosystem Modeling팀 과 협력한다는 항목 삭제
- 2018 증기 ISB 보고 사항 검토  
특기할 사항은 일정으로 6월까지 지역챗터 작성이 끝나고 7~8월에 Synthesis 워크숍을 개최하여 2019년 봄에 NPESR-3 발간을 완료한다는 것임. 현재 이 일정대로 진행되지 않아 일정 조정이 불가피
- ETSO 제출 현황 보고  
2018년 초 이후에 거의 제출되지 않고 있으며 3개의 지역(베링, 알래스카, 동해)만 20

개 이상의 ETSO가 제출되고 나머지는 미미하여 원고 작성에 미흡

○ 지역별 원고 진척 검토

지역별 원고의 상태를 점검한 결과 대부분의 지역의 원고가 부분적으로만 취합 - 작성되었으며 원래 일정에 비해 지연되고 있음. 지연의 원인을 토의한 결과 크게 3가지가 있음. 즉, 1) 국가별로 백개가 넘는 ETSO가 지명되었으나 실제로는 거의 제출되지 않았음. 2) ETSO 제출에 관련한 사람들(coordinator, authors)의 역할이 기대대로 시행되지 않았음. 3) ETSO가 충분히 제출되지 않은 사항에서 주저자들이 대처를 하지 못하였음

○ Implementation plan의 검토 및 수정

지역 저자들이 활용할 수 있는 기본 ETSO(위성, 부이, 반복관측점 등)을 제공. 이를 위하여 전문가를 고용하여 12월까지 처리. 비용은 NPESR 자체예산에서 사용. 이후에도 ETSO가 계속 제출될 수 있게 지속적으로 노력. 지역별로 분량 및 자세함에 대한 혼돈이 있는바 분량은 30쪽 이내, 지역챕터의 목적이 종합챕터 작성의 기초임을 주지 시킴

○ 종합 워크숍(Synthesis workshop) 및 전체 일정의 수정

편집위원들 다수가 위원회 위원장임을 고려하여 종합워크숍을 중기 SB 직전에(4월 또는 5월) 동일 장소에서 개최할 것을 제안하였음. 이를 위하여 지역챕터들을 2그룹으로 나누어 빨리 진행된 지역은 원고를 1월말까지 그 외에는 2월말까지 제출하기로 함. 2019년 연차총회때 마무리 짓는 것으로 조정함(아래 표 참조)

		Key Milestones
2018	December	<ul style="list-style-type: none"> <li>• Foundational ETSOs provided to lead authors</li> <li>• Lead authors continue to develop regional assessments</li> </ul>
2019	January	<ul style="list-style-type: none"> <li>• First half of regional assessments submitted to Editorial Board</li> </ul>
	February	<ul style="list-style-type: none"> <li>• Second half of regional assessments submitted to Editorial Board</li> </ul>
	March/April	<ul style="list-style-type: none"> <li>• Editorial board reviews regional assessments</li> </ul>
	April/May	<ul style="list-style-type: none"> <li>• <b>Synthesis workshop and writing of NPESR-3 just prior to ISB</b></li> </ul>
	Summer	<ul style="list-style-type: none"> <li>• Submit NPESR-3 for review by Editorial Board, submit to Monitor and Future</li> </ul>
2019	PICES 2019	<ul style="list-style-type: none"> <li>• <b>Present NPESR-3</b></li> </ul>

○ Working group 활동 보고서 작성

Co-chairs(유신재, Peter Chandler)가 요약하여 작성

## □ 의견/평가

### ○ 지연의 이유

북태평양생태계보고서 2판까지는 지역주저자를 선정하고 이들이 자료를 확보하고 있는 공저자를 초청하여 원고를 작성하였으나 3판부터는 ETSO 제출 후 제출된 ETSO를 활용하여 원고를 작성하는 것으로 절차를 바꾸었음. 시스템의 교체가 필연적으로 일시적인 혼란을 가져온 것으로 판단되며 3판 준비는 과거 시스템과 ETSO 시스템의 혼용이 불가피함. 4판부터 ETSO 시스템으로 순조롭게 이행될 수 있도록 체계적인 접근이 필요함

### ○ 지역명칭의 혼란

PICES에서 채택해온 관례에 따르면 개별저자가 작성해온 원고의 표기를 존중하되 PICES 기구 전체의 의견반영이 필요한 제목, 목차 등은 SB/GC의 결정을 따르는 것인데 3판의 표기에 대해 관련된 사람마다 이해가 다름. 동해를 제외한 다른 지역해를 번호로 표기하는 것은 과학적 효용성에서 적절하지 않음. 동해 챗터의 표기도 PICES 기존 관례를 준수하는 것이 바람직함. 다만 종합 장에서 어떻게 동해를 표기할지 협의가 필요함. GC에서 명칭에 대해 세부사항에 대한 지침을 일괄 타결하여 공지하는 것이 혼란을 줄이고 출간을 앞당길 수 있을 것임

### ○ 종합챗터의 준비

종합챗터 작성은 북태평양 전체에 대한 정보를 취합할 뿐 아니라 비교분석을 통해 북태평양 전체의 생태계 상태와 변동 경향을 종합하는 것으로 적어도 2개월의 준비작업과 종합워크숍의 개최, 그 결과를 정리하여 30~40쪽의 원고 작성 작업 등이 필요함. 현재 종합챗터 작성을 누가 리드할지 정해지지 않았으나 WG-35의 공동의장인 유신재, Peter Chandler가 잠재적 후보임. 유신재가 종합 장의 책임저자를 맡을 경우 내부인 건비 등의 지원이 필요함

## 17 WG-35

※ WG-36: Common Ecosystem Reference Points across PICES Member Countries

※ 활동기간: 2016.11~2019.10.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-36	이상철	한국해양수산개발원/전문연구원

### □ 회의개요

- 일시: 2018년 10월 26일, 09:00~18:00
- 참석자: 류종성(HD 위원, WG-36 한국 대표), 강수경(FUTURE 공동의장), Jennifer Boldt(WG-36 공동의장, 캐나다), Xinjuan Shan(WG-36 공동의장, 중국), Vladimir Kulik(WG-36, 러시아), Elliott Hazen(WG-36, 미국), Caihong Fu(WG-40, 캐나다 참관인), Mary Hunsicker(WG-36, 미국, 컨퍼런스 콜로 참여)

### □ 의제 및 논의 결과

- 의제
  1. 참석자 소개
  2. 의제 채택
  3. 배경설명
  4. TOR 리뷰 및 주요 업무 확인
  5. 회원국 해양자료 보유현황 체크
  6. PICES-2019 workshop 및 intersessional workshop 제안서 작성
  7. 기타 사항
  8. 폐회
- 주요 논의사항
  - 5개국(일본 불참)의 자료 현황을 공유하고 WG-28의 결과물인 list of indicators에 대해 각국의 자료 가용성을 파악
  - WG의 운영기한인 2019년 10월까지 연구 완료가 불가능하여 WG 운영기간을 1년 연장할 것과 2019년 상반기 또는 하반기에 최소한 3일간 workshop이 필요하다데 모두 공감하여 이에 대한 제안서를 작성하여 FUTURE 위원회에 제출함

## □ 의견/평가

- WG-36은 미국팀에서 개발한 해양생태계 변동 및 훼손을 사전에 인지할 수 있는 분석 모델을 북태평양 전 해역으로 확장적용하는 것이기 때문에 적극적으로 참여하면 선진국의 분석기술을 이전받을 수 있음
- 한-중, 한-일 수산협정으로 인해 한, 중, 일 3개국은 민감한 수산자료의 공개가 어려워 분석에 애로가 있음. 어업협정에 이용될 소지가 없는 공간정보를 삭제한 수산자료를 공개할 수 있도록 전향적인 자세가 필요함
- 해양환경 장기간 자료는 한국과 중국에서 가장 우수한 자료를 보유하고 있어 한-중 공동연구를 별도로 추진하는 것을 적극적으로 고려해야 함
- 금번 비즈니스 미팅에 일본측은 불참
- 비즈니스 미팅 전에 각국의 제도 및 과학적 전략을 기술한 TOR 1을 제출하도록 되어 있었으나 미국과 중국만 제출한 상태였으며, 이를 인지한 본 참가자가 TOR 1을 작성하여 신속하게 제출함
- 향후 intersessional workshop과 2019년 PICES workshop에 본 참가자가 convenor로 참여하기로 함

※ WG-37: Zooplankton production methodologies, applications and Measurements in PICES regions

※ 활동기간: 2016.11~2019.10.

## □ 정부대표

참가부문(역할)	성명	소속/직급
WG-37	강정훈	한국해양과학기술원/책임연구원
WG-37	강형구	한국해양과학기술원/책임연구원
WG-37	장민철	한국해양과학기술원/책임연구원

## □ 회의개요

- 일시: 2018년 10월 28일
- 장소: Workpia Yokohama Convention Center, Oshidori
- 참석자: Toru Kobari(의장), Akash Sastri(부의장), Naoki Yoshie(AP-NPCOOS), Kazuaki Tadokoro, 주세종 박사(BIO), 강정훈, Chih-hao Hsieh(National Taiwan University) 외 2명(캐나다 연구자 1인, 미국 연구자 1인), 다수의 학생들.

## □ 의제 및 논의 결과

1. 각 대표단 및 참석자 소개
2. ToR 설명
  - 2-1. 자연 개체군과 군집의 동플 생산력을 측정하기 위한 전통적 및 생화학적 방법들의 가정, 최근 진보상황 및 한계를 요약
  - 2-2. 전통적 및 생화학적 동플 생산력 방법의 절차와 추천사항들을 생산하고, 웹사이트 상에서 전 세계적으로 이용케 함
  - 2-3. 동플생산력을 측정하기 위한 실질적인 모델을 개발
  - 2-4. 지역 및 세계적 mapping을 위한 동플생산력측정의 교환을 위한 정보교환 플랫폼을 구축
  - 2-5. PICES, ICES 및 개발국가들과 동플생산력 측정을 위한 과학자와 실험실 네트워크를 구축
  - 2-6. PICES, ICES, IMBER를 통한 국제적 협력의 활성화

- 2-7. 최종결과 요약보고서를 출판
3. 2018년 Ocean Science Meeting에 대한 보고  
 - 2018년 2월 15일, 미국 오레곤 주, 구두발표 6개, 포스터발표 9개
4. Workshop에 대한 보고  
 - 2018년 10월 25일, 8개 구두발표, 4개 포스터
5. Practical Workshop Phase I  
 현장 동물플랑크톤 생산력 측정방법에 관하여 수행  
 참여학생: 22명
6. 미래계획에 관한 보고
- 6-1. 화학적 방법에 관한 review paper는 Advances in Marine Biology에 이미 출판됨
- 6-2. 전통적 방법에 관한 방법은 작성 중이며, Progress in Oceanography에 투고될 예정임
- 6-3. 전통적 및 화학적 방법의 지침과 추천
- 6-3-1. 화학적 방법들의 절차와 추천내용이 완성됨. 추후 PICES website와 final report에 포스팅될 것임
- 6-3-2. 전통적 방법들을 작성 중에 있음
- 6-3-3. time-series의 동물플랑크톤 생산력을 평가하기 위한 practical model들을 개발  
 \* Ikeda-Motoda and/or Banse-Mosher models가 고려 중임  
 \* T. Kobari와 K. Tadokoro가 Ikeda-Motoda model을 적용하여 수행함. 다른 워킹그룹 멤버들도 자국의 동플 시계열자료나 data-sets를 이용하여 해보기를 권장함.  
 한국에 문의함
- 6-3-4. PICES, ICES, IMBER의 과학기구를 통한 동물플랑크톤 생산력의 국제적 협력을 촉진함
- 6-3-5. “Phase 2 practical workshop on zooplankton production methodologies and measurements” 2019년 annual meeting 전에 수행할 것임
- 6-3-6. 최종보고서 작성 부분에 지역해의 동물플랑크톤 생산력 측정법 작성: 한국측 기여 확인  
 - 우리측 발표함. 향후 자료를 인입(2 가지)  
 \* 모델링(empirical model)의 time-series결과 자료 있는지?  
 \* Empirical model 값이 있는 것으로 보이는데, 한국지역의 대표모델이 있는지?



<p><b>Summary of methods for zooplankton production in Korea</b></p> <p>Hyung-Ku Kang, Garam Kim, Seok Hyun Yoon, Min-Chul Jung</p> <p>2018 PICES Annual Meeting – WG37 in Yokohama</p>	<p align="center">Summary of Zooplankton Production in Korea</p> <table border="1"> <thead> <tr> <th>Title</th> <th>Journal</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1. Production of <i>Acartia steueri</i> (Copepoda: Calanoida) in Illewang Bay, Southeastern Coast of Korea</td> <td>Journal of Oceanography, 61: 327-334, 2005</td> <td>Production rate</td> </tr> <tr> <td>2. Production of <i>Acartia oweri</i> (Copepoda: Calanoida) in Illewang Bay, southeastern coast of Korea</td> <td>Journal of Marine Systems, 67: 236-244, 2007</td> <td>Production rate</td> </tr> <tr> <td>3. Production of the Copepods <i>Euchaeta plume</i> and <i>Paracalanus raschii</i> in the Southeastern Sea of Korea</td> <td>Ocean and Polar Research, 40: 115-125, 2018</td> <td>Production rate</td> </tr> <tr> <td>4. Egg production of the copepod <i>Acartia hongi</i> in Kyeongsu Bay, Korea</td> <td>Journal of Marine Systems, 67: 217-224, 2007</td> <td>Egg production rate</td> </tr> <tr> <td>5. Temperature-regulated egg production rate, and seasonal and interannual variations in <i>Paracalanus parvus</i></td> <td>Journal of Plankton Research, 35: 1035-1045, 2013</td> <td>Egg production rate</td> </tr> </tbody> </table>	Title	Journal	Remark	1. Production of <i>Acartia steueri</i> (Copepoda: Calanoida) in Illewang Bay, Southeastern Coast of Korea	Journal of Oceanography, 61: 327-334, 2005	Production rate	2. Production of <i>Acartia oweri</i> (Copepoda: Calanoida) in Illewang Bay, southeastern coast of Korea	Journal of Marine Systems, 67: 236-244, 2007	Production rate	3. Production of the Copepods <i>Euchaeta plume</i> and <i>Paracalanus raschii</i> in the Southeastern Sea of Korea	Ocean and Polar Research, 40: 115-125, 2018	Production rate	4. Egg production of the copepod <i>Acartia hongi</i> in Kyeongsu Bay, Korea	Journal of Marine Systems, 67: 217-224, 2007	Egg production rate	5. Temperature-regulated egg production rate, and seasonal and interannual variations in <i>Paracalanus parvus</i>	Journal of Plankton Research, 35: 1035-1045, 2013	Egg production rate	<p><b>Method: Production estimation</b></p> <p>Population production rate (<math>P</math>, <math>\mu\text{gC} \cdot \text{m}^{-3} \cdot \text{day}^{-1}</math>) of <i>A. steueri</i> was calculated using the growth rate method (Stankings et al., 1992; Kang and Yoon, 1996a; Kang et al., 1996)</p> $P = \sum_{i=1}^n (B_i \times D_i) + B_n \times D_n$ <p><math>B_i</math>: biomass (<math>\mu\text{gC} \cdot \text{m}^{-3}</math>) of stage <math>i</math>  <math>B_n</math>: biomass (<math>\mu\text{gC} \cdot \text{m}^{-3}</math>) of adult female  <math>D_i</math>: instantaneous growth rate (<math>\text{day}^{-1}</math>) of stage <math>i</math>  <math>D_n</math>: specific egg production rate (<math>\text{day}^{-1}</math>) of adult female</p> <p>for weight (W):  <math>\text{Log} W = -4.188 + 1.451 \text{Log TL}</math>  <math>\text{Log} W = -3.508 + 1.166 \text{Log PL}</math></p> <p><math>W</math>: gonosomic weight (<math>\mu\text{gC}</math>)  <math>TL</math>: total length (<math>\mu\text{m}</math>)  <math>PL</math>: pleonitic length (<math>\mu\text{m}</math>)</p> <p>Specific egg production rate of adult female was estimated by substituting ambient water temperature (<math>T</math>, <math>^{\circ}\text{C}</math>) and chlorophyll <math>a</math> concentration (<math>\text{mg} \cdot \text{chlor} \cdot \text{m}^{-3}</math>) into the equation of Kang and Kang (1999a)</p> $E_p = 0.00206T - 0.51 / 0.00192 + 1$ <p><math>E_p</math>: body carbon weight (<math>\mu\text{gC}</math>) of stage <math>i+1</math>  <math>W</math>: body carbon weight (<math>\mu\text{gC}</math>) of stage <math>i</math>  <math>D</math>: time duration (day) of stage <math>i</math>  <math>D</math> was estimated from the equation of Kang and Kang (1999a)</p> <p>Annual production of <i>A. steueri</i> was <math>25.5 \text{ mgC} \cdot \text{m}^{-3} \cdot \text{day}^{-1}</math> (or <math>166 \text{ mgC} \cdot \text{m}^{-3} \cdot \text{day}^{-1}</math>), showing peaks in November, May and July. Aligned with a small peak in February and low production in December, April and September. October.</p> <p>There were no significant relationships between the daily production rate of <i>A. steueri</i> and temperature or chlorophyll concentration, indicating that unknown other factors might be related to the variation of the production rate.</p>
Title	Journal	Remark																		
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<p><b>발표자료</b></p>																				

7. PICES 2019 workshop(Canada)에 대한 계획보고

제목: PICES/ICES collaborative research initiative: Toward regional to global measurements and comparisons of zooplankton production using existing data sets.

구성: 초청연사발표, 기여과학자 발표, 토의 및 논의

일정: 1-day

□ 의견/평가

- 2000년에 발간된 ICES Zooplankton Methodology Manual에서 기록된 방법을 염두에 두고, 2차생산력의 측정방법 중 생화학적 방법들이 추가되었고, 상세히 정리하여 기록함
- 동물플랑크톤의 2차생산력 측정법의 통일과 새로운 방법의 공유를 위해 논문게재 외에도 학생들의 교육참여 기회를 제공함
- WG-37활동을 통해 국내에서 활동이 뜸해진 동물플랑크톤 2차생산력 측정에 관한 기회와 관심이 더욱 넓어질 수 있을 것으로 기대함

\* 부록(Final report의 목차 및 담당)

7. Publish a final report summarizing results

- Dr. Kobari proposed tentative plan of contents and responsible authors for the final report referring the previous reports for the past working groups as follows.

In Memoriam(Toru Kobari and Akash Sastri)

Executive Summary(Toru Kobari, Akash Sastri and Lidia Yebra)

1) Introduction(Toru Kobari)

Background and Rationale

Working Group Timeline

- 2) Principle, advantages/disadvantages and recommendations
  - 2-1) Traditional methodologies(from review paper) (Toru Kobari)
    - Natural Cohort
    - Artificial Cohort
    - Molting Rate
    - Egg Production
    - Empirical Models
  - 2-2) Biochemical approaches(from review paper) (Lidia Yebra)
    - Nucleic Acid Indices
    - Enzymatic Methods
    - Chitobiase Activity
    - Protein Synthetases Activity
- 3) Procedures
  - 3-1) Traditional methodologies
    - Artificial Cohort(Russ Hopcroft and Hui Liu)
    - Molting Rate(Russ Hopcroft and Toru Kobari)
    - Egg Production(Shinji Shimode)
    - Empirical models(Koichi Ara)
    - Physiological models(Toru Kobari)
  - 3-2) Biochemical approaches(from review paper)
    - Nucleic Acid Indices(Toru Kobari)
    - Chitobiase Activity(Akash Sastri)
    - Protein Synthetases Activity(Lidia Yebra)
- 4) Zooplankton Production Measurements in Regional Seas(review on the previous studies)
  - Gulf of Alaska(Russ Hopcroft and Hui Liu)
  - Bering Sea(Akash Sastri)
  - Okhotsuk Sea(Russian members?)
  - Western North Pacific(Toru Kobari)
  - Japanese Coast(Toru Kobari)
  - Korean Coast(Se-Jong Ju and Jung-Hoon Kang)
  - East China Sea(Chinese members?)

- 5) Application of Empirical Models to Zooplankton Data Sets in PICES region
  - Station Papa(Akash Sastri)
  - West Coast of Vancouver Island and Strait of Georgia(Akash Sastri)
  - Inland Sea of Japan(Kazuaki Tadokoro)
  - Western North Pacific(Toru Kobari)
  - Oregon coast(Jennifer Fisher and Samantha Zeman)
  - Bering Sea(Dave Kimmel? and/or Russ Hopcroft?)
- 6) Comparisons among Methodologies
  - Protein Synthetase Activity vs. Natural Cohort(Toru Kobari)
  - Chitobiase Activity vs. Natural Cohort(Akash Sastri)
- 7) Concluding Remarks(Toru Kobari, Akash Sastri and Lidia Yebra)
  - Recommendations
  - Future Prospects
- 8) Acknowledgements(Toru Kobari)
- 9) References
- 10) Supplemented Information(Toru Kobari)
  - Appendix 1 WG37 Terms of References
  - Appendix 2 WG37 Membership
  - Appendix 3 Business Meeting Reports from Past PICES Annual Meetings
  - Appendix 4 Session/Workshop Summaries of International Conference Related to  
WG37
  - Appendix 5 Bibliography
  - Appendix 6 Information on Laboratories Working on Zooplankton Production

## 19 WG-38

※ WG-38: Working Group on Mesoscale and Submesoscale Processes

※ 활동기간: 2016.11~2019.10.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-38	김성용	한국과학기술원/교수
WG-38	박영규	한국해양과학기술원/책임연구원

### □ 회의개요

- 일시: 2018년 10월 27일, 09:00~18:00
- 참석자: 의장 - Annalisa Bracco(GIT/미국), Hiromichi Ueno(홋카이도 대학/일본)  
회원 - Tetjana Ross(IOS/캐나다), Daisuke Hasegawa(TNFRI/일본), Sachihiko Itoh(AORI/일본), Carol Ladd(PMEL/미국), Elena Ustinova(LFO/러시아), Elena I. Ustinova(PSRFC, TINRO-center/러시아), 박영규(해양연구원/한국), Yisen Zhong(상하이자우퉁대학/중국), Yoshikazu Sasai (JAMSTEC/일본), 김성용(KAIST/한국)

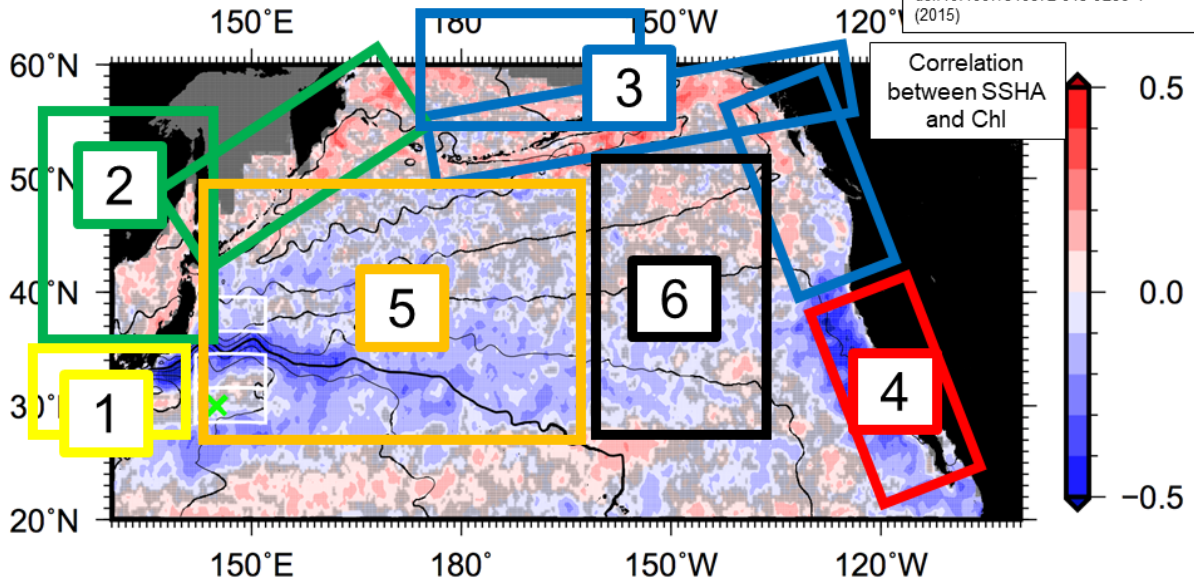
### □ 의제 및 논의 결과

- Mesoscale and submesoscale processes에 대한 참석자별 관심주제와 연구중인 내용의 소개 및 공유
  - Ueno의 중규모 와동류의 통계적 분석 결과 공유
  - 북태평양 PICES 해역별 중규모 아중규모 프로세스에 관한 관심해역 공유 및 담당자 지정
  - 관심해역별 분석을 위한 outline 논의 및 각 세부해역에 대한
    - 시계열(Timescales): 시간평균, trend, interannual, annual
    - 물리변수(Physical metrics): T/S, Eddy kinetic energy, Eddy lifetime, 와동류 형성지역
    - 생물변수(Ecosystem metrics): 영양염, CHLs, higher trophic level의 특성 분석

1,2,3,4: coastal and marginal seas

- 1: Yoshi, Yisen
- 2: Olga, Young-Gyu, Daisuke, Sung Yong
- 3: Hiro, Carol, Tetjana
- 4: Annalisa, Sachi
- 5: Elena, Sergey, Maxim, Sachi, Yoshi, Young-Gyu, Irina
- 6: Yoshi, Tetjana

Kouketsu, S., H. Kaneko, T. Okunishi, K. Sasaoka, S. Itoh, R. Inoue and H. Ueno, Mesoscale eddy effects on temporal variability of surface chlorophyll a in the Kuroshio Extension, J. Oceanogra., doi:10.1007/s10872-015-0286-4 (2015)



WG-38 세부해역 및 담당자 지정



WG-38 각국 대표단 그룹사진



WG-38 각국 대표단 그룹 저녁식사 사진

※ WG-40(CEP): Working Group on Climate and Ecosystem Predictability

※ 활동기간: 2017.07~2020.10.

