

발간등록번호

BSPM60020-11476-7

2017 북태평양해양과학기술
연차총회 참가보고서

2017

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2017. 12.

2017년 북태평양해양과학기구 연차총회 참가보고서

2017. 12

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I . 개요

I. 개 요

□ 기간 : 2017.9.22.(수) ~ 10.1(일)

□ 장소 : 러시아 블라디보스토크/러시아 극동연방대학교(FEFU)

□ 대표단 구성 (총 46명)

○ 수석대표: 해양수산부 허만욱 해양개발과장

○ 교체수석: 한국해양과학기술원 심원준 책임연구원

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

□ 주요 의제

○ 동해편 제2판 발간 관련 한·일 양자회담 개최 및 집행이사회에서의 논의

○ PICES 부의장 및 과학평의회 부의장 선출

○ 한국 과학자 김수암 교수 PICES Wooster상 수상

○ 2017년 제3회 젊은과학자 컨퍼런스(ECSC-3) 결과 및 후속조치 논의

○ FUTURE SSC에서 FUTURE 로드맵 등 진행상황 보고

참고

대표단 명단

역 할	성 명	소속/직급	참가부문	출장기간
수 석 대 표	허만옥	해양수산부/해양개발과장	GC	2017.09.27~10.02
교 체 수 석	심원준	한국해양과학기술원/책임연구원	GC, F&A, WG-31	2017.09.23~10.02
대 표	정재관	해양수산부/사무관	GC	2017.09.27~10.02
	진의림	외교부/사무관	GC	2017.09.27~10.02
	권정노	국립수산과학원/연구관	TCODE	2017.09.21~30
	강수경	국립수산과학원/연구관	FUTURE-SSC. S-CCME	2017.09.22~10.01
	김현우	국립수산과학원/연구사	S-MBM	2017.09.21~30
	박태규	국립수산과학원/연구사	S-HAB	2017.09.21~30
	이준수	국립수산과학원/연구사	TCODE	2017.09.22~10.01
	임월애	국립수산과학원/연구관	MEQ, S-HAB, AP-NIS	2017.09.21~28
	정희동	국립수산과학원/연구관	POC, AP-CREAMS	2017.09.23~30
	최민규	국립수산과학원/연구사	MEQ, WG-35	2017.09.21~30
	한인성	국립수산과학원/연구사	MONITOR, WG-30	2017.09.21~28
	박희운	국립해양조사원/사무관	MONITOR	2017.09.23~28
분과 위원장	주세종	한국해양과학기술원/책임연구원	BIO, WG-37	2017.09.21~10.01
분과별 위원회 위원	정석근	제주대학교/교수	FIS, S-CCME	2017.09.21~28
	홍성진	충남대학교/교수	MEQ	2017.09.23~30
	김성용	한국과학기술원/교수	MONITOR, WG-38, AP-NPCOOS	2017.09.21~27
	최상화	한국해양과학기술원/책임연구원	TCODE	2017.09.23~28
	권석재	한국해양과학기술원/책임연구원	HD	2017.09.23~28
	정명화	한국해양수산개발원/전문연구원	HD	2017.09.21~30
	장찬주	한국해양과학기술원/책임연구원	POC, WG-40	2017.09.22~10.01
	유신재	한국해양과학기술원/책임연구원	FUTURE-SSC. WG-35	2017.09.21~28

역 할	성 명	소속/직급	참가부문	출장기간
전문가 그룹 위원	김경렬	광주과학기술원/교수	AP-CREAMS	2017.09.22~25
	김규범	서울대학교/교수	AP-CREAMS	2017.09.22~26
	이재학	한국해양과학기술원/책임연구원	AP-CREAMS, AP-NPCOOS	2017.09.23~26
	신경순	한국해양과학기술원/책임연구원	AP-NIS	2017.09.24~30
	김수암	부경대학교/교수	S-CCME	2017.09.21~27
	김미란	국립공원연구원/책임연구원	S-MBM	2017.09.22~29
	안용락	국립해양생물자원관/수석연구원	S-MBM	2017.09.21~28
	김석현	한국해양과학기술원/책임연구원	WG-30	2017.09.22~30
	정경태	한국해양과학기술원/책임연구원	WG-30	2017.09.22~30
	문혜원	국립해양생물자원관/연구원	WG-32	2017.09.21~30
	최광식	제주대학교/교수	WG-32	2017.09.27~30
	현정호	한양대학교/교수	WG-33	2017.09.23~27
	남성현	서울대학교/교수	WG-35	2017.09.22~29
	이상철	한국해양수산개발원/전문연구원	WG-36	2017.09.22~24
	신형철	극지연구소/책임연구원	WG-39	2017.09.23~25
	권민호	한국해양과학기술원/선임연구원	WG-40	2017.09.22~10.01
	이충일	국립 강릉원주대학교/교수	WG-40	2017.09.22~26
남정호	한국해양수산개발원/연구위원	SG-MES	2017.09.21~30	
자 문	정희수	한국해양과학기술원/책임연구원	F&A(Advisor)	2017.09.24~30
	김경진	한국해양과학기술원/책임기술원	F&A(Advisor), GC(Advisor)	2017.09.24~10.02
	문중호	한국해양과학기술원/연구사업인력	F&A(Advisor)	2017.09.24~10.02
	김새슬	한국해양과학기술원/연구사업인력	GC(Advisor)	2017.09.27~10.02

참고

'17 북태평양해양과학기구(PICES) 총회 일정

9월 22일 (금)												
	D-504			D-501				D-601				
09:00~12:30	W3 고도 회유성 종			W4 유해적조의 장기적인 변화				W6 동물성플랑크톤 생성				
14:00~18:00								W2 연안 생태계서비스				
9월 23일 (토)												
	A-517	Rm1/L4	B-537	B-552	B-626	D-501	D-504	D-601	D-604	D-569	D-564	
9:00~12:30	W1	WG-32	SG-MES	S-HAB	S-CC	WG-38	WG-30	WG-40	WG-36	WG-35		
14:00~18:00	베링해	미팅	미팅	미팅	미팅	미팅	미팅	미팅	미팅	미팅	S-MBM 미팅	
9월 24일 (일)												
	B-626	B-537	D-504	D-564	D-569	D-501	B-552	D-601				
9:00~12:30	SB	WG-37	AP-NPCOOS	S-CCME	AP-CREAMS	AP-NIS	WG-39	WG-33				
14:00~18:00	FUTURE-SSC				미팅	미팅			S-MBM	미팅	미팅	
18:00~20:00	HD	MEQ	BIO	TCODE	POC		FIS	MONITOR				
	미팅 Day1	미팅 Day1	미팅 Day1	미팅 Day1	미팅 Day1		미팅 Day1	미팅 Day1				
9월 25일 (월)												
08:45~10:10	개회식 [Middle Hall]											
10:30~18:20	과학평의회 심포지움(S1) [Middle Hall]											
18:30~21:00	환영 리셉션 [Big Panoramic Hall]											
9월 26일 (화)												
09:00~10:30	총회(S3, S12, S13) [Middle Hall]											
	D-501	D-504	D-601	D-604	B-537							
10:50~14:00	S13 (인위적 효과)	S3 (최대지속가능생산량)	S8/HD-Paper (해양 생태계 건강)	S6 (연간 변동성; 기후예측)								
14:00~16:00		S12 (먹이 소비)			F&A 미팅 (Closed)							
16:20~18:00												
19:00~21:00	Future SSC 미팅											
9월 27일 (수)												
	Middle Hall					B-537						
09:00~12:30	S10 FUTURE 총회 (신항이슈)					F&A 미팅 (Closed)						
	B-537	A-517	B-626	D-501	D-504	D-601	D-604					
14:00~18:00	BIO	FIS	MEQ	MONITOR	POC	TCODE	HD					
	미팅 Day2	미팅 Day2	미팅 Day2	미팅 Day2	미팅 Day2	미팅 Day2	미팅 Day2					
18:30~21:00	Sports Event											

9월 28일 (목)					
9:00~10:30	총회(S2, S5, S11) [Middle Hall]				
	D-601	D-604	D-501	D-504	TBA
10:50~12:30	S4 (역효과)	S9 (Meso/Submeso)	S11 (북극/아북극 환경 변동성)	S2 (미세 플라스틱)	13:00-15:00 (대학생 대상 공공 강연)
14:00~18:00			S5 (연안생태계 보존)		
18:00~21:00	Poster Session (Reception) [Cafeteria Level 5] "Wine and Cheese"				
9월 29일 (금)					
	D-501	D-504	D-601	D-604	
9:00~12:20	BIO-Paper	FIS-Paper	MEQ-Paper	POC-Paper	
12:20~13:40	폐회식 [Middle Hall]				
13:50~18:00	과학평의회 (Closed) [B-537]				
18:30~21:00	의장만찬 [초청자만 참석]				
9월 30일 (토)					
	D-564		D-569		
9:00~18:00	과학평의회 (Closed)		집행이사회 (Closed)		
10월 1일 (일)					
	D-569				
9:00~18:00	집행이사회(Closed)				

Ⅱ. 부문별 회의경과 및 결과

II. 부문별 회의경과 및 결과

1 F&A 및 GC

□ 정부대표

참가부문	성명	소속/직급
GC, F&A	허만옥	해양수산부/해양개발과장
GC	심원준	한국해양과학기술원/책임연구원

□ 개요

- 일시: F&A: 2017년 9월 26일(14:00~18:00), 9월 27일(9:00~10:30)
GC: 2017년 9월 30일(09:00~18:00), 10월 1일(09:00~18:00)

○ 참석자

- F&A: Carmel Lowe(F&A 의장), 박철(PICES 의장), Robin Brown, Hal Batchelder(사무국) Andrea White, Lesley MacDougall(캐나다), Michael Seki(미국), 심원준, 김경진, 문중호, 정희수(한국), Tetsuichiro Funamoto, Chieko Kondo Yamasaki, Hiroya Sugisaki, Chika Fujimitsu(일본), Rui Zheng, Fangli Qiao, Chuanlin Huo(중국), Igor Shevchenko(러시아)
- GC: 박철(의장), Laura Richards(전의장), Hiroaki Saito(SB의장), Robin Brown(사무국장), Harold Batchelder(사무부국장), Carmel Lowe, Andea White, Lesley MacDougall, Enrique Churchitser(미국), 허만옥, 심원준, 정재관, 진의림, 김경진, 김새슬(한국), Junichiro Otaka, Tomow Watanabe, Tetsuichiro Funamoto, Chieko Kondo, Chika Fujimitsu, Hiroya Sugisaki(일본), Fangli Qiao(중국), Rui Zheng(중국), Oleg Bulatov, Aleksei Baitaiuk, Oleg Katugin(러시아)

□ 의제 및 논의 결과

- 북태평양해양생태보고서(NPESR) 제2판 동해편 발간 관련
 - 집행이사회 개편 한일 양국은 양자회담을 개최하였음. 일본측의 수정안에 대해서 검토할 시간이 없음을 주지시키고, 충분한 검토 후 양자회담을 개최하기로 합의하였음. 집행이사회시에도 이의 요지를 발언함

- 집행이사회에서 의장은 2012년 총회시 NPESR-2의 발간이 완결된 후 후속판을 발간하기로 합의한 사실을 주지시키고, 양국간 합의가 조속히 이루어지길 바란다고 언급함
- 2017 ECSC 결과 및 후속조치
 - 아국이 지원한 기금(6천만원, \$68,237)의 잔액(\$11,187)사용에 대해 아국이 요청한 대로, 2018년 제6회 PICES summer school* 개최 지원경비로 사용하기로 의결
 - * 주제: 연안 해양관측 과학(2018.7.9~13, 캐나다 빅토리아), 소요경비: \$36,000~46,000 예상
- 2018년 PICES 주최 주요 행사
 - “태평양 전이지역에서의 변화 이해” 국제 심포지움(2018.4.22~26 멕시코 라파스)
 - 제4차 PICES/IOC/ICES 주관 전세계 해양 기후변화 영향에 대한 국제 심포지움 (International Symposium on “Effects of climate change on the world’s oceans” [ECCOW]): (2018.6.4~8, 미국 워싱턴 DC)
- PICES 인턴십 프로그램
 - 안정적인 인턴프로그램 운영을 위해 아국은 2017년도부터 매년 \$5,000 자발적 신탁기금을 지원하기로 함
- PICES 사무국 직원 채용
 - 미국, 한국: 연회비 증액을 통해서 정규직원 확대 필요성을 인식, 한국은 예산 회기간을 고려하여 2019년부터 연회비 증액이 가능함을 밝힘
 - 캐나다: 원칙적으로 연회비 증액을 찬성하지만 증액부분에 대해서는 평가가 필요
 - 일본: 연회비 증액을 위한 공식문서가 필요, 2020년부터 가능
 - 러시아, 중국: 사무국의 업무량 증가부분에 대한 평가한 후, 연회비 증액 여부 결정
 - 사무국과 F&A의장이 직원채용을 위한 연회비 증액의 필요성과 증액부분에 대한 문서초안을 작성하여 2017년 12월말까지 F&A 위원회에 회람하기로 하고, F&A 위원회에서는 2018년 2월까지 권고안을 GC에 제출하기로 함
 - 위의 의제를 논의하기 위해 중기집행이사회(1일)을 개최하기로 함
- 일본 특별프로젝트
 - 일본에서 지원한 특별프로그램*이 2017년 완료되어 프로젝트 결과보고
 - * MarWeB 해양생태계건강 및 인간복지(2012.4~2017.3., 505,660\$, 일본농림업어업부)
 - ** ADRIFT 쓰나미 기원 쓰레기 관련 영향 평가(2015.4~2017.3., 3,681,547\$, 일본환경부)
 - 중국은 일본이 PICES를 통하여 수행하는 특별프로젝트에 대해 절차와 관련하여 강력하게 문제를 제기함. 중국을 비롯한 회원국들이 참여하지 못한 부분, 출판물 승인 등