## □ 정부대표

참가부문(역할)	성명	소속/직급
WG-40	권민호	한국해양과학기술원/선임연구원
WG-40	이충일	강릉원주대학교/교수
WG-40	장찬주	한국해양과학기술원/책임연구원

## □ 개요

- 일시: 2018년 10월 26일, 금요일 09:00~18:00
- 장소: Workpia Yokohama Convention, Oshidori room
- 참가자
  - 총 18명(WG-40 위원: 14명, 기타 참가자: 4명)
  - 현장 참석 위원(14명): 장찬주(한국 KIOST), Michael Jacox(미국 U. of California Santa Cruz/MOAA WSWFSC, 공동의장), Ryan Rykaczewski(미국 U. of South Carolina, CLIVAR, 공동의장), Antonietta Capotondi(공동의장 CLIVAR; USA), Masami Nonaka(일본 JAMSTEC, 공동 의장), Jim Christian(캐나다 Canadian Centre for Climate Modelling and Analysis), Caihong Fu(캐나다 Fisheries and Oceans Canada), Fei Chai(중국 Second Institute of Oceanography), Jinqui Du(중국 National Marine Environmental Monitoring Center, 2018년 현재 PICES 인턴 수행중), Yuri Zuenko(러시아 Pacific Scientific Research Fisheries Center(TINRO-Center)), Vladimir Kulik(러시아 Pacific Scientific Research Fisheries Center(TINRO-Center)), Akinori Takasuka(일본 Japan Fisheries Research and Education Agency), Masami Nonaka(일본 JAMSTEC), Emanuele Di Lorenzo(미국 Georiga Institute of Technology)
  - 화상 참가 위원(1명): Shoshiro Minobe(일본 Hokkaido University, 공동의장)
  - 위원이외 참가자(3명): Emi Yati(일본 Hokkaido University), Elena I. Ustinova(TINRO-Center), Steven J. Bograd(미국 NOAA NMFS SWFSC)

## □ 의제 및 논의 결과

- 참석자 소개
  - 참석자 자신 소개 및 화상회의 참가자 확인
- WG-40 관련 연구 소개
  - 각 나라에서 진행 중인 기후와 생태계예측 관련 연구 소개함. 다음은 일부 발표 내용 요약임
    - Fei Chai: 북서태평양 해양순환-생태계접합모형(ROMS-CoSiNE)을 이용한 생태계 예측소개
    - Akinori Takasuka: 쿠로시오 확장역과 홉볼트해류역의 종변화는 수온이 대한 반응이 중요함
    - Emi Yati(일본 Sushiro Minobe교수 제자): 북태평양 동쪽보다 서쪽 해역에서 생태계, 특히 소형 표층어류가 변동이 큼
  - 이번 발표에는 지난 WG-40 모임에서 발표하지 않은 위원 중심으로 연구 결과를 발표함
- 실무그룹 제시 가능성과 토론
  - WG-40에서 제시 가능한 성과가 무엇인지에 대한 토론
    - S2D에 대한 실용문서, 생태계 및 기후 예측 관련 연구 리뷰 및 종합 논문 등이 가능한 성과일 것으로 토론하였음
  - 계절 및 수 십년 시간 규모 예측(S2D)는 해양분야에서 대기분야에 비해 늦게 시작하였으나 S2D 예측성은 대기보다 해양이 크므로 강점이 있음
    - 내년 2018 PICES 총회에 TOR1 관련 topic session을 제안하기로 하였으며 공동좌장은 Ryan Rykaczewski, Akinori Takasuka, Chan Joo Jang 3인이며, APCC에서 대기 계절예측 분야 전문가를 한국측이 제안하여 1명을 초청하기로 잠정 결정함
  - 무엇을 예측할 수 있고 어떤 예측이 유용한 지 정의할 필요가 있음
- ICES 계절 및 십년변동예측(S2D) 실무그룹 활동 보고
  - 덴마크 Mark R. Payne이 화상 발표함
  - 수산자원 변화 예측 결과를 웹에 공개하고 메일링리스트를 만들어 결과 공유 기여 노력을 함
- 회원국 해양생태계 예측모델링 정보수집을 위한 설문조사(부록 2 참조)
  - 회의 전 메일로 설문지를 배부하고 회원국 현황 조사
  - 설문지에 추가할 항목 토의: 모형 해상도 등 상세 정보



- WG-40 관련 세션 제안서 작성(부록 3 참조)
  - 차년도 연례총회에 북태평양 생태계 예측 발전에 대한 세션을 제안함
- 기타
  - 참가하지 못하는 위원은 화상 발표를 하는 등 적극적인 참여가 돋보임. 시차가 크지 않을 경우 부득이 한 경우 한국 위원도 화상으로 활동에 참여할 필요가 있음



WG-40 참석인 사진(왼쪽부터 반시계 방향): Steven J. Bograd Emanuele Di Lorenzo, Emi Yati, Elena I. Ustinova, Samantha Siedlecki, Akinori Takasuka, Ryan Rykaczewski, Masami Nonaka, 장찬주, James Christian, Fei Chai, Michael Jocox, Caihong Fu, Jinqiu Du, Antonietta Capotonti

## □ 의견/평가

- 기후변화 완화 및 적응을 위해 50~100년 뒤의 기후변화 전망보다는 본 작업반의 주제인 계절 및 수십 년 예측이 효과적임. 따라서 본 작업반에 대한 한국의 실효적인 기여를 위해서는 관련 연구사업 개발이 필요함
- ICES는 다양한 연구사업을 통해 중요 사업 어종 예측에 많은 노력을 기울이고 있음. 한국도 수산자원 중요성에 비추어 실효적인 수산자원 예측에 다학제 연구가 효과적으로 추진될 필요가 있음
- 해양고수온(marine heat waves)과 생태계 영향 등에 대한 현안 문제를 토론하는 등 현안 문제 해결에 기여가 논의되었음
- 일본도 페루와 수산분야 협력을 적극 진행 중이며 IMARPE-NRIFS 협력이 한 예임
- 지구시스템모형을 이용한 생태변수의 직접 예측은 상당히 어려우므로 생태변수를 예

측하기 위해서는 물리변수의 예측성을 확보해야 함. 또한 물리변수와 생태변수와는 비선형관계가 있으므로 생태변수의 예측성 확보를 위해서는 물리변수의 예측은 물론 두 변수 사이의 비선형관계에 대한 모델링 연구가 필요함

## 부록 1. WG-40 안건

09:00	Welcome and Introductions
09:15	Brief summaries of relevant research efforts by WG members(10 minutes each) <i>Limited to those who did not present in Vladivostok(see list below)</i>
10:30	Coffee Break
10:45	Continue research summaries
12:00	Discussion of potential WG40 products
12:30	Lunch
14:00	Work on Census of North Pacific Marine Ecosystem Forecasting Efforts
15:30	Coffee Break
15:45	Continue work on Census of North Pacific Marine Ecosystem Forecasting Efforts
16:30	Work on additional tasks <ul style="list-style-type: none"> <li>• Presentation for FUTURE mini symposium(S6)</li> <li>• Begin drafting proposal for PICES 2019 session</li> </ul>
17:15	Presentation from ICES S2D Working Group(Mark Payne)
17:45	Summarize to-do lists and assignments
18:00	Adjourn

## 부록 2. 해양생태계 예측 설문 조사에 보낸 한국측 정보

Region	Forecast Product	Forecast type (statistical/dynamical)	Forecast Lead	Key Mechanisms of Predictability	Operational?
Northwest Pacific (KIOST OPEM)	Temperature, Salinity, Curruents, Sea Surface Height on the Northwest Pacific	Dynamical physics (GFDL-MOM5)	1-10 days		Yes
Global Ocean (KIOST GAIA)	Global Temperature, Salinity, Curruents, Sea Surface Height	Dynamical physics (GFDL-CM2.1)	~12 months		No
Korea Strait	Temperature, Salinity, Currens, Sea Surface Height	Dynamically downscaled physics	3-5 days	flow through the strait, tides, winds	Yes
East Asian Marginal Seas	Temperature, Salinity, Currens, Sea Surface Height	Dynamically downscaled physics	1-3 days	Kuroshio variability, winds	No
Yellow Sea & East China Sea	Current velocity, Temperature, Salinity, Sea Surface Height	Dynamical physics (ROMS)	1-3 days		Yes
East Sea	Current velocity, Temperature, Salinity, Sea Surface Height	Dynamical physics (ROMS)	1-3 days		Yes
East Asian Marginal Seas	sea surface temperature	Both dynamic and statistical models	up to 3 months	atmospheric teleconnection	No
Northwest Pacific focusing on Korean waters	sea surface temperature, current velocity	Dynamically downscaled physics	1-12 months	ocean currents variability, winds	No

### 부록 3. PICES 2019 연례총회 세션 제안서 초안

Title: Advances in North Pacific marine ecosystem prediction

Duration: 1 day

Convenors

Mike Jacox, USA, Michael.jacox@noaa.gov

Fei Chai, China, fchai@sio.org.cn

Jinqiu Du, China, jinqiu609@163.com

Shoshiro Minobe, Japan, minobe@sci.hokudai.ac.jp

Description including background and objectives

Modern ocean and ecosystem models are rapidly developing the ability to make skillful forecasts of the physical, and more recently biogeochemical and higher trophic level, components of marine ecosystems at timescales from days to decades. Such forecasts often align with the tactical decision-making timescales of individuals, businesses, and governments, giving them significant potential to inform climate-ready management strategies. Much work has now been done to establish potentially predictable ecosystem components and to develop prototype forecast systems. In this session we will seek contributions that highlight advances in marine ecosystem prediction, spanning physics to upper trophic level responses and potentially socioeconomic impacts(e.g., fish catch).

This session is intended to advance the terms of reference of WG-40 and build on strong momentum from (1) the ECCWO session “From prediction to projection: the role of seasonal to decadal forecasts in a changing climate”, (2) the PICES 2018 session “Ecological responses to variable climate changes and their applicability to ecosystem predictions”, and (3) NOAA’s Marine Prediction Task Force(MPTF), whose lifespan matches that of WG-40(2017~2020) and whose intent is to improve seasonal forecasts for management of living marine resources. PICES WG-40 aims to identify, diagnose, and quantify predictable response in North Pacific marine ecosystems that arise from regional and large-scale climate processes. The ECCWO session demonstrated the rapid development of marine ecosystem forecasting efforts, and our PICES 2018 session was proposed to identify robust climate-ecosystem relationships that may permit skillful forecasts. The proposed session would be a forum to learn and discuss how these relationships are being exploited for North Pacific marine ecosystem forecasts.

### Co-sponsorship

We seek POC and FUTURE co-sponsorship for this session. We will also reach out to ICES for co-sponsorship of the session, in particular to further collaboration between PICES WG40 and ICES WGS2D. Each of these working groups includes collaboration with the other in its terms of reference. We will also seek involvement of the NOAA Marine Prediction Task Force(MPTF). Two WG-40 co-chairs(Capotondi and Jacox) are also MPTF co-chairs and two additional WG-40 members(Di Lorenzo and Siedlecki) are also MPTF members.

### Names of potential invited speaker(s)

Takeshi Doi, Japan - atmosphere-ocean forecasting on seasonal timescales

Stephanie Brodie, USA(ECS) – seasonal forecasts of fish distributions in the NE Pacific

### Publication requirements

At the minimum, a PICES Press article.

## 21 WG-41

※ WG-41: Working Group on Marine Ecosystem Services

※ 활동기간: 2017.09~2020.09.

### □ 정부대표

참가부문(역할)	성명	소속/직급
WG-41	남정호	한국해양수산개발원/연구위원
WG-41	김혜선	국립해양생물자원관/선임연구원
WG-41	이창수	국립해양생물자원관/연구원
WG-41	유승훈	서울과학기술대학교/교수

### □ 회의개요

- 목적: WG-41(Marine Ecosystem Services)의 비즈니스 미팅
- 일시: 2018년 10월 27일, 14:00~18:00
- 참석자: 류종성(HD 위원, WG-36 한국 대표), Dan Lew(WG-41 공동의장, 미국), Sarah Dudas(WG-41 캐나다 대표), Jingmei Li(WG-41 중국 대표), Kristy Wallmo (WG-41 미국 대표), Aoi Sugimoto(WG-41 일본 대표), Keith Criddle(HD 의장), Caihong Fu(WG-40 캐나다 대표, 참관인), Meng Su(중국 참관인), Olga Lukyanova(러시아 참관인), Steve Kasperski(미국 참관인), Yosuke Fujii(일본 참관인), Shang Chen(WG-41 공동의장, 중국, 화상회의로 참석)

### □ 의제 및 논의 결과

- 의제
  1. 참석자 소개
  2. 의제 채택
  3. 배경설명
  4. WG 공동의장 선출
  5. TOR 리뷰 및 주요 업무 확인
  6. 제안된 프로젝트 토의
  7. PICES-2019 topic session 또는 workshop 제안
  8. 추가 멤버십 토의

## 9. 기타 사항

## 10. 폐회

### ○ 주요 논의사항

- WG-41의 공동의장으로 Dan Lew(미국), Shang Chen(중국)을 만장일치로 선출
- 회원국 중에서 유사한 2~3개 해양생태계서비스 사례 비교연구 추진
- WG-36(Common Ecosystem Reference Points)와 WG-40(Climate and Ecosystem Predictability)의 연구결과를 상호 공유
- 2가지 프로젝트를 제안: 첫째는 회원국의 해양생태계서비스 연구사례를 리뷰하는 것이며, 둘째는 해양생태계서비스에 대한 PICES 각국의 공무원, 전문가들의 인식정도 및 관리 적용정도를 비교하는 설문조사를 실시
- 한국과 미국의 연안관리 정책 선호도에 대한 비교연구 논문(Ryu et al., 2011)을 소개하고 동일한 설문조사지를 각 나라의 언어로 번역하여 설문조사를 수행할 것을 제안 (류종성)
- 현재 참여하지 않고 있는 WG 멤버의 참여를 독려하고 추가로 멤버를 확장하기로 함
- 2019년 PICES에서 2가지 프로젝트에 대한 회원국의 수행결과를 발표하고 공유할 수 있는 topic session을 제안하기로 함

### □ 의견/평가

- WG-41은 PICES 회원국의 해양생태계서비스 연구성과 및 적용사례를 공유하여 이 분야의 연구를 활성화하는 것을 목적으로 함
- 활동기간은 2017년 9월부터 2020년 9월까지이며, 올해 처음으로 비즈니스 미팅이 열림
- WG-41의 한국대표 3명은 금번 비즈니스 미팅에 모두 참여하지 않았고, WG 의장의 업무관련 이메일에도 전혀 답변이 없었다고 함(Dan Lew 의장의 발언)
- 본 참가자는 본래 WG-41에 속하지 않았으나 WG을 관장하는 HD 위원자격으로 참석하여 우리나라의 입장을 대변하였으며, 향후 WG-41의 프로젝트에 대해 HD 위원의 자격으로 도와주겠다고 하였음
- 공식적으로 WG-41에 참여할 지에 대해서 추후 논의가 필요함

※ S-MBM: Section on Marine Birds and Mammals Report

※ 활동기간: 2015.10~2020.

## □ 정부대표

참가부문(역할)	성명	소속/직급
S-MBM	김현우	국립수산과학원/연구사
S-MBM	안용락	국립해양생물자원관/수석연구원
S-MBM	김미란	국립공원연구원/책임연구원

## □ 회의개요

- 일시: 2018.10.28(토) 09:00~17:00
- 참석자: 총 15명(동반 참석자 포함)
  - (한 국) 김미란 박사(국립공원관리공단 국립공원연구원)
  - 김현우 박사(국립수산과학원 고래연구센터)
  - (캐나다) Andrew Trites 교수(Univ. of British Columbia)
  - (미 국) Patrick D. O'Hara 박사(Canadian Wildlife Service)
  - Willam Sydeman 박사(Farallon Institute)
  - Elliott Lee Hazen 박사(Southwest Fisheries Science Center)
  - (일 본) Yutaka Watanuki 교수(Hokkaido University)
  - Kaoru Hattori 박사(Hokkaido National Fisheries Research Institute)

## □ 의제 및 논의 결과

- 활동 보고
  - 북태평양 바닷새학회(Pacific Seabird Group Meeting) 참가
  - PICES International Symposium 참석
  - Workshop 7 참석 보고
  - IWC 위원회 회의 참석 보고
- 세션 위임사항 검토
- 2019년 세션 프로젝트 아이디어 공유
  - 해양 환경변화에 따른 해양생태계의 생태적 지표로서 바닷새와 해양포유류

- 먹이 경쟁과 해양환경과의 관계에 대한 향후 연구 제안
  - 장기 연구, 다른 위원회 또는 워킹그룹과 협력 필요(WG-36, WG-40 등)
  - 기후변화에 따른 바닷새와 해양포유류의 먹이 변화 예측
  - 바닷새와 해양포유류와 생태계 내 스트레스 요인과의 관계
- 바다거북이 프로젝트 검토
- 바닷새의 유전자 분석, 위협요인 파악 등에 대한 PICES와 아주대, WWF Korea, 롯데월드 아쿠아리움 공동 연구
  - 국내 타 기관과의 연구 중복성 검토가 필요했으나 확인 결과 문제없었음
- 현재까지의 연구활동 및 차년도 연구 계획
- 2015년부터 2020년 까지 S-MBM에서는 북태평양 바닷새와 해양포유류 풍도와 분포가 영양단계와 관련하여 기후변화에 어떤 영향을 받는지 검토하기 위해 “기후에 기인한 바닷새와 해양포유류 영양생태(Climatic and Trophic Ecology of Marine Birds and Mammals)”라는 주제로 발표 및 논의가 이어지고 있음
  - 과업 완수를 위해 대상종의 섭이 정보 수집 및 생물역학모델을 활용하여 먹이섭취량을 추정하여 어자원과 어업에 미치는 영향에 대한 하향식(Top-down) 접근, 하위영양 단계에서 상위포식자까지 이르는 영양단계 변화, 기후변화가 상위포식자에 미치는 영향 등을 파악 예정
- S-MBM과 관련된 다른 PICES 내 그룹과의 관계 논의
- WG-36(PICES 회원국 사이 일반생태계 기준점 워킹그룹)은 MBM 관련 시계열 자료가 있다면 내년 회의 기간 중 워크숍이나 주제 세션에 도움이 될 것
  - WG-35(북태평양 해양생태계 현황 보고서 제3판 제작 워킹그룹)에서는 MBM으로부터 각 해역별 예시 작성이 필요하다고 요청
  - SG-MMP(해양미세플라스틱 연구그룹) Savoca 박사는 S-MBM의 협조로 바닷새와 해양포유류 먹이에 포함되어있는 미세플라스틱과 유독물질 연구기회를 얻기 희망
- 2020년 이후 계획 논의
- 먹이생물과 상위포식자와의 반응 변화 예측에 대한 상향식 접근
  - 해양생태계 변화 감지와 예측 인자로서의 바닷새·해양포유류 연구
  - 내년 회의에서 2020년 이후 계획 세부논의 및 제안 예정
- 한국에서 제출한 바다거북 관련 연구계획서 검토
- 인하대, 제주대 등 공동연구팀이 “북태평양 환경 스트레스 인제와 관련된 바다거북



- 생태” 연구계획서 제출하였으며 제주도에서 발견되는 바다거북에 위성추적장치를 부착하여 이동경로 및 생태 연구 희망
- 바다거북은 S-MBM의 주요관심사가 아니나 향후 S-MBM 연구주제 확장가능성 차원에서 검토 가능
  - S-MBM과 상위 분과인 BIO는 제출된 연구계획 지원 찬성
  - 다만, 연구계획서가 포괄적이니 구체적인 연구방향 추가로 제시하기를 요청
- 기타 토론
- 버드라이프인터네셔널이 바닷새 혼획 저감을 위해 일본 내에서 수행하는 프로젝트 소개
  - 동해 일본측 수역 중 바닷새가 많이 분포하는 Teurito섬 인근과 주변수역에서 자망에 의한 혼획 현황 파악 및 자망에 LED등을 달아 바닷새가 인지하도록 해서 혼획을 저감할 수 있는지 연구 예정

## □ 의견/평가

- 향후 연구로서 바닷새와 해양포유류에 대한 인위적 간섭(혼획), 사람과 바닷새, 바닷새와 포유류의 상호 영향에 대한 연구 제안이 있었음
- 장기 연구 주제로 기후변화와 바닷새, 해양포유류에 대한 반응에 대해 연구를 진행하는 논의가 있었음
- 현재 한국, 일본, 캐나다, 미국이 주로 세션에서 활동하고 있어 러시아와 중국의 활동 독려가 필요하다는 의견을 나눔
- PICES는 북태평양 해양생태계 내 바닷새와 해양포유류의 중요성을 인지하고 S-MBM을 구성하였으나 여전히 관여하는 연구자의 수가 적고 이마저도 바닷새 연구에 편중되는 경향을 보임
- PICES의 특별보고서 “북태평양 해양생태계” 해양포유류·바닷새 부분 집필 및 향후 국내에서 수행된 해양포유류 연구결과를 적극 발표함으로써 PICES 내 해양포유류 연구 성과 제공
- 해양포유류는 넓은 행동반경으로 한·중·일·러 해역 전체를 서식권역으로 가지는 경우가 많으므로 해당국 해양포유류 전문가들과의 접촉을 통한 연구동향 파악 및 정보 교류 통한 연구 역량 강화 기대



S-MBM 회원



S-MBM 회의

## 23 S-HAB

※ S-HAB: Section on Ecology of Harmful Algal Blooms in the North Pacific  
 ※ 활동기간: 2003.10~, 2011.10~2104.10, 2015.10~2017.10.(갱신)

### □ 정부대표

참가부문(역할)	성명	소속/직급
S-HAB	김광용	전남대학교/교수
S-HAB	박태규	국립수산과학원/연구사
S-HAB	임월애	국립수산과학원/연구관
S-HAB	정해진	서울대/교수
S-HAB	백승호	한국해양과학기술원/책임연구원

### □ 회의개요

- 일시: 2018년 10월 30일(18:00~21:00)
- 장소: Workpia Yokohama Convention, Yamayuri Room
- 참석자: 의장-Mark Wells(메인대학교/미국)-Douding Lu(MEBSO/중국) Vera Trainer (NOAA/미국), Nicola Haigh(밴쿠버대학/미국), Andrew R.S. Ross(해양과학연구소/캐나다), Setsuko Sakamoto(FRA/일본), Natsuko Nakayama(FRA/일본), William Cochlan(샌프란시스코 주립대학/미국), Pengbin Wang(제2해양연구소/중국) Chunjiang Guan(NMEMC/중국), Hao Guo(NMEMC/중국), 임월애(NIFS/한국), 박태규(NIFS/한국), 백승호(KIOST/한국), Tamara Russell(밴쿠버대학/캐나다), Devan Johnson(밴쿠버대학/캐나다), Svetlana Esenkulova(PSFV/캐나다), Ichiro Imai(홋카이도대학/일본), Clarissa Anderson(캘리포니아대학/미국), Masahito Hirota(MAFF/일본), Takufumi Yoshida(NOWPAP CEARAC/일본), Mitsunori Iwataki (도쿄대/일본), Chunlei Gao(CMERFIO/중국), Chunjiang Guan(NMEMC/중국)

### □ 의제 및 논의 결과

- 6개국 2018년도 적조발생현황에 대한 국가 보고서 발표
  - 1) 캐나다: 2017년과 2018년 PSP 발생상황 비교(2017년 넓게 분포, 2018년 낮은 발생빈도), 헤테로시그마의 경우 2015~2017년에는 매우 소규모 발생, 반면 2018년에는 헤테로시그마 발생
  - 2) 미국: PSP(*A. catenella*)의 경우 매년 정기적으로 발생, DSP는 산발적 발생, ASP는 매우 소규모 발생, 2018년에는 *Karenia brevis*에 의한 brevitoxin에 의한 돌고래, 새

등 폐사발생, ASP 발생이 엘리노와 연관성, 무인 샘플링 선박을 이용한 현장해수 채취를 시험중

- 3) 중국: 해안선을 따라 *Karenia mikimotoi*에 의한 대규모 적조 발생, 패류폐사는 미발생, 강하구역에 *Prorocentrum*에 의한 녹조가 5~6월 발생
- 4) 일본: *Chattonella*, *Heterosigma*, *Karenia mikimotoi*가 주요 적조종으로 패류폐사를 발생시킴, *Alexandrium tamarense/catenella*가 고밀도 발생, *Gymnodinium catenatum* 적조는 4~6월 발생
- 5) 한국: 2018년 유해 적조종은 *Cochlodinium polykrikoides*, 무해종은 *Akashiwo sanguinea*, *Noctiluca* 적조발생, 남해안 적조발생 환경특징은 수온이 평년에 비해 5도 높았음, 7~8월 유해 적조가 발생하였으며, 고흥~여수~통영 해역에서 발생
- 6) 러시아: 미참석

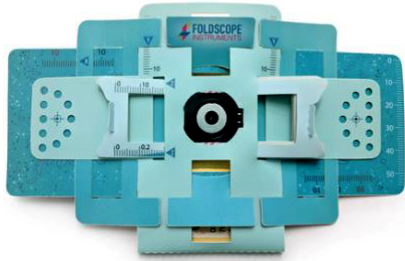
#### ○ GEOHAB 관련 협의

- 지구온난화와 적조라는 주제로 14편의 논문이 Harmful Algae 저널에 지구온난화 스페셜로 게재 예정
- 2019년 워크숍 계획논의: Vera Trainer(NOAA/미국) 주제건의, 적조가 해양생물에 미치는 영향을 경제학적 측면으로 평가, 적조 피해저감과 적조조기경보를 최종 결과로 도출, 경제학자를 초빙하여 각국의 적조발생상황, 수산피해상황을 경제학적으로 평가
- 2019년 리뷰 보고서 계획: 각국의 적조분포, 출현종, 발생규모, 독성여부 등을(HAE-DAT 자료)을 이용하여 Global HAB Status Report를 발간 계획
- 최근 활동 보고: Mark Wells(메인대학교/미국)이 결과 보고, 현장에서 손쉽게 적조를 관찰하는 방법으로 “HydroColor 앱”과 “Paper microscope”를 소개, 인도네시아 등 고가 장비를 접근하기 어려운 지역에서 활용하고 있음
  - 1) “HydroColor 앱”: 바다 수색을 측정할 수 있는 스마트폰 앱으로써 스마트폰의 카메라 기능 중 RGB 컬러채널을 이용하여 빨강, 녹색, 청색을 GPS 연동으로 구분하는 기능을 활용하여 바다 수색을 측정함
  - 2) “foldscope” 일명 paper microscope 종이를 접어 만든 현미경으로 140배까지 볼 수 있으며, 가격이 4~8만원선으로 저렴하기 때문에 현장에서 일반인들이 쉽게 플랑크톤을 관찰할 수 있음

#### ○ S-HAB 향후 계획

- S-HAB 의장은 2018년부터 Vera Trainer(NOAA/미국)에서 Mark Wells(메인대학교/미국)로 변경, 2019년 회의는 회의시간을 3시간에서 반일회의로 연장하여 국가 보고서 발표 이외에 다른 연구결과 발표도 포함 예정

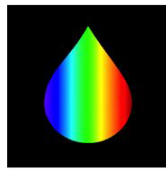
## THE PAPER MICROSCOPE



Foldscope is the ultra-affordable, paper microscope that you assemble yourself. Designed to be extremely portable, durable, and to give optical quality similar to conventional research microscopes (magnification of 140X and 2 micron resolution), Foldscope brings hands-on microscopy to new places!