일본이 PICES의 명의를 활용하여 독자적으로 수행하는 것에 대해 강하게 불만을 나타냄

- 중국측은 SB에서 만장일치가 되지 않으면 GC 의제로 올리지 않을 것을 주장, 특별프로젝트에 대한 대응절차가 필요함을 주장하였으며, 차기 회의에 논의하기로 함

○ PICES 특별프로젝트 정책

- 특별프로젝트 개발 및 승인 절차 새롭게 재정
 - \$50,000 미만 단기 프로젝트: 사무국에서 승인여부 결정
 - \$50,000 이상, 혹은 장기 프로젝트: 의장, SB의장, 사무국 평가 후, 전문가그룹을 구성하여 평가. 이후 SB 승인, 집행이사회 의결을 통해 확정
- 특별프로젝트는 재정행정위원회와 적절한 전문가그룹회의에 주기적으로 진행상황을 보고하고 해당 프로젝트 출판물은 과학평의회, 집행이사회를 거쳐 승인을 받도록 함

○ 2016년 PICES 결산 현황 보고 및 2018년도 예산안 편성 논의

- (2016년 결산) 각국에서 분담하거나 프로젝트 수행을 위해 자발적으로 지원한 예산 총 규모 및 사무운영 등 지출 경비 보고
 - ※ 2016년 결산(사무국 운영) : CAD 802,085
- (2018년 예산) 2017년(\$879,500) 대비 4.8% 증가한 \$922,100로 잠정 확정, 물가상승률을 감안하여 회원국의 분담금은 1.5% 증가(2017: \$129,500 → 2018: \$131,400)
 - ※ 연회비 납부기간: 2018년 1월

○ 새로운 전문가그룹 신설

- 북태평양지역 과학적 협력을 위한 PICES-NPFC* 공동 스터디그룹(Joint PICES-NPFC Study Group for Scientific Cooperation in the North Pacific Ocean)
 - * 북태평양어업위원회(North Pacific Fisheries Commission)
 - 한국 대표 1명 추천 필요
- 해양미세플라스틱 스터디그룹*(SG-MMP)
 - * Study Group of Marine Microplastics
 - 의장: 심원준 박사(KIOST)
 - 한국 대표 추천 필요
- 해양생태계서비스 워킹그룹(WG-MES, WG41)
 - 해양생태계서비스 스터디그룹(1년 기한)에서 워킹그룹(3년 기한)으로 전환
 - ToR에 결과물이 어떻게 정책으로 전달될 것인지에 대한 내용을 추가하는 전제하에 동 워킹그룹 승인

○ 임원 선출

- 집행이사회 부의장: Enrique Curchitser(미국) 선출
※ 2018년 총회까지 1년 재임. 이후 1회 연임가능(절차규정 6조 및 9조 4항)

○ 전문가그룹 해체

- 북태평양지역 방사선의 해양환경질 평가 워킹그룹(WG30)
- 해양오염에서 부각되고 있는 주제 워킹그룹(WG31)

○ 연차총회 및 중기회의

- 2018년 중기회의: 집행이사회(1일), 과학평의회(2일) 개최. 개최일시 및 장소 미정
- 2018년 연차총회: 2018.9.22~10.1, 요코하마
- 2019년 연차총회: 2019.10.16~27, 캐나다 빅토리아
- 2020년 연차총회: 중국이 잠정적으로 개최. 빠른 시일 내에 개최여부를 확정하기로 함

○ 수상

- PICES 우스터상 수상: 김수암(부경대학교)
- 젊은 과학자 프레젠테이션 수상자: 안소연(BIO 생물분야 우수구두 발표), 김무진 (FUTURE분과 우수구두 발표), 노수연(POC 물리분과 우수포스터), 이지영(MONITOR 우수구두 발표)

□ 후속조치 및 제안

○ NPESR-2 동해편 관련

- 일본측의 수정안 제시에 따라 관련 전문가, 외교부와 면밀히 검토하여 대응 예정

○ 신설된 전문가그룹 관련

- 세 개의 전문가그룹에 대해 한국대표(최소 1명) 추천 필요. 아국 과학자가 의장으로 참여할 수 있는 스터디그룹 혹은 워킹그룹을 적극적으로 개발할 필요 있음

○ 수상 관련

- 우스터상의 경우, 장기간 PICES에 학술적으로 기여한 전문가에게 수여하는 관계로 아국의 전문가들이 지속적으로 PICES에 기여할 수 있도록 지원, 격려할 필요가 있음
- 아국 젊은 과학자 프로그램을 통하여 지원한 과학자 6명 중 3명이 우수발표상을 수여 함. 아국 젊은 과학자 지원프로그램을 지속적으로 운영할 필요가 있음
- 인턴프로그램, PICES Summer School 등의 PICES 능력배양 프로그램에도 적극적인 지원 필요

- 제4차 PICES/IOC/ICES 전세계 해양 기후변화 영향에 대한 국제 심포지움에 한국과학자 참여 지원·독려 필요
- 특별프로젝트 관련
 - 새로 재정된 특별프로젝트 정책에 따라 \$50,000 이상의 모든 특별프로젝트에 대해서 관련 전문가들의 평가, 과학평의회 승인 후 집행이사회 의결을 거치고 주기적으로 보고하는 등의 절차를 거치도록 수정됨
 - 향후 아국이 \$50,000 이상의 특별 프로젝트를 제안할 경우, 신중하게 접근할 필요가 있음



PICES-2017 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: 2017년 9월 24일(09:00~12:30), 9월 29일(13:50~18:00), 9월 30일(09:00~18:00)
- 참석자
 - Hiroaki Saito(의장), Emanuele Lorenzo(부의장, POC의장), 주세종(BIO의장), Xianshi Jin(FIS부의장), Chunlian Huo(MEQ의장), Jennifer Boldt(MONITOR의장), Keith Criddle(HD의장), Steven Bograd(FUTURE SSC공동의장), 강수경(FUTURE SSC공동의장), Igor Shevchenko(러시아대표), Motomitsu Takahashi(일본대표),
 - PICES 사무국: Harold Batchelder, Rosalie Rutka
 - 국제기구: Lev Neretin(NOWPAP), Gerard DiNardo(ISC), Vladimir Radchenko(NPAFC), Alexander Zavolokin(NPFC), Matthew Baker(NPRB), Cornelius Hammer(ICES), Salvatore Arico(IOC-UNESCO)

□ 의제 및 논의 결과

- 2017 과학평의회 주관 행사(SB 심포지엄, 포상, 폐회식) 및 절차 점검
 - 젊은 과학자 우수발표 포상 내역 및 선정 절차 재점검
 - 연차보고서를 위해 각 토픽 세션과 워크숍 진행자는 사무국에 발표 및 토론 요약 보고
 - 전문가그룹은 보고서 진행상황을 사무국에 보고 요청
- 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)
 - ISC(International Scientific Committee for Tuna and Tuna-like Species in the North

Pacific Ocean)

- NOWPAP(Northwest Pacific Action Plan)

- 그 외 타 기구(SCOR, IMBER, IOC, IOCCP, WESTPAC, NPFC, IWC, GESAMP, FE-KAN, NPRB, CBD, IPBES)와의 협력활동에 대한 경과보고 및 계획에 대해 보고 함(영문 보고서 원문 참조)

○ 진행중인 전문가그룹 중간 활동 및 계획보고: SG-MES, WG-39(활동 보고서 참조)

○ FUTURE SSC 위원회 활동 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)

○ 새로운 전문가그룹 제안서 심의

(1) 해양생태계서비스 워킹그룹(WG-MES)

- 모 위원회: HD

- 공동 의장 후보: Shang Sunny Chen(중국), Dan Lew(미국)

- 멤버 후보: Miriam O(캐나다), Jingmei Li(중국), Bengrong Peng(중국), Wei Liu(중국), Jie Chen(중국), 남정호(한국), 김종성(한국), Kazumi Wakita(일본), Shion Takemura(일본), Olga Lukyanova(러시아), Elena Anferova(러시아), Dan Lew(미국)

(2) 국제협력(PICES-NPFC) 스터디그룹 (SG-PICES/NPFC)

- 모 위원회: 과학평의회

- 기간: 1년

- 공동의장 후보: PICES와 NPFC에서 추후 추천

- 멤버 후보: Eddy Kennedy(캐나다), Yong Chen(중국), Wei Yu(중국), Toshihide Iwasaki(일본), 최석관(한국), 김은정(한국), Vladimir Kulik(러시아), Tatiana Semenova(러시아), Chih-Hao Hsieh(대만), Kari Fenske(미국), Aleksandr Zavolokin(NPFC 사무국장)

(3) 미세플라스틱 스터디그룹(SG-Microplastic)

- 모 위원회: 과학평의회

- 의장 후보: 심원준(한국)

- 기간: 1년

- 멤버 후보: Peter Ross(캐나다), Sarah Dudas(캐나다), Hideshige Takada(일본), Keiichi

Uchida(일본), Daoji Li(중국), Chengjun Sun(중국), 김승규(한국), Chelsea Rochman(미국), Jennifer Lynch(미국)

○ PICES 활동 관련 과학 저널 출판물

- 2012 PICES 토픽세션 12: 2017년 1월 Progress in Oceanography 특별호 발간
- 2014 FIS 워크숍 관련 peer-reviewed journal 특별호 발간 추진
- ‘ADRIFT’ 관련 2016 토픽세션 8: Marine Pollution Bulletin 특별호 발간 예정
- ‘ADRIFT’ 관련: Aquatic Invasions 특별호 발간 예정
- Dr. Bill Peterson 추모기념 특별호 추진
- 2017 Small pelagic fish 심포지움: Deep-sea research II 와 Marine Ecology Progress Series 특별호 발간 추진
- WG31 활동 관련 특별호 발간

○ PICES 간행물 및 전문가그룹 보고서 현황 보고(영문 보고서 참조)

- SG-Biodiversity Conservation: 최종보고서 완료
- AP-MBM PICES Scientific Report No. 50 “Spatial ecology of marine top predators in the North Pacific: Tools for integrating across datasets and identifying high use area” 완료
- S-HAB PICES Scientific Report on “East-West comparison of Pseudo-nitzschia” 최종 검토 중
- AP-CREAMS PICES Scientific Report on “Oceanography of the Yellow and East China Sea” 출판 완료 독려
- 활동 완료된 전문가그룹(SG-SEES, WG27, WG28, WG29, WG30, WG31) 최종보고서 진행 현황 점검 및 완료 추진 독려
- 특별프로젝트 “MarWeb” 보고서 PICES Scientific report로 출판 추진

○ 기타 PICES 출판물

- 특별프로젝트 “ADRIFT” 보고서 출판 추진
- 특별프로젝트(MarWeb, ADRIFT) 관련 출판물에 대한 PICES 로고 사용 승인 요청*
- PICES Scientific report # 47의 대민홍보용 브로셔 출간 예정
- 북태평양 생태계보고서 2판 Supplementary Chapter: Japan/East Sea 관련 당사국 최종 심의 중

* 일부 위원들의 PICES 특별 프로젝트에 대한 결과물의 출판과 로고사용 승인 절차에 대한 문제 제기로 향후 국제기구에서의 특별프로젝트의 수행 및 관리 규정과 출판물 승인 절차에 대한 사무국과 governing council의 검토 요청함 - 아래 agenda 참조

- 특별 프로젝트 승인, 관리 및 운영에 대한 정책
 - 실행 규칙 및 절차에 대해 논의함(사무국과 Governing council 정책 규정 초안 준비 완료)
- 2016 PICES에서 GC와 과학평의회 결정 및 권고사항 보고
- 2017년 PICES 총회 이후 컨퍼런스·심포지엄, summer school/capacity building 지원 계획
 - IMBIZO-5(미국, 2017.10), La Paz PTA 국제심포지움(멕시코, 2018.04), 4차 국제 기후 변화 심포지엄(미국, 2018.06), 제2차 MSEAS 심포지엄(일본, 2020), PEEC 2018 컨퍼런스(캐나다, 2018.03)
 - PICES AP-NPCOOS Summer School(캐나다, 2018.07), 제7차 SOLAS Summer School(프랑스, 2018.07), IMBER ClimEco6 Summer School(가나, 2018. 08), PICES AP-CREAMS summer school(한국, 2018.08)
- 전문가그룹 멤버 추천
 - WG32는 Tatiana Dautova 박사(러시아)를 추가멤버로 추천함
 - WG32는 Go Suzuki 박사(일본)을 Takeo Kurihara(일본)로 멤버 교체 요청함
 - S-MBM는 Dr. Rob Suryan and Jaime Jahncke(미국)를 추가멤버로 추천함
 - MEQ는 미국 멤버의 적극적인 활동참여를 요청함
 - BIO는 중국과 러시아 멤버의 적극적인 활동참여를 요청함
 - S-HAB는 Polina Kameneca(러시아)를 S-HAB 멤버로 추가하고자 함
 - MONITOR는 Charles Hannah(캐나다)를 Tetjana Ross(캐나다)로 멤버 교체를 요청함
 - MONITOR는 Jeffrey Napp 박사(미국)의 참여중지에 따른 미국멤버 추천을 요청함
 - AP-CREAMS는 장경일 박사(한국)를 김규범 교수(한국)로, David Checkley 박사(미국)를 Ryan Rykaczewski 박사(미국)으로 멤버 교체를 요청함
 - S-CC의 Ex-officio 멤버인 C.T.A. Chen 교수(IGBP 대표)의 활동 종료 요청함
 - SB는 Lidia Yebra 박사(ICES 대표)를 WG37의 Ex-officio로 승인함
- 분과위원장 선출 결과
 - FIS분과 신임 위원장 Xianshi Jin 박사(중국)와 부위원장 Jacquelynne King 박사(캐나다) 선출
 - S-CCME 공동 위원장인 Anne Hollowed 박사(미국) 후임으로 Jacquelynne King 박사(캐나다) 선출
 - MEQ 부위원장 Darlene Smith(캐나다) 종료로 Thomas Therriault 박사(캐나다) 선출

- PICES 수행 특별 프로젝트(MarWeb, ADRIFT) 활동 보고(출판물 승인 요청)
- PICES-2018 준비사항 보고
 - 개최지 및 일정: 일본 요코하마 2018.10.28~11.04(TBD)
 - 주요 테마 ‘Toward intergrated understanding of ecosystem variability in the North Pacific’로 동의
 - 애로사항으로 개최장소가 협소하여 토픽세션/워크숍/개막식 등 일정과 룸 배치에 주의를 요함
 - 12개 Topic 및 5 Paper 세션 제안(GC에서 결정)
 - ISB-2018 워크숍 장소 및 일정: 하와이, 제주도, 러시아 등이 언급되었으나, 최종결정되지 않음. 제주도의 경우 모든 참석자들이 무비자로 참석가능하다는 장점이 언급되었음. 2018년 NPESR3 intersessionl 워크숍과 연계 필요
- PICES-2018 비즈니스 회의 추천(안)

Subsidiary body	Business Meeting (day)
Joint PICES/NPFC SG (pending approval)	1
SG- MMP (pending approval)	1
WG-MES/WG 41 (pending approval)	1
S-CC	1
S-HAB	1
S-CCME	0.5
S-MBM	1
WG 32	1
PICES/ICES WG 33	0.5
PICES/ISC WG 34	0.5
WG 35 (NPESR3)	1
WG 36*	1
WG 37	0.5
WG 38	1
WG 39 (PICES/ICES/PAME)	1
WG 40*	1
AP-CREAMS	1

Subsidiary body	Business Meeting (day)
AP-NPCOOS	0.5
AP-NIS	1
FUTURE SSC	1
SB lunch meeting (Sunday)	3 h Sun.; 3 h Fri.; 1 day Sat.
Committees ' 7	2 h Sun.; 4 h Wed.

* request that WG 36 and WG 40 share 2 hours of their business meetings to identify synergies and collaborations

○ PICES-2018 토평션 세션 추천(안)

Session	Short name	Duration	Status
	Science Board Symposium	0.75	
	Indo-Pacific	0.5	Rejected by Science Board
1	Fish production	1	
2	Science communication	0.5	
3	Biogenic habitats	1	
4	Meso-/submeso-scale processes	1	
5	FUTURE of PICES	0.5	
6	Ecological responses	1	
7	Ocean mixing	1	Merged with 10-Internal tides
8	Science and policy	0.5	
9	Ocean acidification	1	
10	Internal tides		Merged with 7-Ocean mixing
11	Pelagic and forage species	1	
12	Highly migratory species	1	
	BIO-P	0.5	
	FIS-P	0.5	
	MEQ-P	0.5	
	POC-P	0.5	
	HD-P	0.5	

* The abstracts for 10 and 14 below will be merged but are included here for completeness.

○ PICES-2018 워크숍 추천(안)

Session	Short name	Duration
W1	Gelatinous zooplankton	1
W2	Central Arctic Ocean	0.5
W3	Data management	1
W4	Synthesizing climate change impacts	1
W5	Common reference points	1
W6	Secondary production	0.5
W7	Diets	1
W8	Toxic dinoflagellates	1

3 BIO

※ Biological Oceanography Committee

□ 정부대표

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

□ 개요

- 일시: 2017년 09월 24일(18:00~20:00), 27일(14:00~18:30)
- 참석자: 의장-주세종(KIOST/한국), 문혜원(MABIK/한국), Angelica Pena(DFO/캐나다), Akashi Sastri(DFO/캐나다), Michael Seki(NOAA/미국), Ryan Rykaczewski(사우스 캐롤라이나대학/미국), Kaoru Hattori(홋카이도 국립수산연구소/일본), Motomitsu Takahashi(FRA/일본), Jinhui Wang(SOA, 중국), Kirill Kivva(VNIRO/러시아), Tatiana Dautova(FEFU/러시아)
- 대표 미참석 국가: 러시아, 중국

□ 의제 및 논의 결과

- 생물분과 신입 위원 소개
 - 중국: Yingjie Liu 박사(불참)
- 2017 총회 해양생물분과 산하의 세션 및 워크숍 overview
 - S6, S12, S13, W1, W6, BIO paper 세션
 - Best early career scientist presentation award 심사위원 선정 및 심사결과 제출: 구두(S12 - 주세종, Kaoru Hattori, Motomitsu Takahashi; BIO-P - Michael Seki, Angelica Pena, 주세종) 및 포스터(BIO-P-Akashi Sastri, 주세종)
 - ※ BIO 젊은 과학자 우수 발표상 선정 및 수상 : 구두발표 - 안소연(한국), 포스터 발표 - Yusuke Ikawa(일본)
- 총회산하 세션 및 섹션 심포지움, 출판물, 보고서 등 보고
 - PICES/ICES 제3회 젊은 과학자 컨퍼런스 ‘Climate, Oceans and Society Challenges &

- Opportunities’(한국, 2017.5.20~6.2) 보고(주세종 박사)
- PICES/NRC/IMBER ESSAS Open Science Meeting(노르웨이, 2017.6.11~15): PICES 대표로 Dr. Saitoh 참석
 - PICES 과학보고서(49, 50권) 출간(49: MBM-AP 최종보고서; 50: SG-Biodiversity Conservation 최종보고서)
 - WG-28(Motomitsu Takahashi 보고)와 WG-29(장찬주 박사 보고) 최종보고서 2017년 말까지 제출 예정(편집자 최종 확인 중)
- 현재 활동 중인 해양생물분과 산하 세션 및 워킹 그룹 진행 · 계획 보고
- S-CCME(Dr. Hollowed), S-CC(Dr. Christian), S-MBM(Dr. Hattori), WG-33(Dr. Rivkin), WG-37(Dr. Sastri), WG-32(의장 불참)
- FUTURE 프로그램 경과 보고(강수경 박사)
- WG-NPESR 워크숍 결과 및 진행 보고(유신재 박사)
- 새로 요청한 전문가그룹 프로포잘 리뷰 및 심의
- 2개 연구그룹(Joint PICES-NPFC Scientific Cooperation in the North Pacific Ocean; Marine Microplastics)
 - 1개 워킹그룹(해양생태계서비스: WG-MES)
 - 요청한 모든 전문가그룹 BIO 지원 결정
- 2018 북태평양해양과학기구 총회(요코하마, 일본, 10월)를 위해 제안된 토픽 세션과 워크숍에 대한 생물분과 지원 선정
- 제안된 14개 토픽세션 중 5개 지원, 8개 워크숍 중 4개 상위 순위 지원 추천
- * BIO 추천 토픽세션 및 워크숍 목록:

<토픽세션>

1. *“Indicators for assessing and monitoring biodiversity of biogenic habitats”*
2. *“Fish production through food web dynamics in the boundary current systems”*
3. *“Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps”*
4. *“Applying Ecosystem Considerations in Science Advice for Managing Highly Migratory Species”*
5. *“Ocean mixing processes and its impact on biogeochemistry, climate and marine ecosystems”*

<워크숍>

1. *“Diets, consumption, and abundance of marine birds and mammals in the North Pacific”*
2. *“Synthesizing projected climate change impacts in the north Pacific”*
3. *“Regional evaluation of secondary production observations and application of methodology in the North Pacific”*
4. *“Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean”*

○ 2017년 총회 이후 제안된 intersessional 워크숍 리뷰

- 제안된 6개 intersessional 워크숍 중 생물분과는 2개 워크숍 지원 추천 결정: 2개의 지원 워크숍 모두 제4차 기후변화 심포지움* (전·후 동일 장소에서 개최 예정)

* PICES/ICES/IOC 제4차 기후변화 심포지움 ‘Effects of climate change on the world oceans’ (2018년 6월 4~8일, 워싱턴 DC, 미국). PICES 대표로 Anne Hollowed 과학조정위원(생물분과 위원 Angelica Pena 박사 및 다수 참석)



생물해양학분과 위원회 참석자 단체 사진

4 FIS

※ Fishery Science Committee

□ 정부대표

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

□ 개요

○ 일시: 2017년 9월 24일(18:00~19:00) 9월 27일(14:00~18:00)

○ 참석자

- FIS members: Jacquelynne J. King(Canada), Xianshi Jin(Vice-Chairman, China), Naoki Tojo(Japan), Tetsuhiro Funamoto(Japan), Hirota Masahito(Japan), 정석근(Korea), Mikhail Stepanenko(Russia), Xiujuan Shan(China), Jie Kong(China)
- Observers: Gerard DiNardo(USA), Anne Hollowed(USA), 강수경(Korea), Vladimir Randchenko(Russia), Chi-Lu Sun(Taiwan), Yongjun Tian(China) 외 추가

□ 의제 및 논의 결과

○ 참석자 소개

- 비자 문제로 미국측 E.A. Logerwell(미국, 의장)와 J. Field(미국) 참석 못하고, X. Jin(중국, 부의장)이 회의 주재

○ 멤버구성 변화

- Prof. Jie Kong, replacing Prof. Qingyin Wang and representing China
- Dr. Naoki Tojo, replacing Dr. Kazushi Miyashita and representing Japan
- L. Brown(Canada) FIS 회원에서 사퇴

○ Working group 35

- S. Yoo(Korea) 소개와 협조 요청
- 북태평양생태계보고서 3판. NPESR3 2009~2015
- ETSOs(Ecosystem Time Series Observations)