Our mission is to produce low-cost scientific tools that globally expand access to science. We aim to break down the price barrier between people & the curiosity and excitement of scientific exploration.

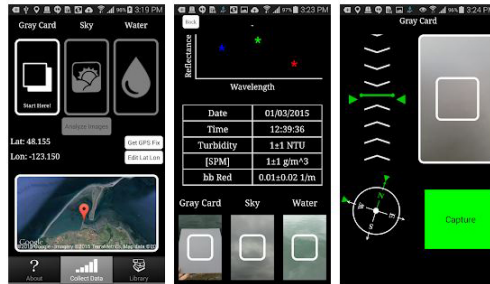
〈Paper microscope를 이용한 현장 플랑크톤 관찰; <https://www.foldscope.com/>〉



### HydroColor: Water Quality App

Thomas Leeuw 도구 ★★★★★ 7.0

위시리스트에 추가 구매 ₩3,226



〈스마트폰 앱을 이용한 바다 수색 측정〉

**Comparative ecosystem studies and data access – contributions to the GlobalHAB Status Report by the North Pacific Marine Science Organization**

Nicola Halgh<sup>1</sup>, William P. Cochlan<sup>2</sup>, Xinfeng Dai<sup>3</sup>, Henrik Enevoldsen<sup>4</sup>, Chunjiang Guan<sup>5</sup>, Woel-Ae Lim<sup>6</sup>, Tatiana Morozova<sup>7</sup>, Tatiana Orlova<sup>8</sup>, Taegyu Park<sup>9</sup>, Setsuko Sakamoto<sup>10</sup>, Vera L. Trainer<sup>11</sup>, Charles G. Trick<sup>12</sup>

<sup>1</sup>Microthalassia Consultants Inc, Nanaimo, BC, Canada; <sup>2</sup>nicky@microthalassia.ca; <sup>3</sup>Romborg Tiburon Center for Environmental Studies, SF-51, Tiburon, CA, USA; <sup>4</sup>National Marine Environmental Monitoring Center (NMEMC), SOA, Dalian, Liaoning, China; <sup>5</sup>Intergovernmental Oceanographic Commission, UNESCO, Copenhagen, Denmark; <sup>6</sup>Oceanic Climate and Ecology Research Division, National Institute of Fisheries Science (NIFS), Busan, Korea; <sup>7</sup>National Scientific Center of Marine Biology, FEB RAS, Vladivostok, Primorsky Krai, Russia; <sup>8</sup>Southeast Sea Fisheries Research Institute, National Institute of Ocean Science (NIOS), Tongyeong, Korea; <sup>9</sup>National Research Institute of Fisheries and Environment of Inland Sea, Japan Fisheries Research and Education Agency, Hiroshima, Japan; <sup>10</sup>NOAA Northwest Fisheries Science Center, Seattle, WA, USA; <sup>11</sup>Schulich School of Medicine and Dentistry, UWO, Ontario, Canada.

#### Abstract

- The North Pacific Marine Science Organization (PICES) member countries (Russia, China, Japan, Korea, Canada, and U.S.A) enter annual data on harmful algal blooms (HABs) into the global Harmful Algal Event Database (HAE-DAT) as part of the terms of reference for the Section on Harmful Algal Blooms (HAB-S).
- HAE-DAT and ICES-PICES-IOC Harmful Algal Event Status Report have information and decadal maps of HAB occurrence, event duration, maximum concentrations, species, and exceptional events.
- Data on HAB species occurrence in the PICES region compiled by member countries will be a cornerstone in the first Global HAB Status Report literature review.
- PICES HAB-S workshops and special sessions during annual meetings have enabled comparison of HAB events in geographically distinct ecosystems, including:
  - Insights into the drivers of toxicogenic *Pseudo-nitzschia* blooms, which are typically observed in the eastern Pacific but have not yet caused closures in the western Pacific.
  - differences in *Heterosigma* blooms between the eastern and western North Pacific region, showing distinct subpopulations that have optimal temperature and salinity windows for toxicity, providing clues regarding environmental drivers of toxin production.

These comparative ecosystem approaches help us answer tough questions regarding drivers of HAB events, and facilitate clear and concise communications among scientists, policy makers, legislators and funding agencies.

#### Power of the relative scale

The Connecting Ocean of HAB in Eastern and Western Pacific

PICES area countries differently assess HABs and their impacts. By using a simple 4-point scale we can more easily compare HABs in different areas. In this way we can:

#### HAE-DAT

HAE-DAT maps are generated from data input by member countries, and can be found online at <http://envlit.ifremer.fr/vsi/envlit/storage/documents/0arammaps/haedat/>, or through [haedat.iodo.org](http://haedat.iodo.org).

PSP

ASP

DSP

**PICES HAB-S workshops & reports**

〈2017년 S-HAB 회의결과를 18차 ICHA(프랑스 낭뜨)에서 포스터로 발표〉



〈2018년 S-HAB 회의 장면〉

※ SG-MMP: Study Group on Marine Microplastics

※ 활동기간: 2017.10~2018.10.

## □ 정부대표

참가부문(역할)	성 명	소속/직급
S-HAB	심원준	한국해양과학기술원/책임연구원
S-HAB	홍상희	한국해양과학기술원/책임연구원
S-HAB	김승규	인천대학교/교수

## □ 회의개요

○ 일시: 2018년 10월 26일

○ 참가자

- 심원준(한국\_의장), 홍상희(한국), 김승규(한국), Hideshige Takda(일본), Shuhei Tanaka(일본), Haruhiko Nakata(일본), Sarah Dudas(캐나다), Matthew Savoca(미국),
- Observer: Tom Therriault(MEQ 부의장), Takafumi Yoshida(NOWPAP), Lauren Howell(캐나다), Kazuhiko Mochida(MEQ), Ryuji Kuwahara(일본), Yumi Okochi(일본), Taichi Yonezawa(일본)

## □ 의제 및 논의 결과

○ 논의 안건 확정 및 SG-MMP 위원 및 참석자 소개

- 총 14명의 위원 중 5개 회원국 총 9명 참석(미국 Jennifer Lynch는 온라인으로 참석, 캐나다 1인 대리참석, 중국 위원은 전원 불참)
- 참석자 소개
- 아젠다 수정 및 확정

○ PICES의 구조 및 SG-MMP 임무 소개

- 많은 위원들이 PICES에 처음 참석한 관계로 PICES의 구조와 SG, WG, 위원회 등의 역할에 대해 의장이 설명
- SG-MMP의 설치 배경, 임무 등 설명

○ 2018년 SG-MMP의 주요 성과 보고

- 2018년 5월 6IMDC에서 개최된 키오프미팅 보고

- 위원대상 설문조사 경과 보고
- 북태평양 및 지역해의 미세플라스틱 오염현황 리뷰 경과 보고
- 북태평양 및 지역해의 미세플라스틱 오염현황 리뷰 분야별 발표
  - 부유 미세플라스틱 오염현황(심원준)
  - 해변 미세플라스틱 오염현황(심원준)
  - 이매패류 미세플라스틱 오염현황(홍상희)
  - 이매패류를 제외한 생물 종 중의 미세플라스틱 오염현황(Matthew Savoca)
  - 소금 중 미세플라스틱 오염현황(김승규)
- 신규 WG 제안 논의
  - 위원들 대상으로 1) 지식의 격차, 2) 국가현안, 3) WG 주제 설문조사 결과 요약 정리 발표
  - 신규 WG 제안 여부 결정
  - 신규 WG 제안할 주제 선정: “Environmental Indicators for Marine Plastic Pollution”으로 결정
  - 신규 WG 제안서(배경, ToR, FUTURE 프로그램 연관성, 외부 조직과의 협력, 공동의 장 및 위원 추천 목록 등) 작성
  - 신규 WG ToR
    - 1) To review micro- and mesoplastic pollution** (e.g. abundance, distribution, composition, and potential impacts) **in North Pacific and its marginal seas**
    - 2) To identify multiple organismal and non-organismal indicators of plastic pollution and its environmental impacts** including associated chemicals in North Pacific and its marginal seas
    - 3) To recommend guidelines for monitoring environmental indicators and a target improvement goal** for the established indicators
    - 4) To convene a topic session and/or workshop** on environmental indicators and impacts of plastic pollution and **coordinate a special issue** in an international peer-reviewed journal
    - 5) Contribute to FUTURE by publishing a final report** summarizing results of Working Group deliberations



- 신규 WG 공동의장 및 위원 추천 명단

**Proposed co-chairs: Jennifer Lynch (USA), Chengjun Sun (China)**

**Proposed members:**

Country	Name	Affiliation
Canada	Sarah Dudas	Fisheries and Oceans Canada
	Chelsea Rochman	University of Toronto
	Peter Ross	Coastal Ocean Research Institute
	S. Avery-Gomm	University of British Columbia,
China	Chengjun Sun	First Institute of Oceanography
	Daoji Li	East China Normal University
	Juying Wang	National Marine Environmental Monitoring Center (NMEMC)
	Weiwei Zhang	National Marine Environmental Monitoring Center (NMEMC)
	Connie Ng	City University of Hong Kong
Japan	Hideshige Takada	Tokyo University of Agriculture and Technology
	Haruhiko Nakata	Kumamoto University
	Shuhei Tanaka	Kyoto University
	Yutaka Watanuki	Hokkaido University
Korea	Wonjoon Shim	Korea Institute of Ocean Science and Technology
	Sanghee Hong	Korea Institute of Ocean Science and Technology
	Seung-Kyu Kim	Incheon National University
	Miran Kim	National Park Research Institute
Russia	Nikolai Kozlovskii	Pacific Geographical Institute
USA	Jennifer Lynch	National Institute of Standards and Technology
	Matthew Savoca	Stanford University
	David Hyrenbach	Hawaii Pacific University
	Michelle Hester	Oiknos
	Amy Uhrin	NOAA

○ 2019년 Topoc session 및 워샵 제안 논의

- 신규로 제안하는 WG 내용과 관련 있는 Topic session을 제안하기로 결정함
- 제목: Environmental indicators of plastic pollution on the North Pacific

○ MEQ 및 SB 발표

- SG-MMP의 활동 성과와 신규 WG 제안과 관련하여 MEQ와 SB 회의에서 의장이 발표함





### Ⅲ. 첨부자료



*GC Appendix A***2018 Governing Council Decisions**

*(The following decisions were taken at the Governing Council Meeting at PICES-2018 in Yokohama, Japan November 3 and 4, 2018)*

**2018/A/1: 2017 Auditor's Report**

Council accepted the audited accounts for *FY* 2017.

**2018/A/2: Annual contributions**

- i. Council re-iterated the importance for all Contracting Parties to pay the Annual Fee by the January 1 deadline and confirmed that for planning of their funding requests for annual contributions, Contracting Parties should continue to use the guideline generally accepted at PICES-1999 (Decision 1999/A/2(ii)), which states that the annual contributions will increase at the rate of inflation in Canada.
- ii. Council instructed the F&A Chairman and Executive Secretary to continue reporting on the metrics to characterize the increase in science activities of the Organization.
- iii. Council instructed the Executive Secretary to consult with other organizations on approaches to determine the uptake/impact of science activities, reporting back to the Finance and Administration Committee at PICES-2019.
- iv. Council instructed the Executive Secretary to send letters to all Contracting Parties requesting payment of Annual Fees shortly after the completion of PICES-2018.

**2018/A/3: Budgetary considerations**

- i. Council accepted the estimated accounts for FY2018.
- ii. Council determined that the very large increase in the employer costs for the pension plan in 2018 were unforeseen and that in order to avoid exceeding the budget set for the General Fund, a portion of this increase be paid from the Working Capital Fund in accordance with Financial Rule 6(iv)(a).
- iii. Council approved the FY 2019 budget of \$1,030,000. The amount of \$241,600 will be transferred from the Working Capital Fund to balance the budget, setting the total annual contributions at \$788,400 and the 2019 annual contribution at \$131,400 per Contracting Party.
- iv. Council approved a transfer from the Working Capital Fund to the Trust Fund to recover the 2018 expenses and restore the Trust Fund to the level of \$110,000.
- v. Council approved expenditure of up to \$30,000 (if required) from the Working Capital Fund as a contribution to the North Pacific Regional Workshop on the UN Decade of Ocean Science for Sustainable Development.

**2018/A/4: Future PICES Annual Meetings and 2019 Inter-sessional Science Board meeting**

- i. Council approved the proposal from Canada to hold the 2019 PICES Annual Meeting from October 16 – 27, 2019 in Victoria.
- ii. Council approved the expenditure of up to \$40,000 from the General Fund to defray the costs of the 2019 Meeting, as requested by Canada.
- iii. Council accepted the offer from China to host the 2020 PICES Annual Meeting at a location and time to be determined and accepted the request for up to \$40,000 from PICES to defray the costs of the 2020 Meeting.
- iv. Council requested Korea to confirm by March 31, 2019 their intention to host the 2021 PICES Annual Meeting in Korea.
- v. Council agreed to a modest increase in the registration fee structure for PICES-2019:

<b>Type of registration fee</b>	<b>CAD \$</b>
Regular	325
Early	250
Student	50
Spousal/guest	50

- vi. Council reviewed the analysis of options on how unexpected revenue from Annual Meetings with high attendance might be re-allocated to the host country to support increased participation at subsequent PICES Annual Meetings and recommends that such options be deferred until the Organization has greater financial stability.
- vii. Council approved an Inter-sessional Science Board meeting to be hosted in April - June 2019 at a location to be determined. Japan indicated their willingness to host such a meeting, subject to confirmation of the meeting size and scope.
- viii. Russia also indicated their willingness to host an intersessional meeting, noting that they require details on the event scope and sufficient lead time to secure funding.
- ix. Council requests that the Secretariat continue to work individually with Contracting Parties to implement approaches for funding annual meetings that are consistent with PICES Financial Regulations.
- x. Council instructed the Executive Secretary to continue to explore the option for a joint ICES/PICES Annual Meeting and to provide an evaluation of the benefits and additional costs for the Organization and Contracting Parties for consideration by the Finance and Administration Committee at PICES-2019.

**2018/A/5: PICES Intern Program**

- i. Considering funding currently available for the Intern Program and stated intentions for contributions by Contracting Parties, Council agreed to initiate the process to obtain an intern for the 2019/2020 term. To ensure continuity of the program, an earlier starting date, such as early May was suggested. Following the existing rotation cycle, Korea was requested to nominate an intern by February 28, 2019.
- ii. Council instructed the Executive Secretary to invite Contracting Parties to provide voluntary contributions to the Trust Fund to support the Intern Program in 2019 and beyond.

**2018/A/6 Data Management Policy**

Council approved the following Data Policy:

**PICES Data Policy**

**Principles and Definitions**

As stated in Article III of the Convention for the North Pacific Marine Science Organization (PICES) the Organization is to promote the collection and exchange of information and data related to marine scientific research in the North Pacific Ocean and its adjacent seas.

The PICES strategy on capacity development identifies TCODE as the committee responsible for the development of communication networks for exchange of data and information.

Data gathered as a result of PICES activities will be responsibly managed to guard against loss and to ensure continued accessibility. The management of data using external data management systems is preferred to using internal PICES resources.

For any data provided to PICES, PICES will respect the ownership rights and any restrictions placed on these data by the provider.

- Data include data products and model outputs related to PICES activities. Metadata are data about data.
- End users include a person, organization, group (including PICES expert groups) using data.
- Data providers include a person, organization, group (including PICES expert groups) providing data.
- The data inventory refers to data for which PICES has the primary responsibility to manage.

**Roles and Responsibilities:**

**The Technical Committee on Data Exchange (TCODE) is responsible to:**

1. Manage the PICES data inventory.
2. Assist Expert Groups to identify data that are to be included in the data inventory.
3. Assist Expert Groups in the development of data management options and strategies.
4. Make recommendations to Science Board on PICES data management and priorities, with particular emphasis on correcting or mitigating any known or anticipated deficiencies.

**The PICES Secretariat is responsible to:**

1. Support TCODE in the maintenance of the data inventory.
2. Support TCODE to correct or mitigate any known or anticipated deficiencies.

**Science Board is responsible to:**

1. Include data management requirements in the Terms of Reference of each PICES expert group.
2. Review the recommendations proposed by TCODE and provide recommendations to Governing Council as necessary.

**Expert Groups are responsible to:**

1. Identify any data developed during the activities of the expert group and inform TCODE and PICES secretariat.
2. Develop, with assistance from TCODE, strategies or options for managing data used by the expert group.

**Data Produced by PICES**

All data produced by PICES are considered to be publicly available unless explicitly specified otherwise. Results, conclusions, or recommendations derived from the data associated with PICES do not imply endorsement from PICES.

Contributions of data from PICES expert groups will adhere to the expert groups' Terms of Reference and be submitted to TCODE for inventory while the group is active.

All data including metadata should be archived using standard codes, formats, and protocols.

**Data Provided to PICES**

The quality assurance of data is the responsibility of the data provider.

In the event that PICES becomes aware there may be quality issues in the data PICES will inform the data providers as soon as possible.

Data providers should inform PICES secretariat of any policies that may place special conditions on their redistribution.

End users are responsible for the proper use of the data and metadata provided.

PICES may reformat data or metadata but will never change the data provider's original record.

Data must be acknowledged, preferably using a formal citation.

**Citation**

Data citations should facilitate giving scholarly credit and normative and legal attribution to all contributors to the data, recognizing that a single style or mechanism of attribution may not be applicable to all data.

Where DOIs (Digital Object Identifiers) exist they should be included in the citation.

**2018/A/7: Election of the Chairman of PICES**

Dr. Chul Park was elected to a second term as Chairman of PICES.

**2018/A/8: Election of Vice-Chairman of PICES**

Dr. Enrique Curchitser (U.S.A.) was elected to a second term as Vice-Chairman of PICES.

**2018/A/9: Appointment of the Chair of the Finance and Administration Committee**

Dr. Carmel Lowe was appointed to a second term as Chair of the Finance and Administration Committee.

**2018/A/10: Intersessional Governing Council Meeting**

- i. Council approved an Intersessional Governing Council Meeting in accordance with Article VII (iv) (e) to review recommendations on the additional funding required to address the pension plan expenses and staffing challenges in the Secretariat.
- ii. If all Contracting Parties are able to confirm (by December 31,2018) their agreement to increase annual fees by \$25,000 per year, beginning in 2020, this Intersessional Governing Council Meeting becomes unnecessary and will be cancelled.

**2018/A/11: Planning for the Recruitment of the next Executive Secretary**

- i. Council decided to initiate the process to recruit the next Executive Secretary with the objective of have a new Executive Secretary in place by February 2020.
- ii. Council decided to form a Search Committee composed of one Governing Council member from each Contracting Party, the Chairman and the Past Chair.
- iii. Each Contracting Party is to identify their Search Committee member by December 1 2018.
- iv. Council agreed to proceed in accordance with the schedule below:

<b>Date</b>	<b>Activity</b>	<b>Notes</b>
November 2018 - at PICES -2018	GC to identify Search Committee and verify process and schedule.	One representative from each Contracting Party plus Chair and Past Chair?
November-December 2018	Search Committee verifies Statement of Qualifications and announcement/advertisement	2014 Announcement is included <i>as GC Appendix 5.</i>
January 2019 – posting of job opportunity	PICES Secretariat posts job opportunity of PICES website	
January 2019- March 2019	Search Committee distributes information about the announcement/posting, with assistance of Secretariat.	It would be useful to track where /how the announcement has been circulated.
June 15 2019	Closing date for applications	
June 15- July 5 2019	Search Committee reviews applications and creates a “short list” of applicants to be interviewed at PICES-2019. Final determination of interview specifics to be completed.	
July 5 2019	Chair of Search Committee (PICES Chair) send notifications and invitation to an interview at PICES-2019. This could include the specifics of the interview.	
July 2019	Secretariat contacts short-listed applicant and arranges for travel of short-listed applicants to interviews at PICES-2019.	
October 2019 – at PICES-2019	Interviews and selection of candidate by Search Committee	
November 2019	Letter of Offer and negotiation of details of employment	PICES Chair assisted by Chair of F&A and Executive Secretary
January- February 2020	New Executive Secretary arrives at PICES Secretariat.	



**2018/A/12: Memorandum of Understanding with the International Pacific Halibut Commission**  
Council approved a new Memorandum of Understanding with the International Pacific Halibut Commission.