- 시상 심사위원 Volunteers for Award Committees
 - Poster(Wednesday): Xiujuan Shan, Jackie King
 - Oral: Jin, Japan
- FIS 의장 · 부의장 새로 선출
 - 의장 X. Jin(중국), 부의장 J. King(캐나다)
- FUTURE 활동 보고
 - 강수경(Korea)
- FIS가 지원하는 전문가그룹 현황 보고
 - S-CCME: Joint PICES/ICES Section on “Climate Change Effects of Marine Ecosystems”. Anne Hollowed. Jackie King
 - Action Item: Does FIS support the S-CCME requests(if any)?
 - WG 34: Joint PICES/ICS Working Group on Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish. TBD. 수과원 대표(권유정, 이성일, 안두해) 1명도 참석 안함. 강수경 박사 대신 참석. 비자 문제로 ISC 참석 저조
 - Action Item: Does FIS support the WG34 requests(if any)?
 - A new project framework by Mitsutaku MAKINO. Japanese government 지원, MAFF, 3 yr April 2017, CND\$100K, ODA, 휴대폰 기술로 어업활동 모니터링. 인도네시아 대상
- 다른 프로그램이나 기구와 관계
 - ICES ASC 2018 list of theme sessions for PICES co-sponsoring(TBD)
 - Action Item: Which theme sessions do FIS recommend PICES supports?
 - ICES/PICES Strategic Planning Team(Attachment 1 Victoria Meeting Report)
 - Early Career Scientist(ECS) Conference. May 29-June 2, 2017 in Busan, Korea (Attachment 2)
 - Aquaculture Steering Group. This is a new Steering Group and is one of five currently sitting within SCICOM and overseeing the work of expert groups. Mike Rust is Chair of the Steering Group. Expert Groups in the Aquaculture Steering Group, cover: Environmental interactions of aquaculture, Scenario planning for aquaculture, Ecological carrying capacity in aquaculture
 - North Pacific Anadromous Fish Commission, International Year of the Salmon(IYS) update. Vladimir Radchenko

- Action Item: Does FIS support the NPAFC requests(if any)?
- North Pacific Fisheries Commission, Pacific Saury Stock Assessment Workshop(13~15 December 2016 at Busan, Korea). Sukgeun Jung(Korea) attendend for PICES.
- WG 39 ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment for the Central Arctic Ocean(Attachment 3)
- Transition Symposium, La Paz Mexico, PICES (North Pacific Marine Science Organization); CIBNOR(Centro de Investigaciones Biologicas del Noroeste, S,C), Mexico; and CICIMAR(Centro Interdisciplinario de Ciencias Marinas), Mexico. (Attachment 4)
- The 4th Climate Change Symposium, PICES, ICES, IOC. Washington, DC during June 4-8, 2018. The primary contact is Dr. Jason Link(NOAA, USA). The SSC members (chair of SSC is Anne Hollowed) are known as are the conveners. <http://meetings.pices.int/meetings/international/2018/climate-change/Background>. Theme Session Proposals are now closed

○ 옵서버 활동 보고

- International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean(ISC) Gerard DiNardo
- North Pacific Anadromous Fish Commission(NPAFC) Jennifer Chang
- North Pacific Fisheries Commission(NPFC) Alexander Zavolokin(need expert from Fis to SG)
- Action Item: Does FIS endorse the Observers' requests for PICES financial support or other involvement(if any)?

○ PICES 2018

- Yokohama, Japan, dates TBD. The theme is TBD
- FIS committee rankings of Topic Sessions and Workshops.
- Action Item: Which proposals does FIS support? Suggest revisions to proposals, if necessary

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

- 의사소통에서 약간의 오해가 있었지만 중국 Jie Kong이 양식에 관한 study group을 제안함. 회의가 끝나서 추후 이메일을 통해서 논의하기로 함



FIS 회의장면

□ 의견/평가

- 중국측 참여가 크게 늘어남
 - FIS 의장으로 선출된 중국황해수산연구소 X. Jin 소장의 적극적인 지원과 지지 때문 인지는 몰라도 중국측 수산분야 젊은 과학자들 참석이 크게 늘고, 발표 수준이 크게 향상됨
 - 이에 대비되는 우리나라 국립수산과학원 수산분야는 참석과 활동이 매우 저조하여 해양수산부 주도로 장기적인 대책이 필요.
- FIS 한국 대표 교체 필요
 - 장창익 교수(부경대) 곧 정년퇴임 예정
 - 이재봉 박사(수과원) 내부 사정으로 3년 연속 불참

5 HD

※ Human Dimension Committee

□ 정부대표

참가부문(역할)	성명	소속/직급
HD	권석재	한국해양과학기술원/책임연구원
HD	정명화	한국해양수산개발원/전문연구원

□ 개요

- 일시: 2017년 9월 24일(18:00~20:00)
- 참석자: Keith R. Criddle(미국/의장), Ian Perry(캐나다), Jingmei Li(중국), Robert Blaish(일본), Olga Lukyanova(Tinro/러시아), Tanya Semerover(Tinro/러시아), Ekaterina Kurilova(Tinro/러시아), 권석재(KIOST/한국), 정명화(KMI/한국)

□ 의제 및 논의 결과

- 그간 HD Committee의 설립 배경, HD 성과, SG-MES 보고 순으로 논의
- 설립 배경
 - 워킹그룹(2004~2009), 스터디그룹(2009~2011)을 거쳐 2016년 상임위원회(committee)로 발전함
 - 북태평양 지역의 해양생태계와 해양을 이용하는 사람, 커뮤니티, 경제간 역학 관계에 대한 이해도 제고를 위한 학제간 연구 증진을 주요 목적으로 함
 - 즉, 해양생태계 분석에서 인류적 관점을 고려한 방법론과 실증적 연구에 대한 필요성을 인지하고 사회·경제·생물학적 관점에서 지속가능한 발전 방법을 모색하고자 함
 - 중점적 연구 분야는 생태계 분석에서 human 차원을 포함시킨 연구의 방법론 및 실증적 연구임
- HD TOR 확인
 - (TOR-1a) 각 국가 및 지역의 사회적 목적과 니즈의 차이점을 명료화(clarify)
 - (TOR-1b) FUTURE와 PICES의 성과물에 대한 잠재적 수혜자 inventory 개발
 - (TOR-2) 기후변화와 같은 글로벌 환경 변화에 대응한 해양의 사회·생물학적(social-ecological) 시스템의 결과 및 대응방안 마련

- (TOR-3) NPESR-3 보고서 발간
- (TOR-4) ICES, IMBER 등 국제기구, 학계간 협력 활성화, 해양생태계에 대한 HD 차원의 심포지엄 구성·개최

○ HD의 주요 성과

- (TOR-1 관련) 일본 MAFF의 재정 지원을 받아 캐나다 측 Ian Perry와 일본 공동의 「해양생태계 건강의 및 인류 웰빙에 관한 프로젝트(2013)」 등 총 7개 프로젝트 수행
- (TOR-2 및 TOR-4) 미국의 「통합생태계 평가에서의 HD를 포함한 해양 사회·경제적 시스템 이해(2016)」 외 2건 수행
- (TOR-3) 미국, 일본 공동 「북태평양 생태계 상황 및 변화에 대한 사회경제적 지표 (2013)」 외 2건 수행



HD 회의 장면

□ 의견/평가

- 향후 HD에서 우리나라 활동 계획 등 전반적인 의견 개진

□ 개요

- 일시: 2017년 9월 26일(14:00~18:00)
- 참석자: Keith R. Criddle(미국/의장), Mitsutaku Makino(일본), Ian Perry(캐나다), 권석재(KIOST/한국), 정명화(KMI/한국) 외

□ HD paper 발표

- (오전 세션) PICES-MAFF 프로젝트 성과 등에 대한 발표
 - ‘해양생태계 건강 및 인간 웰빙’ 등 인도네시아, 과테말라에서 수행된 프로젝트 소개
 - 사회 - 생태계 체계에서 다양한 요소(stressors)들의 상호 연계, 역학관계의 이해 및 해결의 중요성, 역량개발 프로젝트에서 현지 이해관계자의 니즈(수요)와 관점의 통합(융합)의 중요성 제시
- (오후 세션) HD 연구의 학문적 접근, 연구의 깊이와 폭이 넓어진 특징
 - 해양 공간계획, 시민과학(citizen science), 생태계 인식제고, 과학 커뮤니티, 입어 제한을 위한 감척의 편익 분석, 트롤 어업에서 부수어획 감축을 위한 인센티브 제도 등 다양한 주제 발표

발표자	발표주제
Suhendar I Sachoemar	Sato-umi concept and sustainable aquaculture implementation in the coastal area of Indonesia
Chares G. Trick	When the nets leave the waters: A community needs assessment for the lost fishing communities of Pacific coastal Guatemala - Balancing ocean and human health
Wei Liu	An index system for assessment of the performance of construction strategies marine ecological civilization
S. Kim Juniper	Development of broadly distributable metrics of ocean conditions using real-time data and marine ‘community-observatories’ along the British Columbia coast
Konstantin Osipov	Features of media-covering and promotion of marine and fishery researches in Russia
Stephen Kasperski	Groundtruthing social vulnerability indices of Alaska fishing communities
Suhendar I Sachoemar	Integrated multi-trophic aquaculture in traditional pond aquaculture, Indonesia
Mitsutaku Makino	PICES-Japan MAFF Project “MarWeB”
Keith R. Criddle	Retrospective benefit-cost analysis of federally-funded buyback programs for Southeast Alaska salmon purse seine permits
Keith R. Criddle	The economic importance of wild Pacific salmon
Amrtaġjuti V. Sereda	Towards international cooperation in the development of Marine Spatial Plans for the North Pacific: Economic, social, and environmental dimensions



□ 개요

- 일시: 2017년 9월 27일(14:00~18:00)
- 참석자: Keith R. Criddle(미국/의장), Mitsutaku Makino(일본), Ian Perry(캐나다), Jingmei Li(중국), Olga Lukyanova(Tinro/러시아), Tanya Semerover(Tinro/러시아), 권석재(KIOST/한국), 정명화(KMI/한국)

□ 의제 및 논의 결과

- Topic 세션, 2018년 PICES 워크숍 제안서 검토
 - (Topic 세션) ① ‘지속가능한 생태계서비스를 위한 과학과 정책 통합(중국, HD)’ 및 ② ‘북태평양해양과학의 과학 커뮤니케이션(일본, FUTURE, SSC, HD, MEQ)’이 제안
→ 두 주제 모두 과학위원회(SB)에 최우선과제(high priority)로 추천
 - (Intersessional 워크숍) ① ‘북태평양 해양생태계서비스의 종(stock) 관리 - 샘플 채취와 방법론 검토(중국)’, ② ‘북태평양 해역 기후변화 전망과 HAB 전망에 대한 적용(중국) 검토함
→ ① 주제는 ‘최우선’, ② 주제는 ‘중간’으로 과학위원회에 추천
 - (Expert Group 제안서) ‘해양생태계서비스(MES) 워킹그룹 설립에 관한 제안서’ 검토
- 일본의 「A New PICES-MAFF Project」 소개
 - 해당 프로젝트는 일본 농림수산성의 지원으로 “Building Capacity for Coastal Monitoring by local small-scale Fishers” 이뤄짐(2017년 4월~2020년 3월)
 - 해당 프로젝트의 목적은 현지 소규모 어업인들이 연안 생태계와 연안 어업을 모니터링할 수 있는 역량 강화이며, 이를 통한 보다 나은 어업관리와 커뮤니티의 적응력 향상에 기여코자 함
 - 대상 지역 : 인도네시아
 - 사업 주요 내용 : 인도네시아 소규모 어업인의 생태계 및 어업 모니터링을 위한 모바일 기반 기술 도입, 현지 어업인 및 정부 교육·훈련

○ HD의 향후 계획

국가/도시	일 시	행사명	주 제
중국 선젠	2018.12.11~15	생태계서비스 파트너십	생태계서비스 평가와 사회 과학의 역할
미국/포틀랜드	2018.2.11~16	해양과학회의	해양 사회-생태계 시스템 평가를 위한 학제간 연구
미국/ 캘리포니아	2018.3.22~29	자원자본심포지엄 (Natural capital symposium)	
멕시코/ 라파즈	2018.4.24~26	태평양 잠정지역(transition areas) 변화 이해	세션2: 북태평양 잠정지역 고도 회유성 자원 및 경계왕래성 자원 관리의 도전과제 세션6: 연안서식지의 잠정 지역
미국/ 알래스카	2018.5.21~28	미국 수산학회 (American Fisheries Society)	-
미국/워싱턴	2018.6.4~8	세계 해양의 기후변화 영향에 관한 제4차 국제심포지엄	-
미국/시애틀	2018.7.17~20	제19차 세계 수산경제 및 무역학회	-
일본/요코하마	2018.10.25~11.4	PICES HD회의	-
일본/요코하마	2020. 5월 또는 6월	MSEAS II	-

- ETSO 제출 방법 소개
- 11월 30일까지 제출

□ 의견/평가

- 2018년 PICES 연례회의 개최 전 HD 워크숍 한국 개최 제안
- 일시 및 장소: 2018년 9월(잠정)/부산
- 주제(안): HD의 현재와 미래
- 참석자 범위(안): HD 의장(미국), Dr. Ian Perry(캐나다), Dr. Shang Chen(중국), 문대연 (북태평양수산기구 사무총장) 등
- 주최: KIOST, MABIK, KMI



HD 회의(9.27)

6 MEQ

※ Marine Environmental Quality Committee

□ 정부대표

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

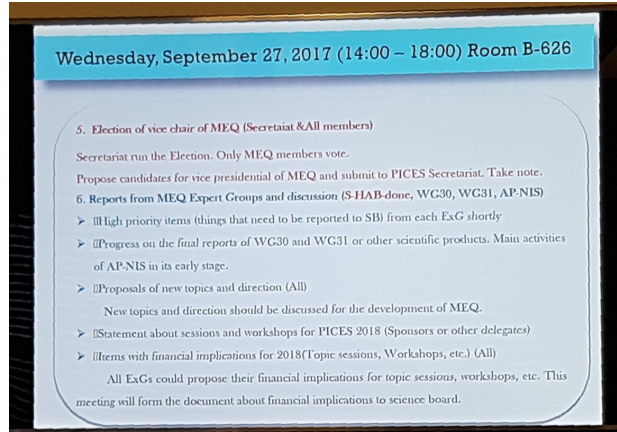
□ 개요

- 일시: 2017년 9월 24일(18:00~20:00, 1차회의), 9월 27일(14:00~18:00, 2차회의)
- 참석자
 - 1차 회의: Chuanlin Huo(의장, SOA/중국), 최민규(NIFS/한국), 임월애(NIFS/한국), 홍성진(충남대/한국), Thomas Therriault(FOC/캐나다), Peter Kershaw(GESAMP/UK), Chunhou Li(SCSFRI/중국), Dexing Wu(중국해양대/중국), Toyomitsu Horii(NRIFS/일본), Ichiro Imai(홋카이도대/일본), Hideaki Maki(NIES/일본), Olga Lukyanova(PSRFC/러시아) 등
 - 2차 회의: Chuanlin Huo(의장, SOA/중국), 최민규(NIFS/한국), 임월애(NIFS/한국), 홍성진(충남대/한국), Thomas Therriault(FOC/캐나다), Andrea White(FOC/캐나다), Peter Kershaw(GESAMP/UK), Chunhou Li(SCSFRI/중국), Toyomitsu Horii(NRIFS/일본), Ichiro Imai(홋카이도대/일본), Hideaki Maki(NIES/일본), Olga Lukyanova(PSRFC/러시아) 등

□ 의제 및 논의 결과

- 각 나라의 기존 위원 및 새 위원 자기 소개, MEQ 회의의 의제 소개(첨부파일)
- MEQ 부의장 선출에 대한 토의
 - East/West balance를 위해 미국 또는 캐나다 국가에서 부의장이 선출 되어야 함
 - 최종 만장일치로 캐나다의 Thomas Therriault이 부의장으로 선출됨
- MEQ의 study group 및 working group 수행 경과 보고
 - S-HAB, WG-30, WG-31, AP-NIS 수행 경과 보고
 - S-HAB 그룹: 여러 가지 2018년도 워크숍 및 토크 세션 제안. 제한된 예산으로 인해

- 우선순위 도출 필요
- WG-30(방사능): 후속 연구를 제안하였으나 추가적인 진행을 놓고 의견이 나뉘었음. 일본, 캐나다 등 반대, 중국은 찬성, 한국은 중립, 향후 추가 토의 필요, 구체적인 다른 목적 토픽 도출 필요
- WG-31(오염): 활동 종료
- MEQ의 방향과 다른 그룹 또는 기구와의 연결성 토의
 - GESAMP(Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection)의 Peter Kershaw 박사의 발표, GESAMP에서 수행중인 study에 대해 소개
 - WG-35(Working Group on Third North Pacific Ecosystem Status Report)의 유신재 (KIOST/한국) 박사님 발표, 현황 레포트 발간을 위한 데이터 협조 요청
- 2018 PICES의 topic session, work shop의 우선순위 결정
 - 2018 일본 요코하마에서 개최될 연차총회의 topic session과 워크숍의 우선순위 토의를 통해 결정
 - MEQ topic과 관련된 세션 및 워크샵이 많이 없어서 우선적으로 추천
 - 추후 MEQ에서 결정된 우선순위를 이용, 의장이 science board 미팅에서 최종적으로 토의, 결정 예정
- MEQ best presentation award 선정
 - S2 Microplastics in marine environments 및 MEQ paper session에서 발표한 구두 및 포스터 논문들 중 early career scientists를 대상으로 평가
 - Huo(중국), Maki(일본), White(캐나다), 홍성진(한국)이 심사위원으로 참여
 - 최종적으로 금요일에 모든 발표가 끝난 후 심사위원 토의를 통해 구두 1인, 포스터 1인을 수상자로 선정
- MEQ의 새로운 스터디 그룹에 대한 코멘트 요청(이메일)
 - SG-MMP, Study group on marine microplastics 새로 제안됨
 - 기간: 1년(2018년 1월~12월)
 - 의장 및 멤버십: 심원준(KIOST/한국) 외 9인
 - terms of references에 대한 코멘트 요청



MEQ 회의 사진

□ 의견/평가

○ 특이사항 없음

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

□ 개요

- 일시: 2017년 9월 24일(18:00~20:30), 9월 27일(14:00~18:00)
- 참석자
 - Jennifer Boldt(FOC/캐나다, 의장), Sonia D. Batten(SAHFOS/캐나다), Tetjana Ross(IOUS/캐나다), Jilong Li(CAFS/중국), 김성용(KAIST/한국), 박희운(KHOA/한국), 한인성(NIFS/한국), Vladimir V. Kulik(PRFC TINRO-Center/러시아), Vyacheslaw Lobanov(POI/러시아), Sei-Ichi Saitoh(Hokkaido Univ./일본), Kazuaki Tadokoro(FRA/일본)

□ 의제 및 논의 결과

- FUTURE SSC 활동보고
 - WG36, WG35과 WG40의 상위 커미티로 지정
 - 젊은과학자 참여 독려 및 워크샵 계획
 - FUTURE 종합내용을 논문으로 출간 계획
 - FUTURE Mini-symposium은 Plenary 및 워크샵으로 대체
- AP-NPCOOS 활동보고
 - 국가별 연안관측 시스템에 대한 소개 및 성공사례를 논문으로 출간준비
 - Journal of Operational Oceanography를 고려중
 - 한국, 미국, 일본, 캐나다의 각국 대표로부터 준비의사 확인
 - 논문준비를 위한 잠정적인 시한으로 논문의 주요 template 제공(2017.10.1), 초록, 저자, 제목 선정(2017.11.1), 논문 작성 완료(2018.3.1), 논문 취합 및 세부 조정후 투고(2018.4.1.)

○ 2018 Summer school 세부계획 논의

- 2018년 7/9~7/13, 빅토리아 대학교
- 25명 미만의 박사과정 졸업예정자 및 젊은 과학자(박사학위후 5년내)의 PICES내 회원을 대상으로 다양한 해양자료의 분석과 현장실습을 계획하고 있음
- 세부일정과 summer school 중 이동경로는 아래 표와 사진 참조
- 지원 및 선정계획은 PICES 홈페이지를 통해 공지(2018.1.1), 지원서 마감(2018.3.15), 참석자 결정(2018.4.1), 참석자 재확인(2018.4.15)

	SUN July 8	MON July 9	TUE July 10	WED July 11	THR July 12	FRI July 13
AM	Students arrive	Time Series: Dewey	Acoustics: Gauthier	SOVI: Costa CORI: Ross	Coast.Oceanog: Hannah/ Klymak/Pawlowicz	Biol.Ocean: Dower/ Perry?
Lunch	Students arrive	At IOS	At IOS	At Vancouver Aquarium	At UVic	At UVic
PM	Check-in/ Welcome dinner	MSV John Strickland /Oceans 2.0/Marine Technology Centre	MSV John Strickland/ Oceans 2.0/Marine Technology Centre	Queen of Oak Bay: Deep Bay Marine Field Station: Dudas/ Evans?	MSV John Strickland & VENUS data processing	Presentations
Dinner	Check-in/ Welcome dinner			Dinner at Deep Bay Marine Field Station	MSV John Strickland & VENUS data processing	Dinner/ Drinks/ Photo

여름학교 세부일정

○ AP-CREAMS/WG-NPESR 활동보고

- NPESR보고서를 위한 ETSO 자료 생성
- SB에서 WG-NPESR3 추천
- WG-35 진행상황 보고(TCODE, MONITOR, NPESR-1,-2):How do we build the next generation North Pacific Ecosystem Status Report?
- NPESR-3 출간계획(1차 초안 2017.11; 워크샵 2018.5; 리포트 2018.8; 출간 2019.봄)

○ 2018년 제안된 sessions, workshops 및 inter-sessional workshops에 대한 우선순위 지정

- 제안된 8개의 topic sessions, 5개의 workshop 및 3개의 inter-sessional workshop의 우선순위 지정을 위한 각국의 의견 청취
- Topic Session은 #14, 15번이 MONITOR 제안과제로 높은 우선 순위를 부여하고, 해양 산성화 문제의 심각성에 따라 #13에도 높은 우선순위 부여 필요성을 제기함(Han) → # 6, 8, 9, 13, 14, 15를 높은 우선순위로 평가함

- Workshop은 # 2, 3, 5를 높은 우선순위로 평가함
- Inter-Sessional Workshop은 # 2, 5를 높은 우선순위로 평가함
- 새로운 Working Group에 대한 의견 청취
 - e-mail을 통하여 회람한 새로운 WG(WG on Marine Ecosystem Services)에 대한 각 회원국의 의견 청취
 - Proposal에 대한 각 회원국의 특별한 이견이 없음을 확인
- PICES 관련 기구/프로그램/기관의 연차 보고
 - CPR(Continuous Plankton Recorder)/SAHFOS(Sir Alister Hardy Foundation for Ocean Science) (Batten/Canada)
 - CPR program: 2017년 북태평양 횡단 및 태평양 동부 해역에 대한 플랑크톤 연속 측정 관측에 대한 결과 보고
 - SAHFOS: CPR 모체 기구로서 태평양 관측에서 얻어진 결과 및 예산 운용 계획 등에 대한 보고
 - GACS(Global Alliance of CPR Surveys): 전 세계를 대상으로 CPR 관측에 대한 현황 및 주요 연구 방향 등에 대한 보고
 - ESSAS(Ecosystem Study on the Sub-Arctic and Arctic Seas) (Saitoh/Japan)
 - ESSAS의 2017년 주요 활동 및 개최 학술대회 소개, 현장 관측 내용 등을 소개
 - NEAR-GOOS(North East Asian Regional GOOS) (Lobanov/Russia)
 - NEAR-GOOS 각 국 data 취합 현황 및 경로, 동해의 Ferryboat monitoring 계획, 동해 2개 관측 라인에 대한 집중 모니터링에 대한 소개
 - AOOS(Alaska Ocean Observing System) (Boldt/Canada)
 - * 미국의 Lisa Eisner의 불참에 따라 Chair가 대리 발표
 - AOOS의 지속적인 모니터링 현황, GPS를 활용한 새로운 해수면 관측 기법, 해양산성화 관측, 새로운 data set과 관련된 웹사이트 구축 등에 대하여 발표
 - GOOS BIO-ECO(Batten/Canada)
 - EOVS(Essential Ocean Variables), IMSOO(Implementation of Multidisciplinary Sustained Ocean Observation) Workshop 등에 대한 소개
 - WOA(World Ocean Assessment) II (Boldt/Canada)
 - * 일본의 Sanae Chiba의 불참에 따라 Chair가 대리 발표
 - 사회·경제적 분야를 포함한 해양환경의 현황을 평가하는 UNRP(UN Regular Process)의 전 지구적 리포트에 관한 소개

○ PICES HD(Human Dimension) committee와의 연계

- HD committee의 부의장인 Mitsutaku Makino가 PICES와 MAFF의 공동 프로젝트로 일본에서 시작한 “Capacity building for coastal monitoring by local small-scale fisheries” 사업(ODA로 개발도상국을 대상으로 추진)에 대한 설명과 MONITOR 회원의 관심과 참여를 요청