**2019/S/1: 2019 PICES Annual Meeting**

- i. The following scientific sessions are to be convened at PICES-2019:
  - ¾-day Science Board (SB) Symposium on *Connecting Science and Communities in a Changing North Pacific*;
  - ½ -day Topic Session on *Habitat Restoration of Marine Ecosystems Marine Ecosystems*;
  - 1 - day Topic Session on *Marine heatwaves in the North Pacific: Predictions and impacts in coastal regions*;
  - 1 -day Topic Session on *Coastal ocean modelling in the North Pacific*;
  - ½ - day Topic Session on *The impacts of marine transportation and their cumulative effects on coastal communities and ecosystems*;
  - 1 - day Topic Session on *Trends in ocean and coastal ecosystems and their services and its future*;
  - 1 - day Topic Session on *Identifying thresholds and potential leading indicators of ecosystem change: the role of ecosystem indicators in ecosystem-based management*;
  - 1 - day Topic Session on *Environmental indicators of plastic pollution in the North Pacific*;
  - 1 - day Topic Session on *Creating More Effective Integrated Ecosystem Assessments (IEAs) in PICES Countries*;
  - 1 - day Topic Session on *Coastal Ocean Observing Systems, Essential Biological Variables, and Community based monitoring*;
  - 1 - day Topic Session on *Linking changes in climate, nutrient distribution, phytoplankton ecology, and production of algal exudates in the North Pacific*;
  - 1 - day Topic Session on *Incorporating Climate Variability and Change into Fisheries Management Advice*;
  - 1 - day Topic Session on *Impacts of meso-/submeso- scale processes on heat/material transport and on marine ecosystems*;
  - ½ - day Topic Session on *Implications of prey consumption by marine birds, mammals, and fish in the North Pacific*;
  - 1 - day Topic Session on *Integrating economic and social objectives in marine resource management*;
  - 1 - day Topic Session on *Advances in North Pacific marine ecosystem prediction*;
  - 1 - day Topic Session on *Application of Ecosystem-Based Fisheries Management in the 21st century: progress and challenges in pelagic systems*;
  - ½-day BIO Contributed Paper Session;
  - ½-day FIS Contributed Paper Session;
  - ½-day MEQ Contributed Paper Session;
  - ½-day POC Contributed Paper Session;
  - ½-day HD Contributed Paper Session.
- ii. The following workshops are to be convened at PICES-2019:
  - 1 – day Workshop on *Learn to Effectively Communicate Your Science*;
  - 1-day Workshop on *Integrating biological research, fisheries science and management of Pacific halibut and other widely distributed fish species across the North Pacific in the face of climate and environmental variability*;
  - ½-day Workshop on *Let's Play the GAME! (to achieve sustainable fisheries development in the PICES regions)*;
  - 1 – day Workshop on *Circulation, biogeochemistry, ecosystem, and fisheries of the western North Pacific marginal seas: Past and future of CREAMS (Circulation Research of East Asian Marginal Seas)*;
  - ½-day Workshop on *Celebrating two decades of North Pacific CPR sampling, and future directions*;
  - 1 – day Workshop on *Assessing Marine Ecosystem Services: A Comparative View Across the North Pacific*;

- ½-day Workshop on *PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Third)*;
  - 1 – day Workshop on *Synthesis of bio-acoustics programs for monitoring zooplankton and fisheries in the North Pacific*;
  - 1 – day Workshop on *Monitoring Non-indigenous Species in PICES Member Countries: Towards Best Practices*;
  - 1 – day Workshop on *PICES/ICES collaborative research initiative: Toward regional to global measurements and comparisons of zooplankton production using existing data sets*;
  - 1 – day Workshop on *The influence of environmental changes on the potential for species distributional shifts and subsequent consequences for estimating abundance of Pacific saury*;
  - ½-day Workshop on *Potential food competition between top predators and fisheries in the North Pacific*;
  - 1 – day Workshop on *Common Ecosystem Reference Points*;
  - 1 – day Workshop on *New frontiers: the application of molecular approaches in marine ecology and fisheries science*;
  - 1½ -day Workshop on *Application of Machine Learning to Ecosystem Change Issues in the North Pacific*;
  - 2-day Workshop on *Developing a collaborative, integrated ecosystem survey program to determine climate/ocean mechanisms affecting the productivity and distribution of Salmon and associated pelagic fishes across the North Pacific Ocean*;
  - 1 – day Workshop on *Scoping an Integrated Ecosystem Assessment (IEA) of the Northern Bering-Chukchi Seas Large Marine Ecosystem (LME)*;
  - 2½ -day Workshop on *Economic Effects of HABS: Recommended Practices*;
  - ½-day Workshop on *The Impacts of mariculture on coastal ecosystems*;
- iii. The following business meetings are to be held at PICES-2019:
- 3-hour overture meeting, ½-day meeting and a 1-day meeting of Science Board;
  - 1-day FUTURE SSC meeting plus a three hour business meeting;
  - 2-hour overture meetings and ½-day meetings of Standing Committees;
  - ½-day meeting of the Section on *Marine Birds and Mammals (S-MBM)*;
  - ½-day meeting of the Section on *Ecology of Harmful Algal Blooms in the North Pacific (S-HAB)*;
  - ½-day meeting of the Section on *Carbon and Climate (S-CC)*;
  - ½ -day meeting of the joint PICES/ICES Section on *Climate Change Effects on Marine Ecosystems (S-CCME)*;
  - ½-day meeting of the Working Group 34 on *Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish*;
  - 1-day meeting of the Working Group 35 on the *Third North Pacific Ecosystem Status Report*;
  - 1-day meeting of the Working Group 36 on *Common Ecosystem Reference Points across PICES Member Countries\**;
  - ½-day meeting of the Working Group 37 on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions*;
  - ½ -day meeting of the Working Group 38 on *Mesoscale and Submesoscale Processes*;
  - ½ -day meeting of the Working Group 39 on *Joint PICES/ICES/PAME Working Group on an Integrated Ecosystem Assessment for the Central Arctic Ocean*;
  - 1 -day meeting of the Working Group 40 on *Climate and Ecosystem Predictability*;
  - 1 -day meeting of the Working Group 41 on *Marine Ecosystem Services*;
  - 1 -day meeting of the Working Group 42 on *Marine Microplastics*;
  - ½-day meeting of the *Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas (AP-CREAMS)*;
  - ½-day meeting of the *Advisory Panel on North Pacific Coastal Ocean Observing System (AP-NPCOOS)*;
  - 1 -day meeting of the *Advisory Panel on Non-Indigenous Species (AP-NIS)*;

- ½-day meeting of the Joint PICES-NPFC Study Group on *Scientific Cooperation in the North Pacific Ocean* (SG-PICES-NPFC);
- 1-day meeting of the Study Group on Impacts of Mariculture on Coastal Ecosystems (SG-IMCE);
- ½-day meeting of the FishGIS Special Project Science Team;
- ½-day meeting of the Marine Turtle Special Project Science Team (subject to final approval by Governing Council).

**2019/S/2: Inter-sessional symposia/session/workshops and meetings**

Council approved the following activities:

Event	Dates	Location	PICES Role	Support Provided
<b>Intersessional Workshops/meeting of PICES Expert Groups</b>				
NPESR3 International Synthesis Workshop	Spring 2019 4 days	TBD-Yokohama?; *With ISB-2018, FUTURE, or BOTH; Sinjae Yoo (KOR) and Peter Chandler (CAN), conveners		10 chapter lead authors at \$5K each (= \$50K from NPESR acct.)
FUTURE SSC Mtg	Spring 2019 2.5 days	*With ISB, NPESR, or BOTH; Steven Bograd (USA) and Sukyung Kang (KOR), conveners		Most support from national funds of travelers; some may come from FUTURE acct.
ISB-2019	Spring 2019 2.5 days	*With FUTURE, NPESR, or BOTH, Hiroaki Saito (PICES), Convener		Most support from national funds of travelers; some may come from PICES FUTURE account.
Workshop on “Identifying the existence of thresholds in marine ecosystem driver-response relationships”	Spring 2019 2 days	In conjunction with ISB (if possible); Mary Hunsicker (USA), Xiujuan Shan (CHN), and Jennifer Boldt (CAN), Conveners	WG 36	
Workshop on “Towards an integrated approach to understanding ecosystem predictability in the North Pacific”	Spring 2019; 3 days	In either Boulder, CO (USA) or Princeton, NJ (USA); Ryan Rykaczewski (USA), Antonietta Capotondi (USA), Masami Nonake (JPN), Myron Peck (Germany/ICES), Enrique Curchitser (USA), Youyu Lu (CAN), and Momme Butenchon (Italy/ICES)	WG 40	Support travel of 1 or 2 scientists (no specific amount)
<b>Co-sponsorship of other Organizations activities</b>				
Global Ocean Acidification Observing	April 15-19, 2019; 3 days	Hangzhou, China	Co-sponsor	1 invited speaker; \$4K

Network workshop				
SOLAS Open Science Conf.	April 21-29, 2019; 9 days	Sapporo, Japan	Co-sponsor	2-3 ECS not to exceed \$6K;
NPAFC-IYS Workshop on salmon ocean ecology	May 18-20, 2019	Portland, OR, USA	Co-sponsor	\$7K for invited speakers/ECS
IMBeR Open Science Meeting	June 17-21, 2019	Co-sponsor	Co-sponsor	Partial travel support for 2-3 ECS; not to exceed \$6K
OceanObs'19 Conference	Sept 16-20, 2019	Honolulu, HI, USA	Co-sponsor	Partial travel support for 2-3 ECS; not to exceed \$6K
Alaska Marine Science Symposium (NPRB)	Jan 28-Feb 1, 2019	Anchorage, AK, USA	Co-sponsor	Partial support for 1-2 ECS to attend; not to exceed \$3K
ICES/NEAFC/NAFO/PICES International Shellfish Symposium "Shellfish-Resources and invaders of the North"	Nov 5-7, 2019	Tromso, Norway	Co-sponsor	\$6K CAD for partial or full support of two ECS to attend; previously approved also travel funding of PICES convener, Gordon Kruse (USA)
2 <sup>nd</sup> Intl Science and Policy Conference on implementation of EAM in the Arctic	~May 2019	Bergen, Norway	Co-sponsor (?)	Not to exceed \$4K
GlobalHAB Meeting	March 25-29, 2019	Paris, France (at IOC)	Co-sponsor	1 PICES participant; Vera Trainer \$3K
WG-SOCIAL/WG-ECON	Spring 2019	East Coast of North America		Criddle to attend; not to exceed \$2K
PACON Conference	July 2019	Vladivostok, RUS	Co-sponsor (?)	2 people not to exceed \$5K
SCOR WG EBUS (Eastern Boundary Upwelling Systems)	3 years	various	Co-sponsor	1 Associate Member representing PICES (Ryan Ryczewski-USA) – no support required

SCOR WG P-OBS (Integration of Plankton Observing Sensor Systems to Existing Global Sampling Programs)	3 years	various	Co-sponsor	Partial support for 1 Associate Member representing PICES (Sonia Batten- Canada).
North Pacific Regional Workshop on the UN Decade of Ocean Science for Sustainable Development	August 2019	Tokyo (?)	Co_sponsor with IOC WESTPAC	TBD
<b>Summer Schools and capacity building</b>				
Pacific Ecology and Evolution Conference (PEEC)	Feb 22-24, 2019	Bamfield, BC, Canada	Co-Sponsor	\$1.5K for logistics
PICES Summer School (Ocean Turbulence: from observing to research)	~August 2019	Qingdao, Shandong, CHN	Primary Sponsor	\$9K
WG37 (Zooplankton Production; Practical Training Phase 2)	Immed. preceding PICES-2019	Victoria, BC, CAN, HAKAI Institute.	Co-Sponsor	\$6K for logistics

**2018/S/3: Publications**

- i. The following publications are to be produced in or submitted to primary journals in 2018–2019:
  - a. A Special Issue in the ICES Journal of Marine Science resulting from the 4<sup>th</sup> International Symposium on the Effects of Climate Change on the World's Oceans in June 2018.
- ii. The following publications are to be produced in the PICES Scientific Report series in 2018–2019:
  - a. WG 32 - *Biodiversity of Biogenic Habitats* - final report in the PICES Scientific Report Series
  - b. WG 33 - *Joint PICES/ICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration* final report in the PICES Scientific Report Series

**2018/S/4: Future of Current Expert Groups**

Council approved the following changes to existing Expert Groups:

- i. The Working Group on *Assessment of Marine Environmental Quality of Radiation around the North Pacific* (WG 30) shall be disbanded on completion of their final report.
- ii. The Working Group on *Emerging Topics in Marine Pollution* (WG 31) shall be disbanded on completion of their final report.
- iii. The Working Group on *Biodiversity of Biogenic Habitats* (WG 32) shall be disbanded on completion of their final report.

- iv. The Study Group on *Marine Ecosystem Services* shall be disbanded on completion of their final report.
- v. The PICES-NPFC Study Group on *Scientific Cooperation in the North Pacific Ocean* be extended for one year (until October 2019) to complete its framework.
- vi. The Working Group on *Mesoscale and Sub-mesoscale Processes* (WG 38) be extended for one year (until October 2019) to analyze dataset for a synthesis paper.
- vii. The Joint PICES/ICES/PAME Working Group on an *Integrated Ecosystem Assessment for the Central Arctic Ocean* (WG-39) be extended for three years (until October 2022) to align with the ICES and PAME extensions, and to complete its Phase 1 assessment report within 1 year.
- viii. The Terms of Reference for the Technical Committee in Data Exchange (TCODE) are changed to reflect the new PICES Data Policy.
- ix. The joint PICES/ISC Working Group on *Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish* (WG 34) be extended for one year (until October 2019) to complete its work.

**2018/S/5: New Expert Groups**

The following expert groups, with terms of reference as described in GC Appendix B, were established:

- i. Study Group on *Impacts of Mariculture on Coastal Ecosystems* (SG-IMCE)
- ii. Working Group on the Impacts of Marine Plastics (WG 42)

**2018/S/6: Chairmanship and membership for Science Board, Standing Committees and expert groups**

- i. Dr. Vera Trainer (U.S.A) was elected Science Board Chair-Elect. Her official term as Science Board Chair will begin following PICES-2019;
- ii. Dr. Guangshui Na (China) was elected Chair of the Marine Environmental Quality Committee, replacing Dr. Chuanlin Huo (China);
- iii. Dr. Andrew Ross (Canada) was elected Vice-Chair of the Marine Environmental Quality Committee, replacing Dr. Thomas Therriault (Canada);
- iv. Dr. Shang (Sunny) Chen (China) and Dr. Dan Lew (U.S.A) were elected as Co-Chairs of WG 41 on *Marine Ecosystem Services*;
- v. Dr. Thomas Therriault (Canada) was elected Chair of the Advisory Panel on Marine Non-indigenous Species;
- vi. Dr. Michael Rust was approved as a potential *ex-officio* member of the Study Group on *Impacts of Mariculture on Coastal Ecosystems* (SG-IMCE) representing ICES.

*GC Appendix B***Study Group on *Impacts of Mariculture on Coastal Ecosystems* (SG-IMCE)**

**Reporting to:** Science Board

**Term:** November 2018-October 2019

**Linkage(s) to previous PICES Expert Groups or activities (if any):**

- Follows from recommendations from Working Group 24 on Environmental Interactions on Marine Aquaculture (<http://meetings.pices.int/publications/scientific-reports/Report44/Rep44.pdf>)

**Linkage(s) to other organizations and programs (if any):**

- As part of the proposed activity, potential linkages to the new ICES activity on mariculture (<http://www.ices.dk/news-and-events/news-archive/news/Pages/Examining-the-present-and-future-of-aquaculture-.aspx>) will be explored.

**Linkage/Contributions to the FUTURE program (if any):**

- A contribution to FUTURE program, particularly Research Theme 3: How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?

**Motivation and Goals and/or Background**

Mariculture, especially large-scale mariculture, is an important factor affecting coastal ecosystems. In PICES Scientific Report No. 44, a previous PICES expert group (Working Group 24 on Environmental Interactions on Marine Aquaculture) provided analyses and overviews of:

- Environmental Interactions of Marine Aquaculture
- Marine Aquaculture Legislative Frameworks and Environmental Interactions Research
- Pathogens of Aquatic Animals: Detection, Diagnosis and Risks of Interactions Between Wild and Farmed Population

While this was an important contribution and a sound basis on which to proceed, there is much more research to be done to characterize the effects of pathogenic and harmful organisms derived from or associated with mariculture on coastal marine ecosystems, consistent with FUTURE Research Theme 3. The Study Group will leverage the international expertise within PICES and partner organizations “identify the impacts in coastal ecosystems that arise from regional- and large-scale mariculture”. The rather cautious “Study Group leading to a Working Group” approach was selected in response to previous challenges and recommendations from the Working Group 24, specifically:

- Any future marine aquaculture-related PICES expert group should be more narrowly focused to not only allow for more directed work, but also to increase the likelihood of experts from all PICES member countries being able to participate and contribute.
- As well, it is clear that active participation from all PICES member countries is key to realizing a complete analysis of sustainable marine aquaculture issues

**Terms of Reference:**

1. Review recent research, activities and priorities related to the effects of pathogenic and harmful organisms derived from mariculture on coastal marine ecosystems in PICES nations;
2. Assess the opportunities to partner with other organizations to address the issues identified above;

3. Prepare Terms of Reference for a Working Group to address the issues identified;
4. Where appropriate, identify opportunities for future PICES expert groups to address issues related to the impacts of aquaculture that were not addressed in the Terms of Reference of the proposed Working Group. This is added in anticipation that the range of issues identified may exceed the capacity for a single PICES working group, in keeping with the recommendation from Working Group 24 to keep subsequent Working Groups focused on specific and tractable objectives.
5. Review capacity for forecast/projects on the impacts of Minuti on coastal ecosystems to support Minuti management.



### **Working Group 42 on the Impacts of Marine Plastics**

**Reporting to:** Marine Environmental Quality Committee (MEQ)

**Term:** November 2018 – November 2021

**Linkage(s) to previous PICES Expert Groups or activities (if any):**

- SG-MMP Study Group on Marine Microplastics

**Linkage(s) to other organizations and programs (if any):** SCOR, GESAMP, ICES, WESTPAC

#### **Motivation and Goals and/or Background**

Marine debris is increasingly recognized as a threat to biota in the ocean, and especially North Pacific and its marginal seas are reported as 'hot spots' for its abundance. However, organismal and non-organismal indicators, which are consistently available across the North Pacific region, for plastic pollution status and trend and ecological impacts are not established.

#### **Terms of Reference:**

1. To review micro- and mesoplastic pollution (e.g. abundance, distribution, composition, and potential impacts) in North Pacific and its marginal seas;
2. To identify multiple organismal and non-organismal indicators of plastic pollution and its environmental impacts including associated chemicals in the North Pacific and its marginal seas;
3. To recommend guidelines for monitoring environmental indicators and a target improvement goal for the established indicators;
4. To convene a topic session and/or workshop on environmental indicators and impacts of plastic pollution and coordinate a special issue in an international peer-reviewed journal;
5. Contribute to FUTURE by publishing a final report summarizing results of the Working Group deliberations.

### **Revised Terms of Reference – Technical Committee on Data Exchange (TCODE)**

1. Identify the data management requirements of PICES;
2. Develop strategic plans to meet these requirements;
3. Recommend establishment of expert groups to deal with specific functions of TCODE;
4. Review the progress of expert groups and provide Annual Reports to Science Board on the work of TCODE; and
5. Advise the PICES Secretariat and expert groups on their data exchange activities.
6. Develop, review, and update PICES data policies and data inventory.

*GC Appendix C***Participants at Governing Council – PICES-2018**Canada

Carmel Lowe (GC member and F&A Chair)  
 Lesley MacDougall (F&A member and  
 advisor)

Japan

Tetsuo Fujii (GC member)  
 Toshiaki Kobayashi (GC member)  
 Tomowo Watanabe (advisor)  
 Chieko Kondo Yamasaki (advisor)  
 Nobuaki Suzuki (advisor)  
 Kazuki Ueda (advisor)

People's Republic of China

Antao Wang (GC member)  
 Fangli Qiao (GC member)

Republic of Korea

Haengnok Oh (GC and F&A member)  
 Wonjoon Shim (GC member)  
 Hyun-Joo Kang (advisor)  
 Saeseul Kim (advisor)

Russian Federation

Oleg Bulatov (GC member)  
 Aleksai Baitaliuk (GC member)  
 Oleg Katugin (advisor)

United States of America

Enrique Curchitser (GC member)  
 Francisco Werner (GC member)  
 Michael Seki (F&A member and advisor)  
 Siri Hakala (advisor)

Other

Chul Park (PICES Chairman)  
 Laura Richards (PICES Past Chairman)  
 Hiroaki Saito (Science Board Chairman)  
 Robin Brown (Executive Secretary)  
 Harold (Hal) Batchelder (Deputy Executive  
 Secretary)

**Report of the Finance and Administration Committee  
October 31, 2018**

Note: Specific recommendations from F&A to GC are in blue:

The Finance and Administration (hereafter F&A) Committee met from 14:00–18:00 hours on October 30 and 10:00 - 12:30 on October 31, 2018 under the chairmanship of Dr. Carmel Lowe.

**FA AGENDA ITEM 1 - OPENING REMARKS**

The Chairman called the meeting to order, welcomed the participants and requested an introduction of members for each delegation. All Contracting Parties were present at the meeting (*F&A Endnote 1*).

**FA AGENDA ITEM 2 - ADOPTION OF AGENDA AND MEETING PROCEDURES**

The Committee reviewed the provisional agenda. At the request of the Executive Secretary and with the approval of the parties two additional information items were added:

- 17(e) - Hosting of the PICES Secretariat by Canada/Fisheries and Oceans Canada
- 17(f) - Intern Program and Capacity Building

The modified agenda is included as *F&A Endnote 2*.

**FA AGENDA ITEM 3 - AUDITED ACCOUNTS FOR *FY*2017**

The *FY* 2017 financial statements were submitted to the auditor Hale & Hughesman on March 31, 2018 and the audit was completed on May 29, 2018. The report (*F&A Endnote 3*) was electronically circulated to all Contracting Parties on June 15, 2018. In the auditor's opinion, "*the financial statements present fairly, in all material respects, the financial position of the North Pacific Marine Science Organization as at December 31, 2017, and the results of its operations and changes in fund balances for the year then ended*". The Committee noted that the auditing process was in line with the PICES Financial Regulations (*Regulation 11 (ii)* and *Regulation 13*) and recommends that the Auditor's Report be approved by Governing Council (hereafter Council).

**FA AGENDA ITEM 4 - ANNUAL CONTRIBUTIONS**

As stated in *Regulation 5(ii)* of the PICES Financial Regulations, all national contributions to PICES "*shall be considered due as of the first day of the financial year (January 1) to which they relate*". A request for payment of the 2017 annual fees was sent to all Contracting Parties on November 23, 2017. All Contracting Parties met their financial obligations for *FY* 2018 (*F&A Endnote 4*).

The Committee reiterated (1) the importance for all Contracting Parties to pay the Annual Fee by the January 1 deadline and (2) that for planning of their funding requests for annual contributions, Contracting Parties continue to use the guideline generally accepted at PICES-1999 (Decision 1999/A/2(ii)), which states that the annual contributions will increase at the rate of inflation in Canada.

The Committee requested that the Executive Secretary send letters to all Contracting Parties requesting payment of Annual Fees shortly after completion of the PICES-2018.

**FA AGENDA ITEM 5 - VOLUNTARY CONTRIBUTIONS AND FUND-RAISING ACTIVITIES**

The Committee reviewed the recent history of voluntary contributions to support PICES activities.

The Committee recommends that the Executive Secretary send letters to all Contracting Parties inviting them to provide voluntary contributions to the Trust Fund to support the Intern Program in 2019 and beyond.

F&A-2018

**FA AGENDA ITEM 6 - THE GENERAL FUND –IN 2017**

The committee reviewed the budget and expenditures in the General Fund for 2017, noting that expenditures were within the budget tolerance for all categories.

**AGENDA ITEM 7 - WORKING CAPITAL FUND IN 2017 AND 2018**

The Executive Secretary provided information on the amount of funds in the Working Capital Fund restricted for specific purposes (encumbered funds) for FY2017 and the estimated amount of the encumbered funds for the fiscal year end FY2018.

**FA AGENDA ITEM 8 - TRUST FUND**

The Committee reviewed the status of the Trust Fund and recommends a Year- End transfer from the Working Capital Fund to the Trust Fund to restore it the level of \$110,000.

**FA AGENDA ITEM 9 – RELOCATION AND HOME LEAVE FUND- IN 2017 AND 2018**

The Committee reviewed the status of the Relocation and Home Leave Fund. No adjustments were recommended.

**FA AGENDA ITEM 10 – JAPAN MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES (MAFF) FISHGIS**

The status of this Special Project was reviewed.

**FA AGENDA ITEM 11 – ESTIMATED ACCOUNTS FOR 2018**

The estimated accounts for FY2018 were reviewed and noted the impacts of the very large increase in employer costs to support the pension plan.

The Committee determined that the very large increase in the employer costs for the pension plan in 2018 were unforeseen and that in order to avoid exceeding the budget set for the General Fund, a portion of this increase be paid from the Working Capital Fund in accordance with Financial Rule 6(iv)(a).

**FA AGENDA ITEM 12 – OPTIONS FOR REVENUE FROM ANNUAL MEETINGS WITH HIGH ATTENDANCE**

The Committee reviewed the analysis prepared by the Executive Secretary.

The Committee recommends that options for revenue from annual meetings with high attendance be deferred until such time as the Organization has greater financial stability.

**FA AGENDA ITEM 13 - POTENTIAL CHANGES TO ANNUAL FEES TO ADDRESS PENSION PLAN DEFICITS AND STAFFING LEVELS IN THE SECRETARIAT**

The Committee reviewed the material presented. Decisions on staffing, pension plan costs and annual fees will be taken after consideration of Agenda Item 15 - Proposed budget for 2019 and forecast budget for 2020.

**FA AGENDA ITEM 14 – FINANCIAL RESERVE PLANNING**

The Committee reviewed the status of the Working Capital Fund Reserve. No adjustments were recommended.

**FA AGENDA ITEM 15 - PROPOSED BUDGET FOR FY 2019 AND FORECAST BUDGET ESTIMATES FOR FY2020**

The Committee reviewed the proposed FY2019 budget of \$1,030,000. The total 2019 contributions of the Parties will be \$803,400 and a transfer of \$226,600 from the Working Capital Fund will be required to balance the budget and recommends that this be approved by Governing Council.

The Committee reviewed that materials provided for Agenda Items 11, 13 and 15. Following careful and considerable consideration of each of the four proposed options to address the organizations financial pressures the Committee failed to reach consensus on a recommended option.

F&A 2

The Committee acknowledged that in the absence of increased revenue (Option 1) that accommodating the current operations of the organizations would require excessive on-going annual transfers of funding from the Working Capital Fund and that this requirement would exhaust the fund reserve in approximately 4 years. Unless Governing Council directs a reduction in the operations of the organization commensurate to its financial pressures, the Committee cautions against endorsement of this option.

In the absence of this consensus, the Committee requires additional direction from Governing Council well in advance of PICES-2019.

#### **FA AGENDA ITEM 16 - SCHEDULE, STRUCTURE AND FINANCING OF FUTURE ANNUAL MEETINGS**

The National Delegate from China confirms that they will be pleased to host PICES-2020 at a location and time still to be determined. The Committee also recommends approving a request from China for up to \$40,000 from

In keeping with the six -year rotation cycle (Decision 1994/A/6), Korea was asked if it was willing to return to the original cycle, hosting the Annual Meeting in 2021. The Committee recommends that Council formally request Korea to explore the possibility of hosting the 2021 Annual Meeting and inform the Secretariat on this matter by March 31, 2019.

At PICES-2001 (Victoria, Canada), Council approved the charging of a registration fee for future Annual Meetings of the Organization and indicated that the registration fee structure should be reviewed annually (Decision 2001/A/4(iv)). The Committee discussed the current registration fee structure.

Recognizing the current financial challenges, the low registration fee compared to other such meetings and the long interval without an increase, the Committee recommends a modest increase to Registration Fees for PICES-2019.