○ Country Reports

- Canada(Boldt): 2016년과 2017년 캐나다 태평양 연안의 전반적인 해양의 특성과 각 관측 프로그램에 대한 소개
 - Line-P 관측: 1950년대부터 시작되어 연간 3회의 관측이 수행되며, 물리, 생지화학 및 플랑크톤 역학에 대한 조사를 주로 수행
 - 북동태평양 대륙연안부 관측: 매년 4회의 관측이 수행되고 있으며, 동물플랑크톤, 물리학적 변동 및 기후변동과의 연관성 규명을 주로 수행
 - Georgia 해협 모니터링: 1년에 4회 관측이 수행되고 있으며, 물리학적 연구, 해수 유동, 영양염, 식물플랑크톤 및 유기물의 연직 플럭스 연구를 주로 수행
 - Bowie Seamount 모니터링: 2008년부터 ROV 등을 활용한 200m 상층부의 서식지 및 저서생물에 대한 연구를 주로 수행
 - Georgia 해협 동물플랑크톤 관측: Georgia 해협에서의 새우 및 기타 종의 풍도 변화를 파악하기 위한 조사를 수행
 - 생태계 기반 조사: small mesh multi-species survey, 태평양 연어의 치어 및 성어 조사, La Perouse 표층역 생태계 조사, 청어 치어 및 연안역 표층역 조사, 태평양 정어리 조사, Integrated 표층 생태계 조사 등을 소개
 - 수산자원 평가 조사: 저서어종 트롤 조사, 태평양 민대구 음향 조사, 기타 어종 조사, 연어 풍도 조사, 던전크랩 trap 조사, 녹색성게 조사, 해양 포유류 조사, 바다표범 조사, 연안 새우 평가 조사, 대하 조사, 북방 전복에 대한 모니터링, 올림피아 굴에 대한 모니터링, 해삼 조사 등에 대한 소개
 - 그 밖에 음향 기반 조사, ARGO drifter, CPR, OON(Ocean Observatory Networks), 브리티시 컬럼비아 연안 정점 해양 프로그램 등에 대한 소개를 수행함
- China(Li): 중국 CAF(Chinese Academic of Fishery Science)에서 수행하고 있는 4개의 모니터링에 대한 소개를 수행
 - 연안 산란장 조사: 2009년부터 보하이해, 황해, 동중국해 및 남중국해를 대상으로 난, 자치어 및 성어에 대한 자료를 축적하고 산란장 mapping database를 구축
 - 연안 간척해역 모니터링: 연안 어류의 서식지 감소의 원인이 되는 해양 간척해역에

대한 모니터링을 수행중

- 영양단계별 연간 변동 및 어획량 모니터링: 1980년부터 중국 해역에 대한 어업별 어획량 변동 및 해양생태계 변화를 모니터링
 - 해빙 및 녹조류 대량발생 모니터링: 2008년부터 인공위성 모니터링을 기반으로 한 해빙과 녹조류 대량 번식 현황을 모니터링
- 일본(Saitoh/Tadokoro): JAMSTEC, FRA 및 북해도대학에서 수행중인 모니터링 내용을 소개
- JAMSTEC: Argo JAMSTEC, Deep NINJA, TAO/TRITON project, IOMICS(Indian Ocean Moored buoy network Initiative for Climate Studies) 프로젝트 및 WOCE 관측 라인의 반복 조사 내용을 소개
 - FRA: A-line 모니터링, O-line 모니터링, CK-line 모니터링, 자원량 평가 프로젝트 모니터링, 동물플랑크톤 샘플 수집, 난, 자치어 샘플 수집, 어종 샘플 모니터링 등에 대한 소개
 - 북해도 대학: T/S Oshoro-Maru 크루즈, R/V Mirai 크루즈, T/S Oshoro-maru 크루즈 2018년 계획 등을 수행
- 대한민국(Han): 국립수산과학원, 국립해양조사원, 한국해양과학기술원 및 KAIST의 최근의 해양 관측 동향을 소개
- 국립수산과학원: 한반도 연근해역 해양산성화 모니터링, Wave-Glider를 활용한 연안 용승역 모니터링, 한반도 연안역에 대한 실시간 해양환경 어장정보시스템 구축 및 운용 등을 소개
 - 국립해양조사원: HF-radar 등 연안/근해역 주요 모니터링 운용 현황, 울릉도 인근 해역 해양특성 모니터링 등 소개
 - 한국해양과학기술원: Wave-Glider를 활용한 동중국해 북부해역 저염분수 모니터링, 해양과학기지의 구축 및 운영 현황 소개
 - KAIST: 한국해양과학기술원과 공동으로 구축을 추진하고 있는 연안역 관측 시스템(COOS; Coastal Ocean Observing System)에 대한 계획을 소개
- 러시아(Kulik/Lobanov): TINRO 센터의 수산자원조사 주요 활동 내용 및 POI의 동해 북부해역에 대한 모니터링 수행 내용 소개
- TINRO 센터: 오호츠크해, 사할린 인근 해역 등에 대하여 센터에서 수행한 자원조사와 조사 결과로 얻어진 명태 등 주요 어종의 풍도 변화에 대한 내용 소개
 - POI: 블라디보스톡 인근 해역 등에서 정기적으로 수행하고 있는 모니터링 내용 및 동해의 중층수/심층수 형성 과정과 최근 연구 결과 등에 대한 소개를 수행

○ 폐회(9월 27일, 18:10)



MONITOR 일요일 저녁 business 미팅후 각국대표단 사진

[붙임]

2017 PICES MONITOR National Report (Rep. Korea)

1. Report from NIFS (National Institute of Fisheries Science)

Ocean acidification surveys in the Korea Waters

Serial ocean acidification surveys are carried out 3 times a year on 79 stations in the Korea Waters since 2015. In this surveys, NIFS measured TIC(Total Inorganic Carbon), TA(Total Alkalinity), pCO₂ and pH at each stations with standard depths. From the results of aragonite saturation state, which was calculated from pH, NIFS estimate the ocean acidification states in spatial and temporal.

Wave-glider survey around the coastal upwelling area

NIFS operated the wave-glider to understand the oceanic condition by appearance of coastal upwelling along the eastern coast of Korea during July and August in 2017. Wave-glider attached the temperature, salinity, Chl-a, wind speed/direction sensors and ADCP(Acoustic Doppler Current Profiler). From these results, NIFS analyze the physical, biogeochemical and atmosphere features related with coastal upwelling in detail.

Real-time Information System for Aquaculture around the Korean coastal area

NIFS operate 54 Real-time Information System for Aquaculture environment (RISA) around the coastal area of Korea. This system measures temperature, salinity and dissolved oxygen every 30 minute with several depths. The data from this system were serviced by internet web-page, mobile web-page, SMS (Short Message Service) and mobile phone application. In this year, abnormal high water temperature, which were higher 2~7°C compared to mean values, was occurred around the Korea coastal area during July and August. Based on observed data by this system, NIFS announced the high temperature alerts to fishermen.

2. Report from KHOA (Korea Hydrographic & Oceanographic Agency)

Additional HF-Radar Systems and Buoy

KHOA currently operates 50 tidal stations, three ocean stations, 31 moored ocean buoys, 40 HF-radar systems and three ocean research stations, which make 127 Korea ocean observing networks in total. By the end of this year, four additional HF-radar systems will be installed around the southwestern shore of Korea to enhance the capacity of real-time surface currents

monitoring progress.

Ulleung-Do ocean characteristic monitoring

In addition to the existing vessel survey of ocean characteristics near Ulleung-do on the east coast, a wave glider was deployed in February and November 2017. The glider was mounted with CTD, ADCP sensors and Multi-beam echo sounder to measure wave height, ocean current and bathymetry to enhance the capacity of existing ocean models during demanding seasons.

3. Report from KIOST (Korea Institute of Ocean Science & Technology)

Low salinity water observation using wave-glider in the Northern East China Sea

KIOST operated wave-glider to understand the behavior of low salinity water masses, which should be diluted by Changjian, from mid-August to early-September in 2017. From the results by wave-glider, which measured temperature, salinity, Chl-a, turbidity and ocean current, KIOST will analyze the features of ocean condition by the behavior of low salinity water mass and make an algorithm the estimation of surface salinity using satellite.

Operation and Construction the Ocean Research Station

KIOST constructed 3 ocean research stations, which are Jeodo Ocean Research Station, Gageo Ocean Research Station and Socheongcho Ocean Research Station. These 3 ocean research stations, which have been operated by KHOA, have measured various ocean and weather factors. Main applications of these are improving comprehensive ocean and weather observations and providing core scientific information and data for the global environmental change studies.

4. Report from KAIST (Korea Advanced Institute of Science and Technology)

Coastal Ocean Observing System in Korea

KAIST constructs the COOS(Coastal Ocean Observing System) with KAIST. COOS generally consists of the observing system by satellites, buoys, gliders ARGO float, tide gauges, HF radars, marine platforms and other in-situ coastal observations. This system will be used for the rescue, coastal environmental accidents, fisheries, coastal disasters and other various coastal problems.

8 POC

※ Physical Oceanography and Climate Committee

□ 정부대표

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

□ 개요

- 일시: 2017년 9월 24일(18:00~20:00), 9월 27일(14:00~18:00)
- 참석자: Emanuele Di Lorenzo(의장), Yury Zuenko(부의장), James Christian, Jennifer M. Jackson(캐나다), Fangli Qiao(중국), Daisuke Hasegawa, Hiromichi Ueno(일본), 장찬주, 남성현, 정희동(한국), Vyacheslav Lobanov, Elena Ustinova,(러시아), Steven Bograd (미국), Anne Hollowed(S-CCME), Annalisa Bracco(CLIVAR), Masami Nonaka(WG40), Cornelius Hammer(ICES), Matthew Baker(NPRB)

□ 의제 및 논의 결과

1. 회의 참석자 소개 등
2. 물리·기후분과 신입 위원 소개
 - 한국: 남성현(서울대)
3. 의제 채택 및 보고자 선임
 - 참석자의 일정을 고려하여 의제 순서 조정
 - 보고자로 Jim Christian(캐나다) 선임
4. 2017 총회 물리·기후분과 주관/공동주관 세션
 - S1, S6, S9, S11, Poster 세션에 대하여 위원 중 9명의 심사위원 선정
5. 전문가그룹 보고서 현황보고
 - WG27 ‘North Pacific Climate Variability and Change’는 최종보고서 진행현황 점검 및 완료 추진 독려
 - WG29 ‘Regional Climate Modeling’ 최종보고서 관련. 장찬주 박사가 진행현황 설명

- 연내 발간 계획임을 천명
- ‘Oceanography of the Yellow and East China Seas(EAST-II region)’(J. Ishizaka, T. Matsuno, J. Zhang, J.-H. Lee, S. Kim, D.Xu, Y. Fei, S.-M. Liu, V. Lobanov) 보고서 편집현황은 AP-CREAMS의 Y. Zuenko(러시아)가 설명. 집필진 22명, 검토진 44명, 총 300페이지로 연내 발간계획임
 - 북태평양생태계보고서 2판 보충서 현황도 Y. Zuenko(러시아)가 설명. 기 수정 보완이 완료되어 인쇄 대기 중임
 - S-CC 연구보고서 진행현황 점검 및 추진 독려
6. 2018년 이후 발간물 논의
7. POC관련 향후 미팅 논의
- IMBIZO-5(2017. 10. 2~5, 우즈홀연구소)
 - Ocean Science Meeting(2018. 2. 11~16, 포틀랜드)
 - Marine Devris 심포지엄(2018. 3. 12~16, 샌디에고)
 - PICES/MoE Session: “The risk of marine debris mega-pulse events: Lessons from the 2100 Great Japan Tsunami”
 - 제4차 기후변화심포지엄(2018. 6. 4~8, 워싱턴디시)
 - PICES-2018 연차총회(2018. 10. 25~11. 4, 요코하마)
8. 지원 우선순위 논의
9. 발표우수자 선정위원: S6, S9, Poster, POC Paper세션 등 9명의 위원선정
10. 활동사항 및 진도보고
- (1) S-CCME의 회기간 활동사항 및 계획 보고(Ane Hollowed)
 - (2) S-CC의 2014~2017 기간 중 활동사항 보고 및 2018년 관련 세션 제안
 - (3) WG 40의 ToR과 회기간 미팅 제안 등(Masami Nonaka)
 - (5) AP-CREAMS(Yury Zuenko)
 - 한·러, 한·일간 정기선박활용 해양관측 현황 논의결과
 - 한·중·일, 한·러·일 Joint cruise 계획 소개
 - NPESR2 완료, CREAMS EAST-II 연구보고서 연내 완료예정 보고
 - Summer School(2018. 8월, 서울대) 계획 소개 및 지원 요청
 - 장경일 박사를 김규범 교수로(한국), David Checkley 박사를 Ryan Rykaczewski 박사(미국) 멤버 교체를 요청함

11. 타 국제기구/프로그램과 협력현황 보고

(1) CLIVAR(Annalisa Bracco)

- CLIVAR는 WCRP의 대기-해양시스템 core project. 조직과 핵심 연구과제 등을 소개. Eastern Boundary Upwelling System 소개에서 2018년 Upwelling system에 관한 summer school 개최예정 등 2017년 활동 및 2018년 계획에 대하여 보고.

(2) ICES(Cornelius Hammer)

- ICES Annual Science Conference의 2017 topic sessions 개최현황 및 2018 세션 소개 등

(3) NPRB(Matthew Baker)

- AOOS의 활동현황 소개 및 Session proposal

(4) NEAR-GOOS

- 동북아해양관측시스템 현황 및 정기항로 활용 한-러, 한-일 표층해양 모니터링 계획 소개

(5) ESSAS

- Ecosystem Studies of Arctic and Sub-Arctic Seas(ESSAS)의 목적과 향후 계획을 설명

(6) Future Earth Ocean(Emanuele Di Lorenzo)

- Ocean KAN(Knowledge Action Network)의 목적과 향후계획을 설명

12. NPESR update

북태평양 생태계보고서 2판 Supplementary Chapter: Japan/East Sea 관련 당사국 최종 심의중

13. New Proposals 우선 순위 결정

- 총 19개가 제안됨
- WG 40의 제안을 high level로 선정 등

14. PICES 2018 & POC Action Item

- 개최지 및 일정: 일본 요코하마 2018. 10.28~11.04(TBD)
- 주요테마: 'Toward intergrated understanding of ecosystem variability in the North Pacific'
- Topic, Paper 세션 및 미팅 제안 논의
 - 1-day Topic Session on Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific
 - 1 -day Topic Session on Ocean acidification and deoxygenation and their impact on

ocean ecosystems: synthesis and next steps(co-sponsored by ICES)

- 1/2-day POC Contributed Paper Session
- 1-day Workshop on Synthesizing projected climate change impacts in the North Pacific;
- 1-day meeting of the Section on Carbon and Climate(S-CC)
- 1/2-day meeting of the joint PICES/ICES Section on Climate Change Effects on Marine Ecosystems(S-CCME)
- 1-day meeting of the WG38 on Mesoscale and Submesoscale Processes;
- 1-day meeting of the Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas(AP-CREAMS);

15. 미팅 보고서 제출

- (1) Business meeting summary: CREAMS-AP, S-CC, S-CCME 등 회의 보고는 각 회의 의장이 총회 종료 후 1개월 이내에 사무국에 제출기로 함
- (2) Topic session 보고는 각 세션의 convenor들이 총회 종료 전까지 완료기로 함

16. 보고서 채택

- SB에 대한 권고사항은 의장이 발표하고, 최종보고서도 의장이 준비하기로 함

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

□ 개요

- 일시: 2017년 9월 24일(18:00~20:00), 27일(14:00~18:00)
- 참석자: 의장- 이준수(NIFS/한국), 부의장- Peter Chandler(IOUS/캐나다)
 멤버- 최상화(KIOST/한국), 권정노(NIFS/한국), Tomowo Watanabe(FRA/일본),
 Daisuke Ambe(FRA/일본), Igor Shevchenko(TINRO/러시아), Georgiy Moiseenko(VNIRO/러시아), Manchun Chen(NMDIS/중국), Fangfang Wan(NMDIS/중국)
 Observer- Yutaka Michida(동경대/일본, IODE 공동의장), Hiroaki Saito(동경대/일본, 과학평의회 의장), 김성용(KAIST/한국, MONITOR&AP-NPCOOS),
 Ryan Rykaczewski(USC/미국, FUTURE-SSC), Jeanette Gann(NMFS/미국, WG-35), Matthew Baker(NPRB/미국, WG-35)

□ 의제 및 논의 결과

- POMA 2017 보고
 - POMA 2017은 두 후보(Newport Hydrographic Line & ESROB)가 제안되었고, TCODE 위원들은 NH-Line을 과학평의회에 추천하였음
- PICES 자료 정책과 자료관리 목록 검토
 - PICES-2016의 GC결정(2016/A/15)에 따라, PICES 사무총장인 Mr. Brown이 PICES 자료관리정책과 자료관리목록 초안을 작성하였고, TCODE는 이를 검토하였음
 - 논의결과, TCODE는 PICES의 자료 및 자료생산물 목록에 대한 관리를 담당하는 것으로 결정하였고, 자료관리정책 초안에 자료목록에 대해 매년 정기적으로 검토하는 임무를 추가함

- 또한, PICES-2018의 워크숍 제안서(제목: PICES 자료관리에 대한 체계적인 접근 방식 개발)를 작성하여 제안함
- 회기간 워크숍 및 2017 총회 TCODE 토픽 세션 및 워크숍 요약 보고
 - WG-35(NPESR 3) 회기간 회의 결과 보고
 - W1(Matthew Baker), S10(이준수) 결과 보고
- FUTURE 현황 보고
 - FUTURE SSC 활동에 대해 Dr. Ryan Rykaczewski 보고
- AP-NPCOOS 회의 요약 보고
 - 김성용 교수 보고
- 타 국제기구/프로그램과 관계 보고
 - IOC/IODE(Prof. Yutaka Michidia), ODINWESTPAC(Ms. Fangfang Wan), NOWPAP/DINRAC(이준수), NEAR-GOOS(이준수)
- TCODE 2016/2017 워크플랜 진행사항 검토
 - PACIFICA GLODAP V2 올해 공개 예정
 - PICES 자료 정책: FNA 검토 결과 추가 논의 필요. 자료 정책 가안 수정
- TCODE TOR 및 액션플랜 2016~2020 논의
 - TCODE TOR에 “PICES 자료 정책 개발” 추가
 - task groups을 expert groups으로 바꾸는 등 일부 문구 수정
- TCODE 2017/2018 워크플랜 검토
 - 타 국제기구와의 협력 담당 지정, PICES-2018 토픽세션 및 워크숍 준비 및 지원, PICES/AP-NPCOOS 여름학교 지원, TCODE 메타데이터 포털 및 웹사이트 담당, PICES 자료정책 수정, NPESR-3 지원, POMA 2018 추천 및 투표 등
- 국가별 활동 보고
 - 시간관계상 이메일로 서면 보고.
 - 우리나라는 한국해양자료센터 활동사항 보고(이준수)

10 FUTURE-SSC

※ 활동기간: 2014.10.~

□ 정부대표

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

□ 개요

○ 일시: 2017년 9월 24일(14:00~17:00), 9월 25일(18:30~21:00)*

○ 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

* 9월 25일 회의 : closed

□ 의제 및 논의 결과

○ Agenda 확인/추가제안 검토

- 참석자 소개(FUTURE SSC 위원이 모두 참석함)

○ 2016년 연례회의 이후 Future SSC 활동 점검

- Future product matrix 및 load map 검토(수정 중)
- Future 종합(Synthesis) 보고서 작성 현황 보고
- 전문가그룹과 Future SSC와의 연락관 시스템 점검
 - 일부 연락관들은 회의시간이 중복되어 다른 연락관들이 전문가그룹과 소통함
 - 우리나라의 유신재 위원은 WG-33, WG-35의 연락관이며, 강수경 위원은 FIS의 연락관으로 활동

〈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*		SG-MES
Toyomitsu Horii	MEQ	WG-30*	S-HAB*	
Sukyung Kang	FIS*	WG-34	S-CCME	
Sinjae 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

2 new SSC members

○ 새로운 전문가그룹 활동 검토

- WG-35 Third North Pacific Ecosystem Status Report(북태평양생태계보고서 3판 작업반)
- WG-36 Common Ecosystem Reference Points across PICES countries(PICES 회원국의 공통된 생태계 관리방안 작업반)
- WG-40 Climate and Ecosystem Predictability(기후와 생태계 예측 작업반)

○ PICES 홈페이지에 FUTURE 프로그램의 노출

- FUTURE SSC 공동의장은 지난 6월 28일 PICES 사무국에 홈페이지에 게재할 내용을 송부하였으나, 모든 자료가 업로드 되어 있지 않고, 대문 페이지에서 FUTURE 프로그램의 존재가 미약함
- FUTURE와 WG-35의 활동인 NPSEER보고서는 PICES의 대표적인 프로그램과 성과임으로 대문 페이지에 게재될 필요가 있음

○ PICES의 후속 과학프로그램을 위한 설문지 작성 논의

- FUTURE SSC 위원인 Ryan이 준비한 9개의 설문 문항을 검토하였으나, 후속 과학프로그램을 설계하는 것이 FUTURE SSC의 역할인지, 과학위원회(SB)의 역할인지에 대한 의문이 제기됨
- 과학위원회에 보고 후 과학위원회의 결정에 따르기로 함
- 이후 과학위원회에서는 과학위원회 의장, FUTURE SSC 공동의장, HD의장을 포함한 몇몇 과학위원회 위원을 중심으로 설문지를 작성하기로 함

○ FUTURE plenary(S10) 개최 및 토의

- 주제: Emerging issues in understanding, forecasting and communication climate impacts on North Pacific marine ecosystems
- 최고논문상: 김무진(부경대) Biotic and abiotic impacts on walleye pollock population off the east coast of Korea over the last 5 decades
- 최고포스터상: Peng Lian(중국) The application of Argo data and innovative methods in fisheries sciences
- 올해는 FUTURE 미니심포지엄을 plenary와 신규 전문가그룹(WG-35, WG-36, WG-40)의 활동보고로 대체함

○ 2017년 연례회의 이후 FUTURE SSC 활동을 위한 요청 사항

- FUTURE SSC 회기간 회의(2018년 봄)
 - 연례회의 기간 외에 SSC가 모여 회의를 하는 것은 반드시 필요하며, 실질적인 과학 연구내용을 논의하는 자리여야 함
- WG-36, WG-40 회기간 워크숍(2018년 봄)
- 2018년 연례회의 기간 중 business meeting과 주제세션 요청
 - 세션: The FUTURE of PICES: Next Steps in Understanding, Forecasting and Communicating Climate Impacts on North Pacific Marine Ecosystems
 - FUTURE 미니 심포지엄을 개최하지 않으므로, 전문가그룹의 활동을 점검할 수 있는 plenary 형태로 진행되어야 하며, 연례회의 기간 중 개최하는 것이 바람직함(예: 수요일)
- 2019년 또는 2020년 FUTURE 종합심포지엄 개최 고려 요청



【첨부 1】

2018 Annual Meeting Topic Session (Mini-Symposium) Proposal

Title: The FUTURE of PICES: Next Steps in Understanding, Forecasting and Communicating Climate Impacts on North Pacific Marine Ecosystems

Duration: 0.5 Day (Plenary; mid-week of meeting)

Sponsor: FUTURE Scientific Steering Committee

Conveners: FUTURE Scientific Steering Committee

Session Description (< 300 words)

‘Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems’ (FUTURE) is the flagship integrative Scientific Program undertaken by the member nations and affiliates of PICES. Since its inception in 2009, FUTURE has contributed to guiding PICES science to understand how marine ecosystems in the North Pacific respond to climate change and human activities, to forecast ecosystem status based on a contemporary understanding of how nature functions, and to communicate new insights to its members, governments, stakeholders and the public. FUTURE is scheduled to conclude in 2019, so this is a good time to reflect on its accomplishments, to identify remaining gaps in fulfilling its research objectives, and to contemplate new directions for PICES science. In this session, we will conduct a FUTURE ‘Mini-Symposium’ to update the PICES community on FUTURE progress and to coordinate activities amongst the PICES Expert Groups. Each Expert Group will provide a brief review of their past, current and planned activities as they relate to the FUTURE Science Program, which will be followed by a plenary discussion on the future path of PICES science in the coming years.