<b>Type of registration fee</b>	<b>CAD \$</b>
Regular	325
Early	250
Student	50
Spousal	50

At PICES-2005, Council re-iterated its support for the concept of inter-sessional Science Board meetings with the participation of Council members but suggested that the need for such a meeting should be evaluated each year and that, given meeting costs (including time commitment of the members), an inter-sessional meeting should be held only if the agenda is substantive. The Committee confirmed these views in 2019. Science Board has already indicated the importance of having an inter-sessional meeting in 2019.

The Committee supports the request by Science Board and recommends it to Council for approval. Japan has indicated their willingness to host the 2019 Intersessional Science Board meeting, subject to confirmation of the meeting size and scope.

Russia also expressed interest in hosting an intersessional event but noted that they require details on the event scope and sufficient lead time to secure funding.

The Committee reviewed the possibility of a joint PICES/ICES Annual Science Meeting, recognizing the potential large impact on costs for Contracting Parties.

The Committee recommends that the Executive Secretary continue to explore this option with ICES and provide an evaluation of the benefits and the additional costs for the organization and Contracting Parties at PICES-2019 for the Committee's consideration at the 2019 Annual Meeting.

#### **FA AGENDA ITEM 17 – ADMINISTRATIVE MATTERS**

##### **FA AGENDA ITEM 17(A) – DATA MANAGEMENT POLICY FOR PICES**

## **F&A-2018**

The Committee reviewed the proposed PICES Data Policy and provided some minor modifications. The Committee recommends that the modified policy (*F&A Endnote 6*) be adopted and implemented by the Organization.

### **FA AGENDA ITEM 17(B) – TRACKING THE ACTIVITY OF THE SECRETARIAT**

The Committee reviewed the indicators developed to track the activity of the Secretariat and recommend that tracking and reporting of these indicators be continued indefinitely.

The Committee further recommended that the Executive Secretary consult with other organizations on approaches to determine the uptake/impact of science activities, reporting back to the Committee at PICES-2019.

### **FA AGENDA ITEM 17(C) – STAFFING IN THE PICES SECRETARIAT**

The Committee reviewed the material presented. Recommendations arising are presented under Agenda Item 15.

### **FA AGENDA ITEM 17(D) – INTERNATIONAL FISHERY COMMISSIONS PENSION SOCIETY (IFCPS) – PENSION PLAN STATUS**

The Committee reviewed the material presented. Recommendations arising are presented under Agenda Item 15.

### **FA AGENDA ITEM 17(E) – HOSTING OF THE PICES SECRETARIAT BY CANADA/FISHERIES AND OCEANS CANADA**

The Committee reviewed the material presented and expressed appreciation to Canada for the substantial “in-kind” benefit to the Organization.

### **FA AGENDA ITEM 17(F) – INTERN PROGRAM AND CAPACITY BUILDING**

The Committee reviewed the material presented. Recommendations arising are presented under Agenda Item 8.

### **FA AGENDA ITEM 18 - APPOINTMENT OF THE F&A COMMITTEE CHAIRMAN**

The Committee expressed appreciation for the contributions of Dr. Carmel Lowe as Chair of the Finance and Administration and recommends that she be appointed to a second two-year term to beginning after PICES-2018 and ending after PICES-2020.

### **FA AGENDA ITEM 19 - OTHER BUSINESS**

Two additional agenda items were discussed under Agenda Item 17 – Administrative Matters

F&A ENDNOTE 1

2018 F&A participation list

Canada

Lesley MacDougall (F&A member)

Japan

Nobuaki Suzuki (F&A member)

Chieko Kondo Yamasaki (advisor)

Ichiro Koga (advisor)

Kazuki Ueda (advisor)

Tomowo Watanabe (advisor)

People's Republic of China

Antao Wang (F&A member)

Fangli Qiao (GC member and advisor)

Republic of Korea

Sun Ha Kim (F&A member)

Hee Jin Kim (F&A member)

Joongho Moon (advisor)

Russian Federation

Igor Shevchenko (F&A member)

U.S.A.

Michael Seki (F&A member)

Other

Carmel Lowe (F&A Chairman)

Chul Park (PICES Chairman)

Robin Brown (Executive Secretary)



F&A-2018

F&A ENDNOTE 2:

**PICES Twenty Seventh Annual Meeting (PICES-2018)**  
**Yokohama, Japan**  
**Tuesday, October 30 (14:00 – 18:00) 2018**  
**Wednesday, October 31 (09:00-12:50) 2018**

**FINANCE AND ADMINISTRATION COMMITTEE (F&A)**  
**AGENDA**  
**(AS MODIFIED AT THE MEETING)**

1. Welcome and opening remarks
2. Adoption of agenda and meeting procedures
3. Audited accounts for FY 2017
4. Annual contributions
5. Voluntary Contributions and Fund-raising activities
6. General Fund in 2017 – Details
7. Working Capital Fund in 2017 –Details
  - a. Includes decisions on moving money within the WCF
8. Trust Fund in 2017 – Details
9. Relocation and Home Leave Fund – Details.
10. MAFF Fish GIS Fund in 2017– Details
11. Estimated accounts for 2018
12. Options for revenue from Annual Meetings with high attendance [Decision 2017/A/4(vi)]
13. Potential Changes to Annual Fees to address pension plan deficits and staffing levels in the Secretariat
14. Financial Reserve Planning
15. Proposed budget for FY 2019 and forecast budget estimates for FY 2020
16. Schedule, structure and financing of future Annual Meetings [Decision 2015/A/4(vi)]
17. Administrative matters:
  - a. Data management policy for PICES
  - b. Tracking the activity of the PICES Secretariat
  - c. Staffing in the PICES Secretariat
  - d. International Fisheries Commission Pension Plan status
  - e. Hosting of the PICES Secretariat by Canada/Fisheries and Oceans Canada (*added during discussion of Agenda Item 2*)
  - f. Intern Program and Capacity Building (*added during discussion of Agenda Item 2*)
18. Schedule for Appointment of F&A Committee Chairman
19. Other business
20. 2018 F&A report and recommendations to Governing Council

F&A 6

F&A ENDNOTE 3:

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION  
FINANCIAL STATEMENTS  
DECEMBER 31, 2017**

F&A 7

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION  
FINANCIAL STATEMENTS  
DECEMBER 31, 2017**

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Statement of Financial Position	
Statement of Operations and Changes in Fund Balances	
Notes to the Financial Statements	

**INDEPENDENT AUDITORS' REPORT**

To the Council of the  
North Pacific Marine Science Organization

We have audited the accompanying financial statements of the North Pacific Marine Science Organization, which comprise the statement of financial position as at December 31, 2017 and the statement of operations and changes in fund balances for the year then ended, and a summary of significant accounting policies and other explanatory information.

*Management's Responsibility for the Financial Statements*

Management is responsible for the preparation and fair presentation of these financial statements in accordance with the North Pacific Marine Science Organization's Financial Regulations and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

*Auditors' Responsibility*

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained in our audit is sufficient and appropriate to provide a basis for our audit opinion.

*Basis of Accounting*

Without modifying our opinion, we draw attention to Note 2 in the financial statements, which describes the basis of accounting. The financial statements are prepared to comply with the North Pacific Marine Science Organization's Financial Regulations as referred to above.

*Opinion*

In our opinion, these financial statements present fairly, in all material respects, the financial position of the North Pacific Marine Science Organization as at December 31, 2017, and the results of its operations and changes in fund balances for the year then ended.

Sidney, B.C.  
May 22, 2018



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Hughesman Morris  
Chartered Professional Accountants

**STATEMENT OF FINANCIAL POSITION  
AS AT DECEMBER 31, 2017**

<b>ASSETS</b>	2017	2016
<b>CURRENT ASSETS</b>		
Cash and short term deposits (note 4)	\$ 2,137,024	\$ 2,205,697
Accounts receivable	21,661	172,372
Prepaid expenses	1,277	3,185
	<b>\$ 2,159,962</b>	<b>\$ 2,381,254</b>
<b>LIABILITIES</b>		
<b>CURRENT LIABILITIES</b>		
Accounts payable	\$ 55,008	\$ 26,715
Funds held for Contracting Parties (note 3)	264,800	259,000
	319,808	285,715
<b>FUND BALANCES</b>		
<b>WORKING CAPITAL FUND</b> (note 4)	1,351,707	1,396,424
<b>TRUST FUND</b>	110,000	110,000
<b>RELOCATION AND HOME LEAVE FUND</b>	300,596	340,552
<b>MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES FUND</b>	-	35,140
<b>MINISTRY OF ENVIRONMENT FUND</b>	-	213,423
<b>MAFF FISH GIS FUND</b>	77,851	-
	1,840,154	2,095,539
	<b>\$ 2,159,962</b>	<b>\$ 2,381,254</b>

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION**  
**STATEMENT OF OPERATIONS AND CHANGES IN FUND BALANCES**  
**FOR THE YEAR ENDED DECEMBER 31, 2017**

	General Fund	Working Capital Fund	Trust Fund	Relocation and Home Leave Fund	Ministry of Agriculture, Forestry and Fisheries Fund	Ministry of Environment Fund	MAFF FishGIS Fund	2017 Total	2016 Total
<b>FUND BALANCES, beginning of year</b>	\$ -	\$ 1,396,424	\$ 110,000	\$ 340,552	\$ 35,140	\$ 213,423	\$ -	\$ 2,095,539	\$ 2,016,302
<b>SOURCES OF FUNDS</b>									
Voluntary contributions and grants (note 5)	-	1,038,542	48,959	-	-	-	96,385	1,183,886	2,504,868
Contributions from Contracting Parties	777,000	-	-	-	-	-	-	777,000	766,200
Interest and other income (note 6)	-	206,922	59	19,571	-	-	-	226,552	201,079
Budgeted transfer to General Fund (note 7)	131,100	(131,100)	-	-	-	-	-	-	-
<b>TOTAL REVENUE</b>	908,100	1,114,364	49,018	19,571	-	-	96,385	2,187,438	3,472,147
<b>FUND BALANCES, before expenditures</b>	908,100	2,510,788	159,018	360,123	35,140	213,423	96,385	4,282,977	5,488,449
<b>EXPENDITURES</b>									
Annual Meeting	42,139	-	-	-	-	-	-	42,139	10,689
Intern program	-	-	46,118	-	-	-	-	46,118	40,915
MAFF Fund expenditures (note 8)	-	-	-	-	35,140	-	-	35,140	71,159
MOE Fund expenditures (note 9)	-	-	-	-	-	200,784	-	200,784	1,342,246
MAFF FishGIS Fund expenditures (note 10)	-	-	-	-	-	-	18,534	18,534	-
Office and administration	27,689	4,793	121	-	-	-	-	32,603	29,117
Personnel services	575,494	110,621	-	-	-	-	-	686,115	577,705
Projects (note 11)	-	1,059,102	-	-	-	-	-	1,059,102	1,025,258
Publications / Communication	37,749	-	-	-	-	-	-	37,749	40,591
Relocation	-	-	-	59,527	-	-	-	59,527	9,697
Special meetings/travel	159,099	5,287	44,390	-	-	-	-	208,776	247,069
<b>TOTAL EXPENDITURES BEFORE OTHER</b>	842,170	1,179,803	90,629	59,527	35,140	200,784	18,534	2,426,587	3,394,446
Foreign exchange loss (gain) (note 12)	16,236	-	-	-	-	-	-	16,236	(1,536)
<b>TOTAL EXPENDITURES</b>	858,406	1,179,803	90,629	59,527	35,140	200,784	18,534	2,442,823	3,392,910
<b>NET FUNDS AVAILABLE</b>	49,694	1,330,985	68,389	300,596	-	12,639	77,851	1,840,154	2,095,539
<b>TRANSFER TO WORKING CAPITAL FUND (note 4)</b>	(49,694)	49,694	-	-	-	-	-	-	-
<b>INTERFUND TRANSFERS (note 7)</b>	-	(28,972)	41,611	-	-	(12,639)	-	-	-
<b>FUND BALANCES, end of year</b>	\$ -	\$ 1,351,707	\$ 110,000	\$ 300,596	\$ -	\$ -	\$ 77,851	\$ 1,840,154	\$ 2,095,539

## 1. PURPOSE OF ORGANIZATION

The North Pacific Marine Science Organization (PICES) is an intergovernmental non-profit scientific Organization whose present members include Canada, Japan, the People's Republic of China, the Republic of Korea, the Russian Federation and the United States of America. The purpose of the Organization is to promote and coordinate marine scientific research in order to advance scientific knowledge of the North Pacific and adjacent seas.

## 2. ACCOUNTING POLICIES

The financial statements are prepared in accordance with the North Pacific Marine Science Organization's Financial Regulations. The following is a summary of the significant accounting policies used in the preparation of these financial statements:

### (a) Fund Accounting

The Working Capital Fund represents the accumulated excess of contributions provided from Contracting Parties over expenditures in the General Fund. The purposes of the General Fund and Working Capital Fund are established by Regulation 6 of the Organization's Financial Regulation.

The Trust Fund was established in 1994 for the purpose of facilitating participation of a broad spectrum of scientists in activities of the Organization.

The Relocation and Home Leave Fund was established in 1995 to pay relocation and home leave expenses of new employees and their dependents to the seat of the Secretariat and removal after period of employment has ended, and to provide home leave for international staff. In 2015 [Decision 2015/A/10], Council expanded the use of this Fund to include funding for severance and excess accumulated vacation pay for all employees. The Governing Council shall determine the required level of the Fund and revise it as appropriate.

The Ministry of Agriculture, Forestry and Fisheries (MAFF) Fund was established in 2007. The Ministry of Agriculture, Forestry and Fisheries of Japan, through the Fisheries Agency of Japan, has provided voluntary contributions for a series of projects. The first PICES/MAFF project (April 1, 2007 - March 31, 2012) was dedicated to the development of the prevention systems for harmful organisms in the Pacific Rim. The goal of the second PICES/MAFF project (April 1, 2012 - March 31, 2017) is to identify the relationships between the sustainable human communities and productive marine ecosystems in the North Pacific, under the concept of fishery social-ecological systems. This project was completed in 2017 and the balance of the funds held was zero on December 31, 2017.

The Ministry of the Environment (MOE) Fund was established on April 15, 2014. The Ministry of the Environment of Japan has provided voluntary contributions for a 3-year project dedicated to assessing and forecasting the effects of debris, generated by the tsunami that followed the 2011 Great East Japan Earthquake, on ecosystem structure and function, as well as the coastlines and communities of the west coast of North America and Hawaii. This project was completed in 2017 and the balance of the funds held was zero on December 31, 2017.

A new PICES project (December 21, 2017 - March 31, 2020) on "*Building Capacity for Coastal Monitoring by Local Small-scale Fishers (FishGIS)*" was established in 2017 with funding from the Ministry of Agriculture, Forestry and Fisheries, under the new procedure (Decision 2017/A/6) for Approval and Management of Special Projects.

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION**  
**NOTES TO THE FINANCIAL STATEMENTS**  
**DECEMBER 31, 2017**

**2. ACCOUNTING POLICIES, continued**

(b) Capital Assets

Capital assets acquired by the Organization are expensed in the year of acquisition. During the current year the Organization purchased \$1,956 of capital assets.

(c) Revenue

Contributions from Contracting Parties are recorded in the year in which they relate to. All other contributions and grants are recorded when received.

Interest revenue is recognized as it is earned.

(d) Expenditures

Expenditures are recognized when services are performed or goods are delivered, if the amount is known or can be reasonably estimated.

(e) Income Tax

The Organization is a non-taxable Organization under the Privileges and Immunities (International Organizations) Act (Canada).

(f) Foreign Exchange

Transactions originating in foreign currencies are translated at the exchange rate prevailing at the transaction dates. Assets and liabilities denominated in foreign currency are translated to equivalent Canadian amounts at the current rate of exchange at the statement of financial position date.

(g) Financial Instruments

The Organization's financial instruments consist of cash and short-term deposits, accounts receivable and accounts payable, the fair value of which approximates their carrying value.

(h) Use of Estimates

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

**3. FUNDS HELD FOR CONTRACTING PARTIES**

The funds held for Contracting Parties are advance contributions from Japan in the amount of \$131,400 and China in the amount of \$133,400.



#### **4. WORKING CAPITAL FUND**

Of the total amount in the Working Capital Fund (\$1,351,707), \$883,940 of cash and short term deposits is restricted for specific designated projects.

Pursuant to decision 2017/A/3(ii) of the Governing Council, \$133,600 of the funds held in the Working Capital Fund will be transferred to the General Fund at the beginning of the 2018 fiscal year to balance the budget, setting the total annual contributions at \$788,400, and the 2018 annual contribution at \$131,400 per Contracting Party.

Pursuant to Financial Regulation 6 (iii), the Working Capital Fund is to be increased/decreased by the surplus/deficit in the General Fund.

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION  
NOTES TO THE FINANCIAL STATEMENTS  
DECEMBER 31, 2017**

**5. VOLUNTARY CONTRIBUTIONS AND GRANTS**

	Working Capital Fund	Trust Fund	MAFF Fish GIS Fund
<b>Contributions to Intern Program:</b>			
DFO (Canada)	-	15,000	-
NOAA (U.S.A.)	-	18,908	-
KIOST (Korea)	-	5,000	-
<b>Contributions for the North Pacific CPR Project:</b>			
DFO (Canada)	15,000	-	-
NPRB (U.S.A.)	203,334	-	-
PWSSC (U.S.A.)	207,732	-	-
<b>Early Career Science Conference:</b>			
KIOST (Korea)	68,237	-	-
SCOR	3,360	-	-
<b>FUTURE Program:</b>			
DFO (Canada)	15,000	-	-
IMBIZO5	25,378	-	-
MAFF Fish GIS Fund:	-	-	96,385
<b>Park KIOST Travel Fund:</b>			
KIOST (Korea)	45,500	-	-
<b>PICES 2016:</b>			
SCOR	-	6,649	-
<b>PICES 2017:</b>			
SCOR	-	3,402	-
<b>PICES 2019:</b>			
DFO (Canada)	125,000	-	-
<b>Small Pelagics Symposium 2017:</b>			
DFO (Canada)	9,359	-	-
FAO	9,275	-	-
IFFO	6,596	-	-
PICES contribution (from General Fund)	8,500	-	-
Registration fees	84,417	-	-
<b>Special project coordination:</b>			
Tax levy	24,082	-	-
<b>Transitional Areas La Paz 2018:</b>			
ISC	6,142	-	-
JSFO	1,088	-	-
JSFS	1,112	-	-
NOAA (U.S.A.)	50,756	-	-
NPFC	2,347	-	-
NPRB (U.S.A.)	12,769	-	-
Registration fees	470	-	-
<b>Washington 2018:</b>			
DFO (Canada)	50,000	-	-
FAO	8,940	-	-
NOAA (U.S.A.)	31,513	-	-
NPAFC	7,500	-	-
NPRB (U.S.A.)	6,385	-	-
ONC	8,000	-	-
Registration fees	750	-	-
	<b>\$ 1,038,542</b>	<b>\$48,959</b>	<b>\$ 96,385</b>

**6. INTEREST AND OTHER INCOME**

	Working Capital Fund	Trust Fund	Relocation and Home Leave Fund
PICES 2017 registration fees	\$ 67,664	\$ -	\$ -
Income tax levies	90,956	-	19,229
GST/HST & PST rebates	19,034	-	-
Interest income	13,787	59	342
Overhead from MAFF Fish GIS Project	12,530	-	-
Miscellaneous income	2,951	-	-
	\$ 206,922	\$ 59	\$ 19,571

**7. INTERFUND TRANSFERS**

The Governing Council approved the transfer of \$131,100 at the beginning of 2017 from the Working Capital Fund to the General Fund (Decision 2016/A/8/ii) to balance the budget, setting the total annual contributions at \$777,000, and the 2017 annual contribution at \$129,500 per Contracting Party.

The remainder of SCOR funds received by the Trust Fund for the Bergen Zooplankton Production Symposium, \$2,355, were transferred from the Trust Fund to the Working Capital Fund for the Early Career Science 2017 event.

\$12,639, the remaining balance in the MOE Fund, was transferred to the Working Capital Fund for the San Diego 2018 event.

The Governing Council approved the transfer of funds from the Working Capital Fund to restore the Trust Fund to \$110,000 by the end of 2017 (Decision 2017/A/3/iii). The amount of the transfer was \$43,966.

**8. MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES FUND EXPENDITURES**

*2012-2017 PICES/MAFF Project: Marine ecosystem health and human well being*

	2017	2016
Miscellaneous	\$ 67	\$ 914
Contractual services	21,491	27,413
Overhead to PICES	-	8,709
Special meetings/travel	13,582	34,123
Total project expenses	\$ 35,140	\$ 71,159

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION**  
**NOTES TO THE FINANCIAL STATEMENTS**  
**DECEMBER 31, 2017**

**9. MINISTRY OF ENVIRONMENT FUND EXPENDITURES**

	2017	2016
Contractual services	\$ 76,079	\$ 1,099,098
Miscellaneous	1,488	4,232
Other workshops	-	9,998
Overhead to PICES	-	167,821
Printing	89,965	-
Special meetings/travel	33,252	61,097
<b>Total MOE expenses</b>	<b>\$ 200,784</b>	<b>\$ 1,342,246</b>

**10. MAFF FISHGIS EXPENDITURES**

*2017-2020 PICES/MAFF Project: Building capacity for coastal monitoring by local small-scale fishers*  
2017

Miscellaneous	\$ 89
Overhead to PICES	12,530
Special meetings/travel	5,915
<b>Total project expenses</b>	<b>\$ 18,534</b>

**11. PROJECTS**

The expenditures in the Working Capital Fund for projects funded by voluntary contributions designated for the respective projects are as follows:

	2017	2016
BC Government Tsunami Debris Mapping	\$ -	\$ 12,025
Development of FUTURE	5,303	21,461
DFO Tsunami Debris	-	25,000
Early Career Scientist 2017	94,411	4,489
IMBIZO	25,210	-
IMDC San Diego 2018	9,874	-
North Pacific CPR Project	516,260	61,035
North Pacific Ecosystem Status Report	2,943	16,349
Park KIOST Travel Fund	27,483	-
PICES 2016 USA	-	467,221
PICES 25th Anniversary	-	181,182
PICES Publication Program	-	33,952
Small Pelagics Symposium	188,037	34,994
Special Project Coordination	179,029	167,550
Transitional Areas La Paz 2018	6,504	-
US Reserve	2,112	-
Visiting Scientists	1,824	-
Washington 2018	112	-
	<b>\$ 1,059,102</b>	<b>\$ 1,025,258</b>

## 12. FOREIGN CURRENCY TRANSACTIONS

At year end all funds held in foreign currency (2017: USD \$182,342, 2016: USD \$66,487), receivables (2017: nil, 2016: USD \$61,858) and payables (2017: nil, 2016: USD \$764) are converted to Canadian dollars using the December 31<sup>st</sup> exchange rate. A foreign exchange loss has been reported on the current year financial statements; this amount is an unbudgeted item which has been caused by the ongoing fluctuations in exchange rates, and not by the actual purchase or sale of any foreign currencies.

## 13. UNFUNDED PENSION LIABILITY

The Organization holds a pension plan for its employees with the International Fisheries Commissions Pension Society. The most recent actuarial valuation report was prepared as at January 1, 2017 and showed an unfunded pension liability for PICES of \$477,000. If the plan were wound-up, the wind-up shortfall (adjusted for cost of future indexation) as at January 1, 2017 would be \$2,501,000.

The International Fisheries Commissions Pension Society will continue to develop a financial plan to reduce the unfunded pension liability.

Pursuant to decision 2017/A/3(iv), Council approved a lump sum employer contribution of \$20,000 from the fiscal year 2018 budget to pay down unfunded liabilities. An additional lump sum payment (up to \$25,000) is approved if there is a fiscal year 2017 surplus in the General Fund, as determined by the 2017 Auditors' Report. This will be paid from the Working Capital Fund in fiscal year 2018.

No amount has been recorded in the financial statements with regards to the total unfunded liability.

## 14. ANNUAL LEAVE, OVERTIME AND SEVERANCE LIABILITY

The Organization accrues annual leave not taken and overtime worked for its employees on a per hour basis. Additionally, there are liabilities for severance pay entitlements for voluntary separation, including retirement. No amount has been recorded in the financial statements with regards to the total liability. Management estimates the present value of this liability to be approximately \$390,714. This value is determined using current wage rates.

A long-term employee will be retiring in 2018 and will have their vacation time and severance paid out over the 2018 and 2019 fiscal years. At current wage rates this amounts to approximately \$192,933 of the above amount.

The amounts actually paid will be calculated using the wage rates in affect at the time of payment and therefore could change significantly.

## 15. FINANCIAL INSTRUMENTS

The Organization is exposed to various financial risks through transactions in financial instruments. The following provides helpful information in assessing the extent of the Organization's exposure to these risks.

### (a) Currency risk

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates. A large percentage of the company's sources of funds and expenditures are in a foreign currency, and as a result, some financial instruments are exposed to foreign exchange fluctuations. Refer to note 12 for the financial instruments exposed to this type of risk.

Unless otherwise noted it is management's opinion that the organization is not exposed to significant credit, liquidity, interest or other price risks.

## **16. FINANCIAL STATEMENTS**

A statement of cash flows has not been presented, as the required information is readily apparent from the other financial statements presented and the notes to the financial statements.

## F&amp;A ENDNOTE 4:

TABLE 4.1: PAYMENT SCHEDULE FOR ANNUAL FEES 2005–2018

	<i>Canada</i>	<i>China</i>	<i>Japan</i>	<i>Korea</i>	<i>Russia</i>	<i>USA</i>
2005	Dec.24, 04	<b>Sep 22, 05<sup>2</sup></b>	Mar 2, 05	Mar. 30, 05	Mar. 31, 05 <sup>3</sup>	Jan 10, 05
2006	Dec 28, 05	<b>Aug 1, 06</b>	Dec 15, 05	Feb 8, 06	Feb. 28, 06	Jan 30, 06
2007	Jan 23, 07	<b>Jul 3,07</b>	Dec 5, 06	<b>Apr 3, 07</b>	Feb. 13, 07	Jan 10, 07
2008	Jan 16, 08	<b>May 15, 08</b>	Dec 20, 07	Feb 15, 08	Feb 13, 08	Jan 7, 08 <sup>4</sup>
2009	Jan 5, 09	<b>Jun 3, 09</b>	Dec 11, 08	<b>Apr 1, 09</b>	Mar 27, 09	Dec 24, 08
2010	Apr 1, 10	<b>Aug 5, 10</b>	Dec 14, 09	Mar 2, 10	Mar 26, 10	Dec 11, 09
2011	Feb 8, 11	<b>Jun 30,11</b>	Dec 3, 10	Mar 25, 11 <sup>5</sup>	Feb 9, 11	Dec 7, 10
2012	Jan 3, 12	<b>Aug 31, 12</b>	Nov 22, 11	<b>Oct 11, 12</b>	Mar 29, 12	Nov 16, 11
2013	Jan 7, 13	<b>Oct 11, 13</b>	Nov 21, 12	<b>May 14, 13</b>	<b>Apr 12, 13</b>	Dec 17, 12
2014	Feb 18, 14	<b>Jul 11,14</b>	Dec 6, 13	<b>Apr 11, 14</b>	Mar 5, 14	Dec 20, 13
2015	Feb 16, 15	Nov 26, 14	Dec 8, 14	Mar 25, 15	<b>May 1, 15<sup>6</sup></b>	Dec 31,14
2016	Mar 30, 16	Nov 13, 15	Dec 4, 15	<b>Jul 8, 16</b>	<b>Apr 8, 16</b>	<b>May 5, 16</b>
2017	Mar 14, 17	Dec 15, 16	Dec 16,16	<b>Jul 5, 17</b>	<b>May 4, 17</b>	Jan 9, 17
2018	Mar 28, 18	Aug 30, 17	Nov 21,17	<b>Jul 30, 18</b>	<b>Oct 24, 18</b>	<b>Apr 11, 18</b>

## Notes:

- 1 Late (after March 31) or partial payments are indicated in bold;
- 2 Partial (86%) payment, remainder paid December 30, 2005
- 3 Partial (96.6%) payment, remainder paid April 25, 2005
- 4 Partial (92.3%) payment, remainder paid on May 22, 2009
- 5 Partial (88.1%) payment, remainder paid on September 20, 2011
- 6 Partial (62%) payment, remainder paid on July 24, 2015

**F&A ENDNOTE 5:**

**PROPOSED FY 2019 BUDGET (AS RECOMMENDED BY F&A)**

<b>Sources for General Fund (GNF)</b>	<b>Amount</b>	<b>Notes</b>
National contributions	\$803,400	FY 2018 fee of \$131,400 per Contracting Party) x 1.9% CPI = \$133,900
Transfer from Working Capital Fund	\$226,600	
<b>Total</b>	<b>\$1,030,000</b>	

<b>Category</b>	<b>GNF Allotment</b>	<b>WCF Allotments</b>
Personnel Services	\$720,000	benefit adjustments, liabilities reduction
Annual Meeting	\$43,000	
Special Meetings/Travel	\$172,000	
Publications/Communications	\$45,000	
Office/Administrative	\$50,000	
Projects		
<b>Total</b>	<b>\$1,030,000</b>	

**APPROVED FY 2019 BUDGET (AS APPROVED BY GOVERNING COUNCIL ON NOVEMBER 1 2018)**

<b>Sources for General Fund (GNF)</b>	<b>Amount</b>	<b>Notes</b>
National contributions	\$788,400	FY 2019 fee of \$131,400 per Contracting Party (as per FY 2018 – no increase)
Transfer from Working Capital Fund	\$241,600	
<b>Total</b>	<b>\$1,030,000</b>	

<b>Category</b>	<b>GNF Allotment</b>	<b>WCF Allotments</b>
Personnel Services	\$720,000	benefit adjustments, liabilities reduction
Annual Meeting	\$43,000	
Special Meetings/Travel	\$172,000	
Publications/Communications	\$45,000	
Office/Administrative	\$50,000	
Projects		
<b>Total</b>	<b>\$1,030,000</b>	

Note:

At PICES-2018, the F&A Committee recommendation on Annual Fees for the 2019 budget was not endorsed by Governing Council. Council decided [Decision 2018/A/3(iii)] to approve the budget outlined above.



F&A ENDNOTE 6:

**PRINCIPLES AND DEFINITIONS PICES DATA POLICY**

**1.**

As stated in Article III of the Convention for the North Pacific Marine Science Organization (PICES) the Organization is to promote the collection and exchange of information and data related to marine scientific research in the North Pacific Ocean and its adjacent seas.

The PICES strategy on capacity development identifies TCODE as the committee responsible for the development of communication networks for exchange of data and information.

Data gathered as a result of PICES activities will be responsibly managed to guard against loss and to ensure continued accessibility. The management of data using external data management systems is preferred to using internal PICES resources.

For any data provided to PICES, PICES will respect the ownership rights and any restrictions placed on these data by the provider.

- Data include data products and model outputs related to PICES activities. Metadata are data about data.
- End users include a person, organization, group (including PICES expert groups) using data.
- Data providers include a person, organization, group (including PICES expert groups) providing data.
- The data inventory refers to data for which PICES has the primary responsibility to manage.

**2. ROLES AND RESPONSIBILITIES:**

The Technical Committee on Data Exchange (TCODE) is responsible to:

- Manage the PICES data inventory.
- Assist Expert Groups to identify data that are to be included in the data inventory.
- Assist Expert Groups in the development of data management options and strategies.
- Make recommendations to Science Board on PICES data management and priorities, with particular emphasis on correcting or mitigating any known or anticipated deficiencies.

The PICES Secretariat is responsible to:

- Support TCODE in the maintenance of the data inventory.
- Support TCODE to correct or mitigate any known or anticipated deficiencies.

Science Board is responsible to:

- Include data management requirements in the Terms of Reference of each PICES expert group.
- Review the recommendations proposed by TCODE and provide recommendations to Governing Council as necessary.

Expert Groups are responsible to:

- Identify any data developed during the activities of the expert group and inform TCODE and PICES secretariat.
- Develop, with assistance from TCODE, strategies or options for managing data used by the expert group.

**3. DATA PRODUCED BY PICES**

All data produced by PICES are considered to be publicly available unless explicitly specified otherwise.

Results, conclusions, or recommendations derived from the data associated with PICES do not imply endorsement from PICES.

Contributions of data from PICES expert groups will adhere to the expert groups' Terms of Reference and be submitted to TCODE for inventory while the group is active.

All data including metadata should be archived using standard codes, formats, and protocols.

#### **4. DATA PROVIDED TO PICES**

The quality assurance of data is the responsibility of the data provider.

In the event that PICES becomes aware there may be quality issues in the data PICES will inform the data providers as soon as possible.

Data providers should inform PICES secretariat of any policies that may place special conditions on their redistribution.

End users are responsible for the proper use of the data and metadata provided.

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## Best Presentations at PICES-2018

Award certificates for Best Presentations in a Committee/Program-sponsored Topic Session or Workshop at PICES-2018 were given to the following early career scientists.

Science Board Best Oral presentation by an early career scientist in the Science Board Symposium (S1) on “*Toward integrated understanding of ecosystem variability in the North Pacific*”

**Christina E. Kong**

Ocean Science and Technology School, Busan, R Korea, cejkong@kiost.ac.kr

“*Spatial and inter-annual variability in the primary productivity of the East China Sea and Southern Yellow Sea (1998-2012)*”

co-authored with Sinjae Yoo and Chan Joo Jang

Science Board Best Poster presentation by an early career scientist in the Science Board Symposium (S1) on “*Toward integrated understanding of ecosystem variability in the North Pacific*”

**Joanne K. Breckenridge**

University of British Columbia, Vancouver, Canada, jbrecken@eoas.ubc.ca

“*The importance of peak river flow timing to copepod abundance in the Fraser River Estuary, Canada*”

co-authored with Evgeny A. Pakhomov

FUTURE Best Oral presentation by an early career scientist in FUTURE Topic Session (S3) on “*Science communication for North Pacific marine science*”

**Vanessa R. Fladmark**

University of British Columbia, Vancouver, BC, Canada, vfladmark@eoas.ubc.ca

“*Citizen engagement through shoreline cleanup litter data: British Columbia case study*”

co-authored with Cassandra Konecny and Santiago J. De La Puente

FUTURE Best Poster presentation by an early career scientist in FUTURE/POC Topic Session (S7) on “*Ecological responses to variable climate changes and their applicability to ecosystem predictions*”

**Hiroto Abe**

Hokkaido University, Hakodate, Japan, abc@fish.hokudai.ac.jp

“*Sediment-associated phytoplankton release from the seafloor in response to wind-induced currents in the Bering Strait*”

co-authored with Makoto Sampei, Toru Hirawake, Hisatomo Waga, Shigeto Nishino and Atsushi Ooki

BIO Best Oral presentation by an early career scientist in BIO/POC Topic Session (S10) on “*Ocean acidification and deoxygenation and their impact on ocean ecosystems: Synthesis and next steps*”

**Jessica N. Cross**

NOAA Pacific Marine Environmental Laboratory, Seattle, WA, USA, jessica.cross@noaa.gov

“*Ocean acidification impacts on biogeochemistry and the decadal variability of Total Alkalinity in the North Pacific*”

co-authored with Brendan R. Carter, Samantha A. Siedlecki, Simone R. Alin, Nina Bednarsek, Andrew G. Dickson, Richard A. Feely, Richard H. Wanninkhof, Alison M. Macdonald, Sabine Mecking, and Lynne D. Talley

## Best Presentations – 2018

BIO Best Poster presentation by an early career scientist in BIO Paper Session (BIO-P)

**Takuya Sato**

University of Tokyo, Tokyo, Japan, astakuy@g.ecc.u-tokyo.ac.jp

*“Nitrogen fixation and diazotroph community structure in the high latitude region around Hokkaido, northern Japan”*

co-authored with Yukiko Taniuchi, Hiromi Kasai, Takuhei Shozaki and Kazutaka Takahashi

FIS Best Oral presentation by an early career scientist in FIS Topic Session (S12) on *“Applying ecosystem considerations in science advice for managing highly migratory species”*

**Ayako Suda**

Research Center for Bioinformatics and Biosciences, National Research Institute of Fisheries Science, Japan Fisheries Research and Education Agency, Yokohama, Japan, ayasuda@affrc.go.jp

*“Development of male-specific DNA markers in the Pacific bluefin tuna (Thunnus orientalis): Potential applications for sex ratio control in aquaculture and contribution to tuna resource management”*

co-authored with Tsubasa Uchino, Issei Nishiki, Yuki Iwasaki, Masashi Sekino, Tetsuya Akita, Nobuaki Suzuki and Atushi Fujiwara

FIS Best Poster presentation by an early career scientist in General Poster Session (GP)

**Koji Fujita**

Graduate School of Biosphere Science, Hiroshima University, Hiroshima, Japan, m174299@hiroshima-u.ac.jp

*“Influence of submarine groundwater discharge on feeding and growth of fish”*

co-authored with Jun Shoji

HD Best Oral presentation by an early career scientist in HD Topic Session (S9) on *“Integration of science and policy for sustainable marine ecosystem services”*

**Aoi Sugimoto**

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*“Environment and culture in an island community: Some insights for re-building the framework of cultural ecosystem service”*

MEQ Best Oral presentation by an early career scientist in MEQ Paper Session (MEQ-P)

**Seongbong Seo**

Ocean Circulation and Climate Research Center, Korea Institute of Ocean Science and Technology, Busan, Korea, ypark@kiost.ac.kr

*“Fate of floating debris released from Major rivers around Korea”*

co-authored with Young-Gyu Park

MEQ Best Poster presentation by an early career scientist in MEQ Paper Session (MEQ-P)

**Su-Hyun Kim**

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*“Atmospheric long-range transport of microplastics: A preliminary result of atmospheric fall-out samples from a remote island (Daecheong Is.), South Korea”*

co-authored with Seung-Kyu Kim

POC Best Oral presentation by an early career scientist in POC Topic Session (S5) on “*Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific*”

**Yu-Lin Eda Chang**

Application Laboratory, JAMSTEC, Yokohama, Japan, ychang@jamstec.go.jp

“*Potential impact of ocean circulation on Japanese eel larvae migration*”

co-authored with Yasumasa Miyazawa, Michael J. Miller and Katsumi Tsukamoto

POC Best Poster presentation by an early career scientist in POC Paper Session (POC-P)

**Sang-Chul Cha**

Jeju National University, Jeju, Republic of Korea, chasc0050@gmail.com

“*Climate-related decadal sea level and heat content shifts in the tropical Pacific*”

co-authored with Jae-Hong Moon

MONITOR Best Oral presentation by an early career scientist in MONITOR Topic Session (S11) on “*Influence of climate and environmental variability on pelagic and forage species*”

**Yanhui Zhu**

Graduate School of Environmental Science Hokkaido University, N10W5, Sapporo, Hokkaido, Japan, zhuyanhui0817@eis.hokudai.ac.jp

“*Seasonal dynamics in pelagic fish abundance around Set-net in Kochi prefecture*”

co-authored with Kenji Minami, Yuka Iwahara, Kentaro Oda, Koichi Hidaka, Osamu Hoson, Kouji Morishita, Sentaro Tsuru, Masahito Hirota, Hokuto Shirakawa and Kazushi Miyashita

MONITOR Best Poster presentation by an early career scientist in MONITOR Topic Session (S11) on “*Influence of climate and environmental variability on pelagic and forage species*”

**Mitsuhiro Ishino**

Hokkaido National Fisheries Research Institute, Japan Fisheries Research and Education Agency (FRA), Kushiro, Japan, ishinom@affrc.go.jp

“*Why the body size of walleye pollock larvae in Funka Bay and the adjacent waters, Hokkaido was large in 2016?*”

co-authored with Tomonori Hamatsu, Masayuki Chimura, Hiroshige Tanaka and Yuuho Yamashita

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# CONVENTION FOR A NORTH PACIFIC MARINE SCIENCE ORGANIZATION (PICES)

## PREAMBLE

### THE CONTRACTING PARTIES,

**RECOGNIZING** the need for improved scientific understanding of the North Pacific Ocean and its processes, living resources, and oceanographic features;

**AWARE** that due to the vast expanse of the North Pacific Ocean, scientific understanding of the area can be best achieved through a spirit of international scientific cooperation on a mutually beneficial basis;

**DESIRING** to establish an appropriate intergovernmental organization to promote and facilitate such scientific cooperation and avoid duplication of effort;

**ACKNOWLEDGING** that the activity of the organization must be based on the principles and rules of the international law of the sea applicable to marine scientific research,

**HAVE AGREED** as follows:

### Article I

#### Establishment of the Organization

The Contracting Parties hereby establish an intergovernmental organization entitled the North Pacific Marine Science Organization (PICES), hereinafter referred to as the "Organization".

### Article II

#### The Area Concerned

The area which the activities of the Organization concern shall be the temperate and sub-Arctic region of the North Pacific Ocean and its adjacent seas, especially northward from

30 degrees North Latitude, hereinafter referred to as the "area concerned". Activities of the Organization, for scientific reasons, may extend farther southward in the North Pacific Ocean.

### **Article III**

#### Purpose of the Organization

The purpose of the Organization shall be:

- (a) to promote and coordinate marine scientific research in order to advance scientific knowledge of the area concerned and of its living resources, including but not necessarily limited to research with respect to the ocean environment and its interactions with land and atmosphere, its role in and response to global weather and climate change, its flora, fauna and ecosystems, its uses and resources, and impacts upon it from human activities; and
- (b) to promote the collection and exchange of information and data related to marine scientific research in the area concerned.

### **Article IV**

#### Structure of the Organization

The Organization shall consist of:

- (a) a Governing Council (the "Council");
- (b) such permanent or ad hoc scientific groups and committees as the Council may establish from time to time; and
- (c) a Secretariat.

### **Article V**

#### Functions of the Governing Council

1. The scientific functions of the Council shall be, inter alia:

- (a) to identify research priorities and problems pertaining to the area concerned, as well as appropriate methods for their solution;
- (b) to recommend coordinated research programs and related activities pertaining to the area concerned, which shall be undertaken through the national efforts of the

- participating Contracting Parties;
- (c) to promote and facilitate the exchange of scientific data, information, and personnel;
  - (d) to consider requests to develop scientific advice pertaining to the area concerned;
  - (e) to organize scientific symposia and other scientific events; and
  - (f) to foster the discussion of problems of mutual scientific interest.
2. The administrative functions of the Council shall be, inter alia:
- (a) to adopt and, if necessary, to amend the Rules of Procedure and Financial Regulations of the Organization;
  - (b) to consider and recommend amendments to the Convention;
  - (c) to adopt the annual report of the Organization;
  - (d) to examine and adopt the annual budget and final accounts of the Organization;
  - (e) to determine the location of the Secretariat;
  - (f) to appoint the Executive Secretary;
  - (g) to maintain contact with other relevant international organizations; and
  - (h) to manage the activities of the Organization.
3. The Council shall take such other decisions as may be necessary or desirable to enable the organization to carry out its activities efficiently and effectively.

## **Article VI**

### Composition and Procedures of the Governing Council

1. Each Contracting Party shall be a member of the Council and shall appoint to the Council not more than two delegates, who may be accompanied as appropriate by alternates, experts and advisers.
2. The Council shall elect a Chairman and a Vice-Chairman, taking due account of the principle of rotation among Contracting Parties. The Chairman and Vice-Chairman shall be representatives of different Contracting Parties. During his term the Chairman shall cease to be part of his national delegation.
3. The Chairman of the Council shall convene a regular annual meeting of the Organization. The annual meetings shall ordinarily be held at the seat of the Organization, unless otherwise decided by the Council.



4. Any meeting of the Council, other than the annual meeting, shall be called by the Chairman at such time and place as the Chairman may determine, upon the request of the Council.
5. The Council may invite other states, organizations, and experts to attend scientific meetings of the Organization, or to participate in activities of the Organization on such terms as the Council may establish.

## **Article VII**

### Decision Making in the Governing Council

1. Each Contracting Party shall have one vote in the proceedings of the Council.
2. The Council shall make every effort to take decisions on the basis of consensus. For the purpose of this Convention, consensus means the absence of a formal objection.
3. If all efforts at consensus have been exhausted, and no agreement has been reached, decisions of the Council may be adopted by a three-quarters majority vote of the Contracting Parties present and voting.
4. Notwithstanding paragraph 3, consensus shall be required for the following:
  - (a) the establishment of permanent or ad hoc scientific groups and committees;
  - (b) the appointment of an Executive Secretary;
  - (c) the adoption of the annual budget of the Organization;
  - (d) recommendations for amendment of this Convention;
  - (e) the holding of any meeting of the Council other than the annual meeting; and
  - (f) other matters of substance that the Council may agree upon.

## **Article VIII**

### The Secretariat

The Council shall appoint an Executive Secretary on such terms and with such duties as it may determine. The staff of the Secretariat shall be appointed by the Executive Secretary in accordance with such rules, procedures, and requirements as may be determined by the Council.

## **Article IX**

### Financial Provisions

1. The Council shall adopt an annual budget for the Organization.
2. Each Contracting Party shall contribute to the annual budget. Contributions shall be paid in the currency of the state in which the Secretariat is located in accordance with the respective laws and regulations of each Contracting Party.
3. The Council shall consider at its annual meeting the failure of any Contracting Party to discharge its financial obligations under this Convention. A Contracting Party that fails to pay its contributions for two consecutive years shall not, during the period of its default, have the right to participate in the taking of decisions in the Council unless the Council decides otherwise.

## **Article X**

### Working and Official Language

The working and official language of the Council shall be English.

## **Article XI**

### Privileges and Immunities

1. The Organization shall enjoy such legal personality and capacity as may be agreed between the Organization and the Contracting Party in whose territory the Secretariat is located.
2. The Organization, its officers and employees, together with delegates to the Council, shall enjoy such privileges and immunities, necessary for the fulfillment of their functions, as may be agreed between the Organization and the Contracting Party in whose territory the Secretariat is located.

## **Article XII**

### No Prejudice to Existing Rights

1. Nothing in this Convention, nor activities of the Organization taking place pursuant to it, shall prejudice or in any way affect:
  - (a) the sovereignty, sovereign rights and jurisdiction of a Contracting Party under international law over its territorial sea, 200 nautical mile zone, or continental shelf, including its jurisdiction over marine scientific research;
  - (b) the rights of a Contracting Party to manage its national research programs;
  - (c) other international agreements, bilateral or multilateral, to which Contracting Parties are party.
2. Nothing in this Convention shall be construed as authorizing the Organization to regulate the activities of the Contracting Parties.

### **Article XIII**

#### Signature and Ratification, Acceptance or Approval

1. The Convention shall be open for signature at Ottawa, Canada, from March 1, 1991 until December 31, 1991 by Canada, the People's Republic of China, Japan, the Union of Soviet Socialist Republics and the United States of America.
2. The Convention shall be subject to ratification, acceptance or approval by the signatory states in accordance with their domestic laws and procedures. Instruments of ratification, acceptance or approval shall be deposited with the Government of Canada, which shall act as the Depository.

### **Article XIV**

#### Entry into Force and Accession

1. The Convention shall enter into force sixty days after the date on which three of the signatory states have deposited instruments of ratification, acceptance or approval with the Depository.
2. After the Convention has entered into force, it shall be open for accession by any non-signatory state. States desiring to accede to the Convention may so notify the Depository which shall notify the Contracting Parties. In the absence of a written objection by a

Contracting Party within 90 days of receipt of such notification, a state may accede by deposit of an instrument of accession with the Depository and accession shall take effect sixty days following deposit.

#### **Article XV**

##### Amendments

Any Contracting Party or the Council may propose amendments to this Convention. The text of a proposed amendment shall be transmitted to all Contracting Parties by the Depository at least 90 days prior to the meeting at which the amendment is proposed to be considered. Amendments shall enter into force sixty days after the deposit of instruments of ratification, acceptance or approval by all of the Contracting Parties in accordance with their domestic laws and procedures.

#### **Article XVI**

##### Withdrawal

A Contracting Party may withdraw from this Convention at any time by giving written notice of withdrawal to the Depository. The withdrawal shall be effective six months after receipt of the notice of withdrawal by the Depository.

#### **Article XVII**

##### Termination

1. This Convention shall be terminated upon the withdrawal of three of the signatory states listed in Article XIII.
2. The effective date of termination shall be one year after the deposit with the Depository of the number of withdrawals required to terminate the Convention in accordance with paragraph 1 above.

#### **Article XVIII**

##### Authentic Texts and Certified Copies

The original of the present Convention in the English and French languages, each version being equally authentic, shall be deposited with the Depository, which shall transmit certified copies thereof to all of the signatory states.

IN WITNESS WHEREOF, the undersigned, duly authorized by their respective Governments, have signed this Convention.

DONE in duplicate, at Ottawa, this 12th day of December, 1990, in the English and French languages, each version being equally authentic.

# PICES 협약

협약국은

북태평양의 이용, 생물자원 및 해양학적 특성에 관하여 과학적 이해증진 필요성을 인지하고,

북태평양의 광활함으로 인하여, 상호이득을 바탕으로 한 국제협력의 정신을 통해서야만 그 지역에 대한 과학적 이해가 잘 될 수 있다는 점을 인식하며

이러한 과학적 협력을 촉진/증진하는 동시에 중복의 노력을 피하기 위해 정부간 기구를 설립하는 것을 희망하고

그 기구의 활동은 해양과학연구에 해당하는 국제해양법의 규칙과 원칙에 기초를 두어야 한다는 점을 인정하며,

다음에 대해 합의한다:

## 제1조 (기구설립)

협약국은 북태평양해양과학기구(이하 “기구”)란 이름의 정부간기구를 설립한다.

## 제2조 (관련지역)

기구의 활동이 영향을 미치는 지역은 북태평양과 그 인근 특히 아래 지역에 “관련 지역”으로 언급된 북위 30도 이북의 온대 및 아북극 해역이다. 학술적으로 필요시 기구의 활동은 북태평양 내에서 남쪽으로 더 멀리 확장될 수 있다.

## 제3조 (존치목적)

기구의 목적은

- (a) 생물자원과 관련지역에 대한 과학적지식을 증진시키기 위하여 해양과학연구를 촉진하고 조정함이다. 다만, 반드시 해양환경과 토양, 기후와의 상호작용에 관한 연구에 제한하지 않고, 지구의 기상/기후변화는 물론이고, 식물군, 동물군 그리고 생태계, 이용과 자원, 그리고 인류활동으로 발생된 영향에 대한 대응과 역할까지 그 범위를 확장한다.
- (b) 관련 지역내 해양과학연구와 연관된 정보와 자료의 수집과 교환을 촉진하기 위함이다.

#### 제4조 (조직구성)

기구는 다음과 같이 구성한다.

- (a) 집행이사회
- (b) 집행이사회가 설립하는 상설 혹은 특별 과학그룹 또는 위원회
- (c) 사무국

#### 제5조 (집행이사회)

##### 1. 집행이사회 의 과학적 기능:

- (a) 관련 지역과 연관된 연구 우선순위 및 문제점, 그리고 적절한 해결방안 발견
- (b) 협약국의 국가적 노력을 통하여 수행될 수 있는 협력적 연구 프로그램과 관련 지역에 적용되는 유관 활동을 권장
- (c) 과학적 자료와 정보, 그리고 인력교류를 증진하고 촉진
- (d) 관련 지역에 적용되는 과학적 조연을 개발하는 요구사항을 검토
- (e) 과학심포지엄 및 기타 과학행사들을 준비
- (f) 상호 과학적 관심사항에 관한 문제에 대하여 논의를 조성

##### 2. 집행이사회 행정적 기능:

- (a) 필요시 기구의 절차규정 및 재무규정 개정 또는 채택
- (b) 협약의 개정을 발의 또는 검토
- (c) 연차보고서 채택
- (d) 예결산 검토, 승인
- (e) 사무국 소재지 선정
- (f) 사무총장 임명
- (g) 관련 국제기구와의 연락유지
- (h) 기구의 활동 운영

3. 여타 기구에 필요하거나, 능률적이고 효과적인 수행의 활동을 위한 안건도 결정함.

#### 제6조 (집행이사회 의 구성 및 절차)

- 1. 각 협약국은 집행이사회 의 구성원으로 2인 이하의 대표를 임명하고 대표는 대리인, 전문가 및 자문을 수반할 수 있음
- 2. 협약국간 교대의 원칙에 의거하여 집행이사회 의장과 부의장을 선출함. 의장과 부의장은 동일국에서 나와서는 안 됨. 의장 및 부의장은 임기 중 국가의 대표를 겸임할 수

없음

3. 집행이사회 의장은 기구의 연차총회를 소집함. 집행이사회의 다른 결정이 있지 않는 한 연차총회는 기구에서 개최됨
4. 집행이사회가 소집하는 회의(연차총회를 제외)의 장소·날짜는 GC의 요청에 의해 의장이 정함
5. 집행이사회는 학술회의, 학술활동에 비협약국, 타기구, 전문가를 초청하거나 참여시킬 수 있음

### 제7조 (집행이사회의 의사결정)

1. 협약국은 집행이사회의 의결절차상 1표씩 행사함
2. 집행이사회는 만장일치(반대가 없는 상태)를 위해 최선을 다함
3. 만장일치가 되지 않으면 4분의 3 이상의 동의를 얻은 것이 채택됨
4. 단 다음 사항에 대해서는 반드시 만장일치이어야 함
  - (a) 상설 혹은 특별 과학그룹 또는 위원회의 설립
  - (b) 사무총장 임명
  - (c) 기구의 연간예산안 승인
  - (d) 협약개정안 발의
  - (e) 연차총회 외의 다른 회의 개최
  - (f) 기타 집행이사회가 필요하다고 여기는 주요사항

### 제8조 (사무국)

집행이사회는 사무총장의 임기와 책무를 정함. 사무국 직원은 집행이사회에 의해 결정된 규칙, 절차 및 자격요건에 따라 사무총장이 임명한다.

### 제9조 (재정규정)

1. 집행이사회는 기구의 연간예산을 승인한다.
2. 협약국은 연간예산을 분담한다. 분담금은 협약국의 규정과 법에 관련하여 사무국이 소재한 국가의 통화로 지불한다.
3. 집행이사회는 협약 아래 재정적 의무를 지우기 위해 연차총회에서 납부현황을 점검한다. 2년연속 미납시(집행이사회에서 달리 결정하지 아니하는 한) 납부의무를 이행할 때까지 본 협약에 따른 권리를 향유하지 못한다.



## 제10조 (공식 언어)

집행이사회의 공식 언어는 영어로 한다.

## 제11조 (특권 및 면제)

1. 기구는 사무국 소재지에서 협약국과 기구의 합의 하에 기능수행과 목적달성에 필요한 법적능력을 가진다.
2. 사무국임직원과 각국 GC 대표는 사무국 소재지 내에서 협약국과 기구간의 합의 하에 그들의 기능의 이행을 위해 필요한 특권과 면제권을 가진다.

## 제12조 (기존 권리의 침해 불가)

1. 이 협약의 어떤 규정도 조직의 행위에 영향을 미치거나 침해하지 않는다.
  - (a) 해양연구에 관한 협약국의 관할해역, 영해, 200해리수역, 대륙붕에 관한 국제법 아래 주권, 주권의 권리와 협약국의 관할권
  - (b) 협약국의 국가적 연구사업을 이행하기 위한 협약국의 권리
  - (c) 협력국이 당사자인 여타의 국제합의(양자 또는 다자)
2. 이 협약으로 협약국의 행위를 규제할 수 없다.

## 제13조 (서명, 비준, 수락, 승인)

1. 본 협약은 1991년 3월 1일부터 12월 31일, 캐나다, 중국, 일본, 소련, 미국의 가입서명을 대기하였다.
2. 본 협약은 협약국의 법과 절차에 따른 비준, 수락, 승인을 전제로 한다. 비준서·수락서 또는 승인서는 PICES의 공탁소 역을 맡은 캐나다 정부에 보관한다.

## 제14조 (발효)

1. 본 협약은 3개의 협약국으로부터 비준서·수락서 또는 승인서가 기탁되는 날의 60일 이후에 발효한다.
2. 본 협약은 발효 후에도 비가입국의 가입을 허용한다. 가입희망국은 승인서를 통지하여 기존협약국들에게 통보한다. 통보 90일 이내에 협약국이 반대의견을 서면통고하지 않아 희망국이 가입서류를 캐나다 정부에 기탁하면 그로부터 60일 이후 자동가입된다.

## 제15조 (개정)

회원국 또는 집행이사회는 본 협약의 개정을 발의할 수 있다. 개정안은 개정안이 발의될

회의 개최 90일 전까지 PICES 공탁소(캐나다 정부)를 통해 모든 회원국에 알려져야 한다. 개정안은 전 회원국이(자국 국내법 및 절차에 따라) 비준, 동의, 승인을 받은 서류를 공탁소에 기탁한 후 60일 후 발효한다.

#### **제16조 (탈퇴)**

회원국은 본 협약에서 언제든지 탈퇴할 수 있다. 공탁소(캐나다 정부)에 탈퇴통보서를 보내어 공탁소가 접수를 확인한 날로부터 6개월 후 제명된다.

#### **제17조 (협약의 종료)**

1. 본 협약은 3개국 이상이 탈퇴(제13조의 절차에 따라)하면 파기된다.
2. 3개국 이상의 탈퇴통보서가 기탁된 날로부터 1년 후 해체된다.

#### **제18조 (협약문 원본 및 원본대조필 사본)**

영어 및 불어로 작성된(각 번역본의 효력은 동일) 본 협약의 원본은 공탁소에 기탁되고 원본대조필 사본은 회원국에 보내진다

본 협약은 서명자의 입회하에 각 정부에 의하여 절차에 따라 정히 서명되었다. 영어와 불어로 작성된 번역본의 효력은 동일하고 1990년 12월 12일 오타와에서 작성되었다. 끝.

# **RULES OF PROCEDURE**

Amended (Rules 13, 14, 16 and 17) on October 24, 2015

## **Definition of terms**

advisor	- a person, invited by a delegate to advise the delegate during meetings of the Governing Council (hereinafter "Council"), or a person, invited by a member or alternate member, to advise them at a Finance and Administration Committee meeting
alternate delegate	- a person, formally appointed by a Contracting Party, to exercise all responsibilities of a delegate, in the absence of that delegate
alternate member	- a person, formally appointed by a Contracting Party, to exercise all responsibilities of a member of the Finance and Administration Committee or a Scientific Committee, in the absence of that member
decision	- a resolution of the Council as it appears in an Annual Report (GC decisions)
delegation	- delegates and members appointed by a Contracting Party
delegate <sup>1</sup>	- one of not more than two persons, formally appointed by the government of a Contracting Party, to represent its interests as a member of the Council
executive committees	- permanent committees reporting directly to the Council
formal	- in written form (including electronic mail) by a person with authority to do so
group	- an organizational entity created by decision
member <sup>2</sup>	- a person appointed to represent a Contracting Party on a group, including those serving as chairman
<i>ex-officio</i> member	- a person from a non-Contracting Party or an international organization formally appointed annually to a group by the Council on the basis of their expertise
observer	- a person, formally invited by the Council to observe some aspect of its activities
permanent committee	- all of the executive, scientific, and technical committees
recommendations	- resolutions of the executive committees seeking approval by the Council; coded as "S" (Science Board) or "A" (Finance and Administration Committee), as they appear in an Annual Report

<sup>1</sup> Wherever in Rules 1-22 the term "delegate" appears, it applies equally to alternate delegate.

<sup>2</sup> Wherever in Rules 1-22 the term "member" appears in reference to a Scientific Committee or the Finance and Administration Committee, it applies equally to alternate member.

## **Applicability**

These Rules shall govern the procedures of the North Pacific Marine Science Organization (PICES), hereinafter referred to as the "Organization".

## Representation

### Rule 1

- ( i ) Each Contracting Party shall inform the Executive Secretary promptly, in writing, of any changes in the names of its delegates or members;
- ( ii ) each Contracting Party shall, three weeks in advance, inform the Executive Secretary of the names of delegates, advisors, and members attending each meeting of the Organization;
- ( iii ) each Contracting Party shall bear the expenses of its own Delegation to all meetings authorized by the Council, held pursuant to this Convention;
- ( iv ) *ex-officio* members shall bear their own expenses to all meetings authorized by the Council, held pursuant to this Convention.

### Rule 2

The Council may invite any governments not party to the Convention, any international or other organizations having objectives related to those of the Organization, and any individuals to participate as observers at selected meetings of the Council.

## Voting Procedures in the Council

### Rule 3

The execution of responsibilities identified in the Convention will require the taking of decisions by the Council.

- ( i ) In accordance with the Convention, decisions will be made by consensus if at all possible;
- ( ii ) if, in the opinion of the Chairman, efforts at consensus have been exhausted, and no agreement has been reached, decisions of the Council may be adopted by a three-quarters majority of the Contracting Parties casting affirmative or negative votes (not abstaining);
- ( iii ) notwithstanding paragraph ( ii ) above, consensus of all Contracting Parties shall be required for the following:
  - a. the establishment of permanent or *ad hoc* scientific groups and committees;
  - b. the appointment of an Executive Secretary;
  - c. the adoption of the annual budget of the Organization;
  - d. recommendations for amendment of the Convention;
  - e. the holding of any meeting of the Council other than the Annual Meeting;
  - f. other matters of substance that the Council may agree on;
- ( iv ) each Contracting Party shall have one vote on any decision at any meeting or proceeding of the Council;
- ( v ) either Delegate, where more than one is appointed, may cast the vote of that Contracting Party;
- ( vi ) for all decisions other than elections, the Council shall vote by show of hands, except that a vote by roll call shall be taken upon request of any Contracting Party.

## **Rule 4**

Between meetings of the Council, in cases of urgency, the Chairman may direct the Executive Secretary that a vote of the Contracting Parties be taken by correspondence, or other agreed means. In the case of such a vote, the Executive Secretary shall acknowledge the receipt of correspondence from each Contracting Party. The Executive Secretary shall inform the Contracting Parties that the subject has been adopted when it obtains a three-quarters majority (as specified in Article VII of the Convention), and of any formal objections received. The Chairman may establish a reasonable deadline, after a Contracting Party has acknowledged receipt of the communication, for responding to such a vote; a Contracting Party which has not responded by the deadline shall be deemed to have no formal objection to the proposal.

## **Elections**

### **Rule 5**

- ( i ) Elections shall not be conducted without a simple majority of the Contracting Parties;
- ( ii ) nominations of candidates for elections in the Council shall be sent in writing to the Executive Secretary at least 60 days prior to the start of the Annual Meeting at which the election will occur;
- ( iii ) elections shall be conducted by show of hands, except that an election by secret ballot shall be conducted upon the request of any delegate (Council) or member (Science Board or Scientific Committee);
- ( iv ) for election to the office of Chairman, Vice-Chairman, Chairman of Science Board or Chairman of a Scientific Committee, a candidate shall be declared elected who secures votes numbering more than half the number of Contracting Parties casting votes (not abstaining). If no candidate secures the number of votes required for election:
  - a. if there are only two candidates, voting shall be continued until a candidate is elected; and
  - b. if there are three or more candidates, the candidate receiving the lowest number of votes shall be eliminated and voting continued in accordance with this Rule until a candidate is elected, providing that if there are two or more candidates receiving the lowest number of votes those candidates shall be eliminated;
- ( v ) between meetings, as appropriate, the Chairman may direct the Executive Secretary to conduct an election by correspondence, or other agreed means. In the case of such an election, the Executive Secretary shall inform the Contracting Parties of the result when a candidate obtains the number of affirmative votes as specified in Rule 5 (iv), and of any formal objections received from a Contracting Party. The Chairman may establish a reasonable deadline, after a Contracting Party has acknowledged receipt of the communication, for responding to such an election; a Contracting Party which has not responded by the deadline shall be deemed to have no formal objection to the result.

## **Chairman and Vice-Chairman of the Council**

### **Rule 6**

The Chairman and the Vice-Chairman shall each be elected from among the delegates for a

term of two years and each shall be eligible for re-election only once for a successive term. They shall normally take office at the conclusion of the Annual Meeting at which elected.

**Rule 7**

The duties of the Chairman shall be:

- ( i ) to preside at meetings of the Council;
- (ii) to decide any questions of order raised at those meetings, subject to the right of any delegate to request that any ruling by the Chairman shall be submitted for decision by vote;
- (iii) generally, to make such decisions and give such directions to the Executive Secretary as will ensure that the business of the Council is carried out efficiently and in accordance with the decisions of the Council;
- (iv) to arrange for appointments to groups as required by the Council;
- (v) to participate, as desired, in any meeting of the Organization;
- (vi) to take such other actions as may be necessary to protect and promote the interests of the Organization, and the benefits it provides to the Parties.

**Rule 8**

In the event of the office of Chairman becoming vacant, the Vice-Chairman shall become Chairman. A Vice-Chairman who becomes Chairman for less than one year shall be eligible for election to two full successive terms, otherwise to one full term.

**Rule 9**

- ( i ) The Vice-Chairman shall act as Chairman whenever the Chairman is unable to act;
- (ii) after election, the Vice-Chairman shall continue to act as a delegate, except during any period when acting as Chairman. During any such period, the Contracting Party, normally represented by the Vice-Chairman, may appoint another person to serve as delegate;
- (iii) the Vice-Chairman may participate, as desired, in any meeting of the Organization;
- (iv) in the event of the office of Vice-Chairman becoming vacant the Council shall elect a new Vice-Chairman at its next meeting. A Vice-Chairman elected to fill a partial term shall be eligible for re-election to two full successive terms.

**Executive Secretary**

**Rule 10**

- ( i ) The Executive Secretary shall be the Chief Executive Officer of the Organization and shall be responsible to the Council for the management of the Secretariat's staff and office;
- (ii) the Executive Secretary shall be responsible for the receipt of all funds due to the Organization and

for disbursements in accordance with the budget; signing cheques on behalf of the Organization or authorizing their signature; and in general for the implementation of the Organization's Financial Regulations;

- (iii) the Executive Secretary shall normally attend sessions of the Council and may attend, as appropriate, meetings of any Committee and any other meetings of the Organization;
- (iv) the Executive Secretary, in consultation with the Chairman, shall appoint members of the Secretariat staff in accordance with positions designated by the Council and with salaries, tenure, and other conditions established by the Council;
- (v) the Executive Secretary shall provide secretarial services for all meetings of the Council and, as appropriate, arrange for such secretarial services as may be needed for other meetings of the Organization;
- (vi) the Executive Secretary shall transmit to the Contracting Parties as soon as possible after each meeting of the Council a report of the proceedings;
- (vii) the Executive Secretary shall circulate to delegates a draft agenda 60 days before each meeting of the Council and indicate the date on which proposals for inclusion should be submitted for consideration, and a provisional agenda 45 days before each meeting;
- (viii) the Executive Secretary shall prepare an annual report of the activities of the Organization and transmit it to the Contracting Parties; and
- (ix) the Executive Secretary shall perform such other functions as may be assigned by the Council.

## **Executive Committees**

### **Rule 11**

- (i) The executive committees of the Council shall be a Science Board and a Finance and Administration Committee;
- (ii) the Council may give direction to an executive committee concerning its activities;
- (iii) an executive Committee may, with the approval of the Council, establish subsidiary bodies to meet the needs of the Organization.

## **Science Board**

### **Rule 12**

- (i) The Science Board shall consist of the Chairmen of the Scientific Committees, Technical Committees, and Advisory Panels of Scientific Programs, together with a Chairman elected by the Science Board from among the nominees#, for a term of three years. The Chairman shall not concurrently be a Chairman of another group nor be eligible for re-election for successive terms. When the Science Board chairmanship becomes vacant for any reason, the Science Board shall elect a new Chairman at its earliest convenience;
- (ii) the Vice-Chairman of the Science Board shall be elected from amongst the members of the Science Board for a term of one year and shall be eligible for re-election for a successive term. The Vice-Chairman will normally reside on the opposite side of the Pacific to the Science Board

- Chairman. The Vice-Chairman shall act as Chairman whenever the Chairman is unable to act;
- (iii) should a Contracting Party have no representation on the Science Board via committee or program chairmanship, it may appoint a suitably qualified member;
- (iv) the Science Board shall:
- (a) have general oversight over:
    - the scientific interests of the Council and its scientific work;
    - the programs of research approved by the Council;
    - the arrangements for carrying out the Council's scientific work and the programs of research recommended or coordinated by it;
    - the organization of special scientific meetings.
  - (b) be responsible for advising the Council on all matters mentioned in sub-paragraph (a);
  - (c) provide guidance, as it may deem necessary, to groups under their jurisdiction, as to the performance of their functions;
  - (d) review and make recommendations to the Council concerning the provision of scientific advice to Contracting Parties or other international organizations requesting such advice;
  - (e) consider, at each Annual Meeting of the Science Board, reports from all groups under their jurisdiction and report thereon to the Council with special reference to any expenditures involved;
  - (f) advise the Council of its publication requirements.
- (v) Scientific Programs shall have a single vote in decisions of the Science Board.

<sup>3</sup> Nomination procedures described in Rule 17.

## Scientific Committees

### Rule 13

Scientific Committees are established by the Science Board with the approval of the Council, as ongoing groups responsible to the Science Board for the planning, direction, and oversight of major themes within the Organization's general scientific aims. A Scientific Committee:

- (i) shall consist of not more than three members appointed by each Contracting Party;
- (ii) shall establish one Chairman according to Rule 17;
- (iii) may, with the endorsement of the Science Board and approval by the Council, establish ongoing sub-committees (hereafter "Sections") to consider in greater detail, topics of sufficient general importance to the Organization to warrant continuing attention, but only when sufficient expertise is lacking on a Scientific Committee.
 

*Sections:*

  - (a) shall consist of members appointed by Contracting Parties, after considering any recommendations concerning membership by the Science Board;
  - (b) may, with the endorsement of the Science Board and approval of the Council, include *ex-officio* members;
  - (c) shall establish Co-Chairmen according to Rule 17;
  - (d) shall be responsible to and reviewed regularly (at least once every five years) by the parent Scientific Committee and members confirmed by the Contracting Parties at each review;
- (iv) shall, with endorsement of the Science Board and approval by the Council, establish ad hoc groups (Advisory Panel, Working Group) to facilitate the work of the Scientific Committee.



An *Advisory Panel* is a group of scientists established by the Science Board, with approval by the Council, to coordinate and/or provide scientific advice on the activities of a Scientific Committee or Scientific Program. An Advisory Panel:

- (a) shall consist of members with relevant scientific expertise:
  - (i) appointed by Contracting Parties, after considering recommendations for membership from the Science Board, to advise a Committee; or
  - (ii) nominated by Committees, selected by the Science Board and approved by the Council, to advise a Scientific Program.
- (b) may, with the endorsement of the Science Board and approval of the Council, include *ex officio* members;
- (c) shall establish a Chairman or Co-Chairmen according to Rule 17;
- (d) shall be disbanded at the discretion of the Science Board.

A *Working Group* is a group of scientists, generally established by a Scientific Committee, for a period of typically three years, to undertake specific terms of reference and to report to the Organization on their findings. A Working Group:

- (a) shall consist of members appointed by Contracting Parties, after considering any recommendations concerning membership by the Science Board;
- (b) may, with the endorsement of the Science Board and approval of the Council, include *ex-officio* members;
- (c) shall establish Co-Chairmen, according to Rule 17;
- (d) shall be disbanded either after preparing its final report, or, as determined by the Science Board, for inadequate progress in achieving its tasks.

## Technical Committees

### Rule 14

Technical Committees are established by the Science Board, with the approval of the Council, as ongoing groups responsible to the Science Board to facilitate the technical and operational activities required to support the Organization's general scientific aims. A Technical Committee:

- (i) shall consist of not more than three members appointed by each Contracting Party;
- (ii) may, with the endorsement of the Science Board and approval of the Council, include *ex-officio* members;
- (iii) shall establish one Chairman according to Rule 17.
- (iv) may, with endorsement of the Science Board and approval by the Council, establish ad hoc groups (Advisory Panel, Working Group) to facilitate the work of the Technical Committee.

## Study Groups

### Rule 15

A *Study Group* is established by the Council or an executive committee, with the approval of the Council, for a period not normally exceeding one year, with specific terms of reference,

to consider any scientific, policy, advisory and/or financial issue of interest to the Organization and to provide recommendations thereon. A Study Group:

- ( i ) shall consist of members appointed by Contracting Parties, and by the Council;
- ( ii ) may, with the endorsement of the Science Board and approval of the Council, include *ex-officio* members;
- ( iii ) shall establish one Chairman according to Rule 17;
- ( iv ) shall be disbanded after submitting their final report and recommendations.

## **Scientific Programs**

### **Rule 16**

A Scientific Program is established by the Science Board, with the approval of the Council, to address major scientific questions of general interest to the Organization. A Scientific Program will typically place significant demands on the Organization for periods of up to a decade. The Program:

- ( i ) shall have an organizational structure recommended by the Science Board to complete the work;
- ( ii ) may include a Scientific Steering Committee reporting to the Science Board. Such a Scientific Steering Committee may, with the endorsement of the Science Board and approval by the Council, establish temporary expert groups to consider in greater detail, topics of importance to the Scientific Program to warrant continuing attention, but only when sufficient expertise or capacity is lacking with the existing structure of Scientific Committees and other expert group;
- ( iii ) shall be supported by resources determined by the Organization;
- ( iv ) will be disbanded at the discretion of the Science Board.

## **Scientific Leadership**

Concerning appointments to scientific leadership roles in the Organization, the nomination of suitably qualified Co-Chairmen will normally include candidates from both Asia and North America, if Co-Chairmen are required. Concerning elections of Chairmen, nominations will give consideration to rotating a chairmanship among the Contracting Parties, providing that it serves the scientific interests of the group. Concerning elections of Vice-Chairman, nominations will give consideration to candidates from the opposite side of the Pacific Ocean from the Chairman.

### **Rule 17**

- ( i ) Qualified<sup>4</sup> candidates nominated, or seeking, to be elected as Chairman of the Science Board shall submit their credentials (*curriculum vitae* and letter of justification) in writing to the Executive Secretary at least 60 days prior to the start of an annual meeting at which said election will occur;

- (ii) the Chairman of a Scientific Committee or Technical Committee shall be elected by its members from among its members for a term of three years, shall assume office at the conclusion of the Annual Meeting at which elected, and shall be eligible for re-election for one consecutive term;
- (iii) a Scientific Committee or Technical Committee may, at its discretion, elect a Vice-Chairman from among its members for a term of up to three years. The Vice-Chairman shall assume office at the conclusion of the Annual Meeting at which elected, and shall be eligible for re-election for one consecutive term;
- (iv) for Sections, Co-Chairmen are selected from the membership by the Science Board for approval by the Council to serve for a term of three years, and shall be eligible for re-election for one consecutive term;
- (v) for Working Groups, Co-Chairmen are selected from the membership by the Science Board for approval by the Council to serve for the life of the group (typically three years);
- (vi) for Study Groups, a Chairman is selected by Council if the group reports directly to the Council, or alternatively, nominated by an executive committee and approved by the Council if the group reports to an executive committee. The Chairman or Co-Chairmen serve for the life of the group (typically one year);
- (vii) for Advisory Panels, a Chairman or Co-Chairmen are selected from the membership by the Science Board, for approval by the Council, to serve for a period to be determined by the Science Board;
- (viii) if for any reason, a Chairman identified in Rule 17 (i-vi) is unable to complete a full term of office, a new Chairman shall be selected according to Rule 17 (i-vi), the term of the appointment to begin following election or appointment;
- (ix) if a Chairman is temporarily unable to act, the Chairman of Council, in consultation with the Science Board Chairman and Council members, shall appoint a member of the group to act as Chairman.

<sup>4</sup> In addition to scientific and leadership qualifications, scientist must be a citizen of one of the Contracting Parties.

### **Rule 18**

The Chairmen of groups identified in Rules 12-16 shall:

- (i) preside over meetings of the group concerned and regulate their procedure;
- (ii) prepare an agenda for each meeting of the group;
- (iii) communicate with group members, ensure that work is carried out in accordance with the terms of reference, and maintain records thereon;
- (iv) compile a general review of the work done and the results achieved;
- (v) furnish the Science Board with a summary report of the groups deliberations and recommendations together with an annotated estimate of their financial needs.

## **Finance and Administration Committee**

### **Rule 19**

- ( i ) The Finance and Administration Committee shall consist of not more than two members appointed by each Contracting Party;
- ( ii ) the Executive Secretary shall be a non-voting ex officio member of this Committee;
- ( iii ) the Chairman of the Finance and Administration Committee shall be appointed by the Council from among the Committee's members for a period of two years and if re-appointed, total consecutive service may not exceed four years. The Chairman of the Finance and Administration Committee shall not concurrently serve as a member of the Finance and Administration Committee. If the Chairman of the Finance and Administration Committee cannot attend an annual meeting, for any reason, then the Chairman of the Council will appoint an alternate to serve as interim Chairman of the Finance and Administration Committee. If, for any reason, a Chairman is unable to complete a full term of office, a new Chairman shall be appointed by the Council.
- ( iv ) at an Annual Meeting of the Organization, the Finance and Administration Committee shall examine:
  - ( a ) the audited accounts of the Council for the preceding financial year;
  - ( b ) the preliminary accounts for the current financial year;
  - ( c ) a budget for the upcoming year, and a forecast budget for the year thereafter;
  - ( d ) the administrative effectiveness of the Secretariat in particular and the Organization in general.
- ( v ) the Committee shall consider such other matters as may be referred to it by the Council or as it may deem desirable, and shall report its observations and conclusions to the Council.

## **Meetings**

### **Rule 20**

- ( i ) Meetings of the Scientific Committees and Technical Committees shall be held as a rule during the Annual Meeting of the Organization;
- ( ii ) the Chairman of a Committee in Rule 17(i) may, with the authority of the Chairman of the Council, call a meeting of the Committee between Annual Meetings of the Council. The expenses of the meeting may be borne by the Organization, if approved by the Council;
- ( iii ) ( a ) meetings of the Science Board may be attended by persons other than members, only on the invitation of the Chairman of the Council or Chairman of the Science Board;  
( b ) meetings of the Finance and Administration Committee may be attended by persons other than members, alternates, and advisors, only on the invitation of the Chairman of the Council or Chairman of the Finance and Administration Committee, and;
- ( iv ) any person registered to attend the Annual Meeting of the Organization may attend the meetings of any group, except in cases where participation in meetings has been limited by the Council.
- ( v ) meetings of the Council and executive committees are closed; the Council or executive committee may, at their discretion, invite other participants to attend all or part of their meeting.

## **Language of the Organization**

### **Rule 21**

English shall be the working language of the Council and its subsidiary bodies but, if desired, any other language may be used, it being understood that persons doing so at meetings will provide their own interpretation. All official publications and communications of the Organization shall be in English.

## **Amendment or Suspension of the Rules**

### **Rule 22**

- ( i ) These Rules of Procedure may be suspended only by a decision of the Council adopted in accordance with the provisions of Article VII of the Convention; and
- ( ii ) no proposal involving changes in these Rules of Procedure or the Financial Regulations shall be considered at a meeting of the Council unless either:
  - (a) two months' notice of the proposal has been given to the Contracting Parties; or
  - (b) the Council agrees by consensus.

# PICES 절차규정

(2015.10.24 개정)

규정의 적용범위: 본 규정은 PICES의 회의절차를 규정한다.

## Rule 1. 대표단

- (i) 회원국은 회원국대표나 위원에 변동이 있을 경우 즉시 사무총장에게 서면으로 고지한다.
- (ii) 회원국은 회원국대표, 자문, 위원 명단을 당해회의 개막 3주전까지 사무총장에게 알린다.
- (iii) 회원국은 PICES협약과 관련있고 GC가 승인한 모든 회의의 참가비용을 스스로 부담한다.
- (iv) 당연직은 PICES협약과 관련있고 GC가 승인한 모든 회의의 참가비용을 스스로 부담한다.

**Rule 2.** GC는 정부 및 국제기구 등 비PICES협약국도 PICES의 목적에 부합할 경우 초청할 수 있다. 또한 GC가 선정한 회의의 경우, 개인도 참관인자격으로 초청가능하다.

**Rule 3.** GC에서의 표결: PICES협약에 적시된 책임과 의무는 GC결의에 따라 이행한다.

- (i) PICES협약에 따라, GC에서의 의결은 되도록 만장일치로 한다.
- (ii) 의장이 판단기에 만장일치를 위한 노력을 다했는데도 만장일치에 도달하지 못했다면 회원국 3/4의 찬성을 요하는 찬반다수결에 붙일 수 있다(기권국 불계상).
- (iii) 아래 경우는 위 (ii)항과 무관하게 반드시 만장일치에 의해서만 가능하다.
  - a. 과학그룹과 과학위원회(상설, 혹은 임시)의 설립
  - b. 사무총장의 임명
  - c. PICES 1년 예산의 승인
  - d. PICES협약 개정 권고
  - e. 연차회의를 제외한 모든 GC회의의 개최
  - f. 기타 GC가 중대하다고 판단한 사안
- (iv) GC등 모든 회의에서 1국은 1표만을 갖는다.

- (v) 회원국대표가 1인 이상일 때 둘 중(어느 쪽이던) 한 사람이 투표권을 행사한다.
- (vi) 선출을 제외한 다수결은 거수로 행한다. 단 회원국이 호명투표를 요구할시 그리할 수 있다.

**Rule 4.** 사안이 긴급할 경우 GC회기중이라도 의장은 사무총장에게 서면결의 등 여타 방식으로 투표를 행하게 할 수 있다. 이 경우, 사무총장은 회원국의 서면투표를 접수했음을 확인해야 한다. 사무총장은 PICES협약 제7조와 같이 3/4 이상이 찬성했을 경우 승인을 회원국들에 통보하고, 반대의 경우에도 회원국들에 통보해야 한다. 의장은 제 회원국이 서면결의요구서 접수를 알린 후 적정한 시일을 투표마감일자로 정한다. 마감일까지 서면투표하지 않은 회원국은 안전에 반대하지 않는 것으로 간주된다.

**Rule 5. 선거**

- (i) 선거는 다수결 사안이 될 수 없다.
- (ii) GC에서 후보의 지명은 선거가 행해질 연차회의 개막 60일전까지 사무총장에게 서면으로 해야 한다.
- (iii) 선거를 거수로 행하되 GC회원국 대표나 SB위원, 과학위원회위원이 무기명투표를 요구할 경우 그리한다.
- (iv) 의장, 부의장, SB의장, 과학위원장의 선출시, 투표권을 유효하게(기권제외) 행사한 회원국의 과반을 넘는 득표를 하여야 당선된다. 이 조건을 충족하는 후보가 없는 경우:
  - a. 후보가 총 2인일 시, 조건을 충족하는 후보가 나올 때까지 재선거한다.
  - b. 후보가 3인 이상일 경우, 최저득표자(들)을 뺀 채 당선조건을 충족하는 후보가 나올 때까지 재선거한다. 만약 2인 이상의 후보가 최저득표를 했을 경우 그 후보들은 제외된다.
- (v) 의장은 사무총장에게 회기중 타당하다고 판단될 경우 서면결의 등 다른 방식의 선거를 지시할 수 있다. 상기 iv항에서 정한 당선요건을 충족하는 후보가 나오면 사무총장은 회원국에게 결과를 통보한다. 회원국이 이의를 공식제기할 경우도 역시 회원국에게 그것을 통보한다. 의장은 회원국이 서면결의요구서의 수령을 알린 후 적정기간을 두고 투표마감일을 설정할 수 있다. 마감일까지 투표하지 않은 회원국은 결과에 이의가 없는 것으로 간주한다.

**Rule 6.** GC의장 및 부의장: 2년 임기로 회원국 대표중 선출한다. 연임은 1회에 한하여 가능하다. GC의장 및 부의장은 선거가 행해진 연차회의의 폐회 즉시 취임하는 것이 보통이다.

**Rule 7.** 의장의 직무는

- (i) GC를 주재하고,
- (ii) 의사진행발언에 대한 판정을 내리고(단, 이때 회원국대표는 의장판정에 투표를 요구할 권리가 있음),
- (iii) GC의사일정이 효율적으로 그리고 GC결의와 부합하게 진행될 수 있도록 결정을 내려 사무총장에게 지시하고,
- (iv) GC가 설립을 요구한 그룹의 설립을 도모하고,
- (v) 필요하다고 여겨지는 PICES회의(그 어떤 회의든)에 참석하며,
- (vi) PICES와 PICES회원국의 이익을 위한 조치를 취한다.

**Rule 8.** 의장직이 공석일 경우, 부의장이 의장직을 승계한다. 의장직을 승계한 부의장은 임기가 1년 이하일 경우 2번의 연임이 가능하며, 그렇지 않을 경우 한 번만 가능하다.

**Rule 9.**

- (i) 의장 유고시 부의장은 언제라도 의장직을 수행한다.
- (ii) 선거후, 부의장은 계속 회원국 대표를 할 수 있으나 부의장이 의장직을 수행하는 동안에는 그럴 수 없다. 부의장이 의장직을 수행하는 동안, 회원국은 다른 회원국 대표를 선임해야 한다.
- (iii) 부의장은 필요하다고 여겨지는 어떤 PICES회의라도 참석할 수 있다.
- (iv) 부의장 공석시 GC는 차기회의에서 신임부의장을 선출한다. 이렇게 선출되어 임기가 2년 미만인 부의장은 이후 2선이 가능하다.

**Rule 10.** GC의장 및 부의장

- (i) 사무총장은 PICES의 CEO로서 사무국과 사무국직원의 관리에 관한 책임을 GC에 진다.
- (ii) 사무총장은 PICES와 관련한 모든 자금의 접수와 예산집행(PICES를 대신하여), 수표발행, PICES 재무규정의 이행전반에 책임을 진다.
- (iii) 사무총장은(특별한 경우를 제외하고) GC에 참석해야 하며 각종 위원회회의



등 어떤 PICES회의에도 참석할 수 있다.

- (iv) 사무총장은 의장과 협의하여 GC가 정한 직위, 급여, 임기 등 조건에 따라 사무국직원을 임명한다.
- (v) 사무총장은 GC의 모든 회의 개최를 지원하며 PICES의 다른 회의 개최도 지원할 수 있다.
- (vi) 사무총장은 GC폐회후 가장 빠른 시일내 회원국에게 회의결과보고서를 제출한다.
- (vii) 사무총장은 GC개회 60일전 안건(안)을 회원국 대표에게 회람하며(이때 의견 제출 마감일을 설정해야 함) 45일전에 잠정의제를 회람시킨다.
- (viii) 사무총장은 PICES연차보고서를 작성하여 회원국에 송부하고,
- (ix) 사무총장은 GC가 맡길 경우 다른 기능도 수행해야 한다.

#### **Rule 11. 집행위원회**

- (i) GC에 있어서 집행위원회란 SB와 F&A를 말한다.
- (ii) GC는 집행위원회에게 사업추진과 관련한 지시를 내릴 수 있다.
- (iii) 집행위원회는 PICES에 필요하다면 GC의 승인을 받아 보조기구를 설립할 수 있다.

#### **Rule 12. SB**

- (i) SB는 SB의장(3년임기), 과학위원장, 기술위원장(과학프로그램에 자문역인), AP의 대표들로 구성된다. SB의장은 과학위원회, 기술위원회, AP소속인 자중 지명(추천)받은 자중에서 선출한다. 후보지명(추천)에 관해서는 본 규정 17조를 참조. SB의장은 타 그룹의장과 겸직이 금지되고 연임도 불가하다. SB의장 직이 공석이 될 경우, SB는 후임의장을 조속한 시일 내에 선출해야 한다.
- (ii) SB부의장은 1년임기로 SB성원중에서 선출하며 연임이 가능하다. 의장이 북동태평양 출신일 경우 부의장은 북서태평양 출신이어야 하며 그렇지 않을 경우 부의장은 북동태평양 지역에서 나와야 한다. 의장 유고시 부의장이 임무를 대행한다.
- (iii) 어떤 회원국이 SB, 위원회, 프로그램에 대표자를 두고 있지 않을 경우, 그 외의 적정한 인물을 지명할 수 있다.
- (iv) SB는:
  - (a) 다음의 총괄적 감독책임을 갖는다.

- GC의 학술적 사안과 학술업무
  - GC가 승인한 연구프로그램
  - GC의 과학사업과 GC가 권고 또는 조정하는 과학프로그램의 이행조치
  - 특별학술회의의 개최
- (b) 상기 (a)항에서 언급한 모든 문제에 관해 GC에 조언할 책임이 있다.
- (c) 필요할 경우 SB관할 하에 있는 그룹의 활동과 기능에 관한 지도역할을 맡는다.
- (d) 회원국이나 여타 국제기구가 PICES에 자문을 요청해 올 경우, GC를 통해 학술적 recommendation을 하거나 recommendation을 검토한다.
- (e) SB연차회의시 SB산하 그룹의 보고서를 검토하고 보고서중 비용집행과 관련한 부분은 GC에 보고한다.
- (f) SB의 출판계획에 대해 GC에 통고한다(advise the GC of its publication requirements).
- (v) SB의결시 과학프로그램들은 1프로그램당 1표를 행사한다:

### Rule 13. 과학위원회

과학위원회는 PICES가 추구하는 과학적목표를 보다 구체적으로 이루기 위한 상설그룹(ongoing group)으로서 GC의 승인을 받아 SB가 설립되어, SB가 과학위원회의 기획, 수행, 감독책임을 진다.

과학위원회는:

- (i) 각 회원국이 임명한 3인 이하의 인원으로 구성되어,
- (ii) 1인의 의장을 선출한다(규정 17조).
- (iii) 과학위원회는 PICES 목표이행에 중요한 세부주제를 지속적으로 다루는데 있어 과학위원회의 역량만으로는 부족할 경우, SB와 GC의 승인을 얻어 소위원회(ongoing sub-committees 즉 섹션)를 설립할 수 있다.

섹션은:

- (a) 회원국이 임명하고 SB가 심의한 멤버들로 구성된다.
- (b) SB와 GC가 승인할 경우 당연직을 선임할 수 있다.
- (c) 공동의장을 선임할 수 있다(규정 17조).
- (d) 매 점검 때마다 소속 모(母)과학위원회와 회원국 멤버에 보고하며 최소 5년에 한번 점검을 받는다.

(iv) 과학위원회의 직능을 보다 잘 이행하기 위하여 SB와 GC의 승인을 얻어 특별 그룹(ad hoc groups 일테면 AP이나 워킹그룹)을 설치한다.

AP란 과학위원회나 과학프로그램의 활동에 대해 학술자문이나 조정기능을 해주기 위해 SB와 GC의 승인에 의해 설립된 과학자들의 그룹이다.

AP는:

- (a) 관련분야에 전문지식을 가진 멤버들로 구성된다.
  - (i) AP위원들은 SB의 구성심의를 거친 후 회원국에 의해 임명되어 위원회에 자문하거나.
  - (ii) 위원회에 의해 지명되고 SB, GC에 의해 선정되어 과학프로그램에 자문한다.
- (b) SB, GC의 승인을 얻어 당연직을 둘 수 있고,
- (c) 의장과 공동의장을 두는데(규정 제17조),
- (d) 그 해산은 SB의 판단에 따른다.

워킹그룹은 통상 과학위원회에 의해 설립되는 과학자들의 그룹으로서(보통 3년), 구체적이고 세부적인 임무를 수행하여 그 결과물을 PICES에 보고한다.

워킹그룹은:

- (a) SB의 구성심의를 거쳐 회원국에 의하여 임명된 위원(멤버)들로 구성된다.
- (b) SB, GC의 승인을 거쳐 당연직을 둘 수 있다.
- (c) 규정 17조에 따라 공동의장을 둘 수 있다.
- (d) 최종보고서 제출후 해산되나 SB가 판단하기에 임무수행 경과상 문제가 있을 경우 그 이전이라도 해산가능하다.

**Rule 14.** 기술위원회: PICES의 과학적 목표를 이루는데 필요한 기술적·경영적 활동을 촉진하기 위한 ongoing groups으로서 GC의 승인을 거쳐 SB가 설립하며 SB에 보고책임을 진다.

기술위원회는:

- (i) 회원국이 임명한 3인 이하의 멤버로 구성된다.
- (ii) SB, GC의 승인을 얻어 당연직을 둘 수 있다.
- (iii) 규정 17조에 의거 의장을 둔다.
- (iv) 기술위원회 직능을 보다 잘 이행하기 위하여 SB와 GC의 승인을 얻어 특별그룹(ad hoc groups 일테면 AP이나 워킹그룹)을 설치할 수 있다.

**Rule 15.** 스터디그룹: GC승인을 거쳐 GC가 직접 또는 집행위원회가 설립하는데 존속기간은 통상 1년 이하이며 PICES의 과학적, 정책적, 권고적, 재무적 사안을 검토하고 (스터디그룹이 검토를 명받은 범위는 매우 구체적·세부적임) 그 검토결과에 따라 recommendation을 제공한다.

스터디그룹은:

- (i) 회원국과 GC가 임명한 위원(멤버)들로 구성되는데,
- (ii) SB, GC의 승인을 얻어 당연직을 둘 수 있고,
- (iii) 규정 17조에 따라 의장을 둔다.
- (iv) 최종보고서 제출 후(또는 recommendation이 있을 때) 해산된다.

**Rule 16.** 과학프로그램: PICES 전체의 이익에 부합하는 과학적 중대사안을 다루고자 GC의 승인을 거쳐 SB가 설립하는 중장기(최장 10년) 프로그램이다.

과학프로그램은:

- (i) SB가 업무를 완료하기 위해 제안한대로 조직·구성된다.
- (ii) SB에 보고하는 과학조종위원회(Scientific Steering Committee)를 포함할 수 있다. 이러한 과학조종위원회는 SB, GC의 승인을 얻어 지속적인 관심을 보장하기 위해 과학프로그램에 주요한 주제를 보다 상세하게 고려하기 위한 임시 전문가그룹(expert group)을 설치할 수 있으나, 이는 현존하는 과학 위원회 구성과 타 전문가그룹에 충분한 전문가 및 능력이 부족한 시기에 국한된다.
- (iii) PICES가 배정한 재원으로 운영된다.
- (iv) SB의 판단으로 해산 가능하다.

학술책임자:

PICES산하 학술조직에서 공동의장이 필요할 경우 아시아와 북미출신의 책임자중에서 지명한다.

의장임명시 국별안배 즉 순환수임을 고려해야 하며, 그룹의 과학적 이익에 기여할 수 있어야 한다.

의장이 동태평양출신일 경우 부의장은 서태평양쪽을 고려하고, 반대로 서태평양출신일 경우 동태평양을 고려한다.

**Rule 17.**

- (i) 유자격자(능력 뿐 아니라 국적도 포함함. 즉, 회원국 국민이어야 함)가 SB의장 후보로 지명받거나 출마를 결심하면, 선거가 행해질 연차회의 개최 60일전에

- 관련서류(이력서 및 letter of justification)를 사무총장에게 제출한다.
- (ii) 과학위원회의장/기술위원회의장(3년 임기)은 과학위원회의원/기술위원회의원 중에서 과학위원회의원/기술위원회의원의 표결로 선출한다. 임기는 선거가 행해진 PICES연차회의 폐막 즉시 개시되며 1회에 한해 연임가능하다.
  - (iii) 과학위원회/기술위원회가 필요하다고 판단시 부의장(3년 임기)을 위원 중 선출할 수 있다. 부의장 임기는 선거가 행해진 PICES연차회의 폐막 즉시 개시되며 1회에 한해 연임이 가능하다.
  - (iv) 섹션의 부의장(3년 임기)은 SB가 섹션위원 중에서 인선하여 GC의 승인을 받아 임명되며, 1회에 한해 연임이 가능하다.
  - (v) 워킹그룹의 경우, 부의장은 SB가 워킹그룹 성원중에서 인선하여 GC의 승인을 받는다 임기는 워킹그룹의 존속기간(통상 3년)과 같이 한다.
  - (vi) GC직할 스터디그룹의 의장은 GC가 인선하고, 집행위원회에 보고의무를 갖는 스터디그룹의 의장은 집행위원회의 지명(추천)을 받아 GC가 승인한다. 의장, 부의장의 임기는 공히 그룹의 존속기간(통상 1년)과 같이 한다.
  - (vii) AP의장과 부의장의 경우, AP성원중에서 AP의 자체인선으로 인선되어 GC승인을 거친다. 임기는 SB가 정한다.
  - (viii) 규정 17조에 규정된 의장이 임기를 마칠 수 없을 시, 신임의장은(역시 규정 17조에 따라 임명이나 투표를 통해) 인선된다.
  - (ix) 의장이 일시적으로 임무수임을 못하게 될시, GC의장은 SB의장 및 GC와 협의하여 그룹멤버중 1인을 대행으로 임명한다.

#### Rule 18.

규정 12~16조에 규정된 그룹의 의장은:

- (i) 관련그룹의 회의들을 주재하며 회의질서를 유지한다.
- (ii) 관련그룹 회의의 의제를 설정한다.
- (iii) 관련그룹 멤버들과 소통하여 임무가 부여된 대로 수행되고 있는지 확인하고 그 과정을 기록으로 남긴다.
- (iv) 진도와 성과에 대한 검토의견을 취합한다.
- (v) 그룹토의결과 및 recommendation의 요약 및 예산(안) 설명자료를 SB에 제출한다.

#### Rule 19. F&A

- (i) F&A는 회원국이 임명한 멤버(국별 2인 이하)들로 구성된다.

- (ii) 사무총장은 본 위원회에서 투표권이 없는 당연직이다.
- (iii) F&A의장(2년임기, 연임시 재임기간 합계 4년초과 금지, F&A겸직금지)은 F&A위원들중 GC가 임명한다. 어떠한 사유에서든 의장이 연차회의에 참석하지 못할 경우, GC의장은 대체인원을 지명하여 위원회의 임무를 임시적으로 이행할 수 있게 해야 한다. 의장이 임기를 채우지 못하게 될 시, GC는 신임의장을 임명한다.
- (iv) PICES연차총회시 F&A는 다음을 검토한다.
  - (a) 전년도 감사결과
  - (b) 당해연도 예비결산보고서
  - (c) 차년도 예산신청 및 차차년도 예산안
  - (d) PICES전체 특히 사무국의 행정적 효율성
- (v) F&A는 GC가 회부하거나 F&A검토가 필요하다고 여겨지는 기타 사안을 검토하여 그 결과를 GC에 보고한다.

#### **Rule 20. 회의**

- (i) 과학위원회/기술위원회의 회의는 통상 PICES연차총회 회기중에 연다.
- (ii) 위원회의장은 규정 제17(i)조에 따라 GC의장의 권한을 빌어 연차회의 회기중이 아닌 시기에 위원회를 소집할 수 있다. 회의개최 비용은 GC승인을 득했을 경우 기구(PICES)에 부과할 수 있다.
- (iii) (a) SB회의에 SB위원이 아닌 자가 참석하려면 반드시 GC의장 또는 SB의장의 초청이 있어야 한다.  
 (b) F&A회의에 F&A위원, 대리인, 자문이 아닌 자가 참석하려면 반드시 GC의장 또는 F&A의장의 초청이 있어야 한다.
- (iv) PICES연차회의에 참가등록한 자는 - GC가 특별히 제한한 경우를 제외하고 - 어느 그룹회의나 참석할 수 있다.
- (v) GC와 집행위원회는 비공개회의이다. 단, GC나 집행위의 초청을 받은 경우 (전체 또는 일부) 배석할 수 있다.

**Rule 21.** GC 및 부대회의의 공식언어는 영어이다: 단 다른 언어가 필요하다면 참가국 스스로에게 자력으로 통역을 제공하는 것은 용인된다. PICES의 모든 출판물, 소통방식은 영어이다.

**Rule 22. 규정의 개폐**

- (i) 본 규정의 일시효력 정지는 PICES협약 제VII조가 규정한 대로 GC결의에 의해서만 가능하다.
- (ii) 본 규정이나 재무관련 규정의 개정은 오직:
  - (a) 개정 2개월 전 개정안을 회원국에 제출할 경우와
  - (b) GC의 만장일치에 의해서만 가능하다. 끝.

## 용어정리

- 집행이사회(General Council, GC)
- 과학평의회(Science Board, SB)
- 자문(advisor) = 회원국 대표가 GC에 조언을 받기 위해 동행하고자, 또는 F&A위원이 F&A에 관한 조언을 얻고자 초빙한 자
- 부대표(alternate delegate) = 회원국 대표 유고시 회원국 대표의 전권을 수임할 것을 회원국으로부터 명 받은 자
- 부위원(alternate member) = F&A위원 또는 과학위원회위원 유고시 전권을 수임할 것을 회원국으로부터 명 받은 자
- GC결의(decision) = PICES연차보고서에 기재된 GC의결사안
- 회원국 대표단(delegation) = 회원국이 임명한 회원국 대표 및 F&A위원
- 회원국 대표(delegate) = 회원국이 자국의 이익을 지키기 위해 임명한 1~2인(규정1~22번에 언급된 “회원국 대표”는 회원국 부대표도 포함)
- 집행위원회(executive committees) = GC에 직접 보고하는 상설위원회
- 공식(formal) = 권한을 가진 자가 서면(이메일 포함)으로 보냄
- 그룹(group) = GC결의에 의해 구성된 하부조직
- 멤버(member) = 그룹에서 일국을 대표하는 자(그룹의장도 포함, 단, 규정 1~22번에서 “과학위원회위원” 및 “F&A위원”은 부위원을 포함하는 개념)
- 당연직(ex-officio member) = 타 국제기구 등 회원국이 아닌 단체에 소속된 전문가로서 GC에 의해 그룹멤버로 위촉된 자
- 참관인(observer) = PICES activity중 일부, 일면을 참관하도록 GC가 초빙한 자
- 상설위원회(permanent committee) = 집행위원회, 과학위원회, 기술위원회의 통칭
- 레커멘데이션 (recommendations) = 집행위원회가 GC에 상정한 안건(연차보고서상에 SB 관련일 경우 ‘S’, F&A 관련일 경우 ‘A’로 표기됨)