Invited speakers: Two requested (ECS)

Publication requirements: No

【첨부 2】

FUTURE SSC Meeting Agenda

PICES 26th Annual Meeting, September 2017

Dates: September 24th, 2:00pm-5:00pm/September 26th, 6:30pm-9:00pm

Venue: Vladivostok, Russia

1. Introductions and nomination of a rapporteur
2. Adoption of Agenda
3. Review FUTURE SSC Activities, Tasks and Timeline
 - Review 2017 Action Plan (Appendix 2)
 - Review FUTURE SSC liaisons and schematic (Appendices 4, 5)
 - Review FUTURE SSC activities at 2017 Annual Meeting (Appendix 7)
 - Review FUTURE SSC liaison powerpoint
 - Discuss FUTURE outreach activities (FUTURE logo, buttons, brochure, videos, poster; presence at other meetings; social media)
4. Review ToRs and Proposed Activities of Working Groups 36 and 40
5. Review Revised FUTURE Product Matrix and Discuss Dissemination
6. Discuss PICES Survey for Next Science Program
 - Format and Implementation
 - New Working Groups?
7. Discuss FUTURE Synthesis Paper: Finalize Writing Assignments
8. Plan 2018 FUTURE SSC Activities
 - Inter-Sessional Business Meeting
 - Inter-Sessional Workshops (SSC, WG-36, WG-40)
 - Topic Session proposal for 2018 Annual Meeting
 - Workshop proposal for 2019 Annual Meeting (Appendix 8)

9. FUTURE Roadmap and Tasks: Summary
 - Finalize Action Plan for 2018
 - Review and revise FUTURE Roadmap (Appendix 6)
10. Other SSC Business

Adjourn

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	김경렬	광주과학기술원/교수
AP-CREAMS	이재학	한국해양과학기술원/책임연구원
AP-CREAMS	정희동	국립수산과학원/연구관
AP-CREAMS	김규범	서울대학교/교수

□ 개요

- 일시: 2017년 9월 24일(09:00~12:00)
- 참석자: 의장 - 김경렬(한국), Vyacheslav B. Lobanov(러시아), Joji Ishizaka(일본), Fei Yu(중국), Yury I. Zuenko(러시아), Osamu Kato(일본), 이재학(한국), 정희동(한국), Tomowo Watanabe(일본), Tetsuichiro Funamoto(일본), 남성현(한국), 김규범(한국), Jinqiu Du(중국)

□ 의제 및 논의 결과

- CREAMS/PICES 프로그램과 관련된 각국의 활동에 대한 보고 요약
 - 한국(정희동): Ferry boat를 이용한 동해(한국) - 블라디보스톡(러시아) 관측 진행 사항에 대해 보고하고, 향후 Sakai-minato(일본)과 관측선 연결에 대해 제안
 - 러시아(Vyacheslav B. Lobanov): 향후 한국해양환경관리공단과 협력하여 부산(한국)과 블라디보스톡(러시아) 연결 cargo ship 활용 계획에 대해 설명
 - 일본(Joji Ishizaka): T/V Nagasaki-Maru를 이용한 2017년 7월 관측 결과에 대해 보고(중국, 한국 공동 승선자가 포함되어 있었음)
 - 중국: 보고 없었음
- 국제협력 연구 보고 및 논의
 - 한국(이재학, 김규범, 남성현): 2018년 4월 온누리호를 이용한 동중국해 연구 계획에 대해 설명하고, 중국과 일본 측 공동 연구자 승선 제안
 - CREAMS 1999 20년(2018~2019) Cruise에 대한 계획: 동해에서 2018년 후반부 및 2019

년에 EAST-I 광역 공동 관측 계획 보고. 관측선 확보를 위한 WESTPAC WG(장소: 일본 규슈, 2017년)에서의 러시아, 일본, 한국측 추가 공동 관측 계획 수립에 대해 논의

○ 기타

- AP-CREAMS publications에 대한 논의: Status report on EAST-I, Status report on EAST-II, NPESR-3에 대한 논의가 있었음
- 인공위성 연구 관련 summer school 개최(서울대, 박경애)에 대한 지원 요청이 있었음
- 다음 Inter-sessional AP-CREAMS 미팅은 중국 항조우에서 2018년 4~5월 경에 개최하기로 함. Annual AP-CREAMS 미팅은 일본 요코하마에서 2018년 10월 개최하기로 함
- EAST-II publication에 대한 진도 보고가 있었음
- FUTURE 프로그램에 대한 보고가 있었음(V. Lobanov)



AP-CREAMS 회의 장면

□ 의견/평가

- 향후 EAST-I 및 EAST-II 관측을 위한 한국, 러시아, 일본, 중국의 관할 수역 공동 관측을 위한 지속적인 논의가 필요

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

□ 개요

- 일시: 2017년 9월 24일(09:00~12:30)
- 참석자: 의장 - 김성용(KAIST/한국)
회원 - Kim Juniper(ONC/캐나다), Naoki Yoshie(에히메대학/일본), Vyacheslaw Lobanov(POI/러시아)
관찰자 - Daisuke Hachigawa(FRA Tohoku/일본), Lian Peng(OUC/중국), Sonia Batten(SAHFOS/캐나다), Losley McaDougall(DFO/캐나다), Peter Chandler (DFO/캐나다), Jim Christian(DFO/캐나다)

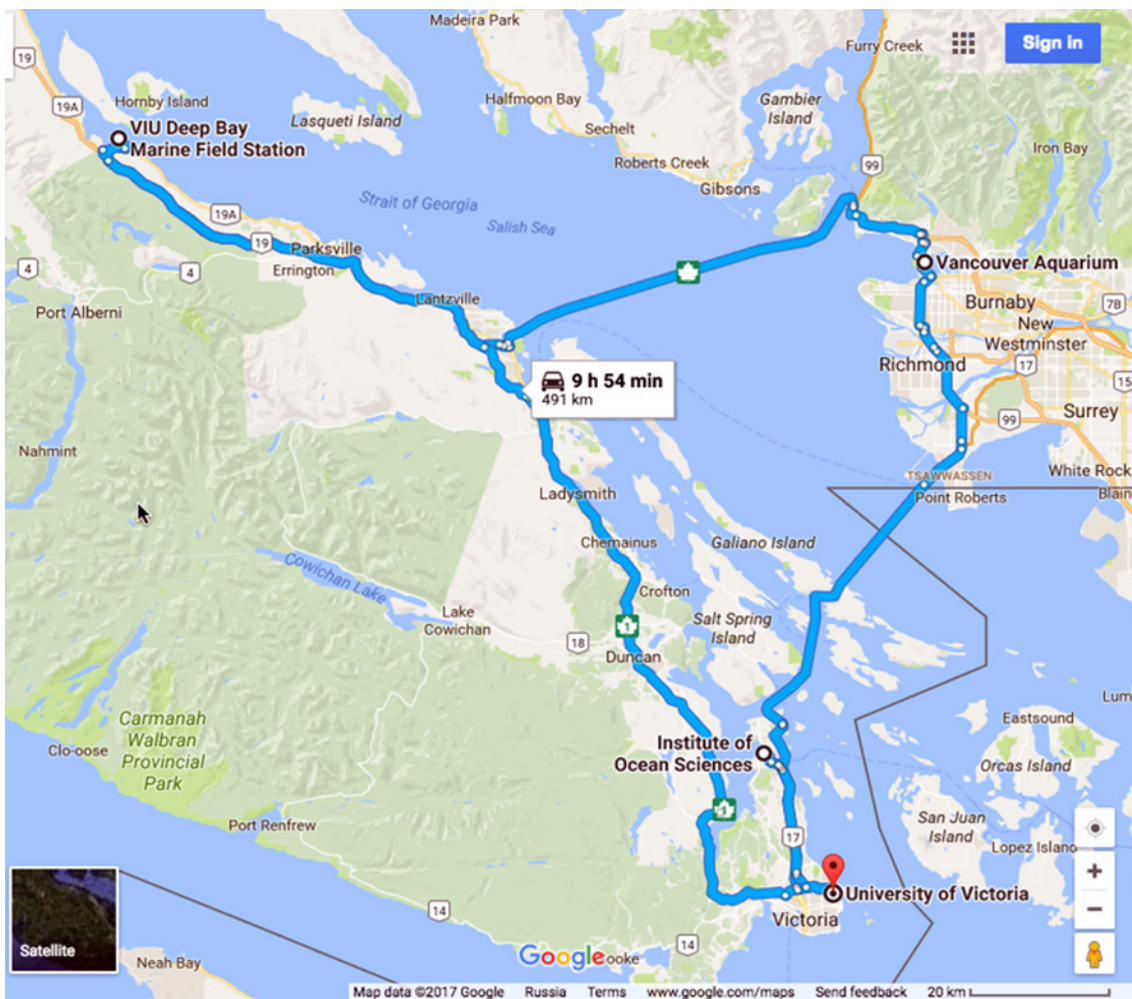
□ 의제 및 논의 결과

- 2017년 국가별 연안관측 시스템 업데이트
- 국가별 연안관측 시스템에 대한 소개 및 성공사례를 논문으로 출간준비
 - Journal of Ocean Technology와 Journal of Operational Oceanography를 고려중
 - 한국, 미국, 일본, 캐나다의 각국 대표로부터 준비의사 확인
 - 논문준비를 위한 잠정적인 시한으로 논문의 주요 template 제공(2017.10.1), 초록, 저자, 제목 선정(2017.11.1), 논문 작성 완료(2018.3.1), 논문 취합 및 세부 조정후 투고(2018.4.1)
- 2018 Summer school 세부계획 논의
 - 2018년 7/9~7/13, 빅토리아 대학교
 - 25명 미만의 박사과정 졸업예정자 및 젊은 과학자(박사학위후 5년내)의 PICES내 회원을 대상으로 다양한 해양자료의 분석과 현장실습을 계획하고 있음
 - 세부일정과 summer school중 이동경로는 아래 표와 사진 참조

- 지원 및 선정계획은 PICES 홈페이지를 통해 공지(2018.1.1), 지원서 마감(2018.3.15), 참석자 결정(2018.4.1), 참석자 재확인(2018.4.15.)

	SUN July 8	MON July 9	TUE July 10	WED July 11	THR July 12	FRI July 13
AM	Students arrive	Time Series: Dewey	Acoustics: Gauthier	SOVI: Costa CORI: Ross	Coast.Oceanog: Hannah/ Klymak/Pawlowicz	Biol.Ocean: Dower/ Perry?
Lunch	Students arrive	At IOS	At IOS	At Vancouver Aquarium	At UVic	At UVic
PM	Check-in/ Welcome dinner	MSV John Strickland /Oceans 2.0/Marine Technology Centre	MSV John Strickland/ Oceans 2.0/Marine Technology Centre	Queen of Oak Bay: Deep Bay Marine Field Station: Dudas/ Evans?	MSV John Strickland & VENUS data processing	Presentations
Dinner	Check-in/ Welcome dinner			Dinner at Deep Bay Marine Field Station	MSV John Strickland & VENUS data processing	Dinner/ Drinks/ Photo

여름학교 세부일정



여름학교 이동경로



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

□ 개요

- 일시: 2017년 9월 24일(09:00~12:30)
- 참석자: 의장 Thomas W. Therriault(캐나다), (Members) 임월애(한국), Masaya Katoch(일본) (Observers) 최민규(한국), Toyomitsu Horli(일본), 중국인 2명

□ 의제 및 논의 결과

- WG-21 이후 후속 첫 모임으로 간단한 멤버 및 이전 프로젝트 소개
 - 각국의 참가자가 확정되지 않아 일본과 우리나라만 참석 차후 각국의 추천을 받아 멤버 구성 예정
 - PICES에서의 이전 해양 외래유입종에 대한 역할에 대한 재조명: WG-21(일본 MAFF 예산), ADRIFT 프로젝트(2014~2017, 일본 MOE 예산), NOWPAP과 ICES에서의 역할 등 소개
- 외래유입종에 관한 워크숍 정보 공유 및 참석 독려
 - 2018년 3월 중국: Marine and Freshwater Invasive Species conference
 - 2018년 10월 아르헨티나: 제10차 해양외래유입생물에 대한 국제회의
- 외래유입종에 관한 효과적인 공유방법 논의 및 조기모니터링 방법 관련 프로젝트 소개
 - WG-21 database 및 global database(AquaNIS) 활용 필요
 - ADRIFT/SERC life history database 등 활용 필요
 - 각국의 정책 및 NIS에 관한 정보 논의: 한국은 유해해양생물 지정 및 관리 등에 관한 고시 소개

※ WG-30: Working Group on Assessment of Marine Environmental Quality of Radiation around the North Pacific

※ 활동기간: 2013.08.~2017.(연장)

□ 정부대표

참가부문(역할)	성명	소속/직급
WG-30	김석현	한국해양과학기술원/책임연구원
WG-30	김영일	한국해양과학기술원/책임연구원
WG-30	정경태	한국해양과학기술원/책임연구원
WG-30	한인성	국립수산과학원/연구사

□ 개요

○ 일시: 2017년 9월 23일(09:00~18:00)

○ 참석자

- 대한민국(4명) : 정경태, 김석현, 김경옥 박사(KIOST)/한인성 박사(NIFS)
- 중국(4명) : Yusheng Zang(Third Institute of Oceanography) 외 3명
- 캐나다(1명) : John Smith(Fisheries Ocean Canada)
- 일본(2명) : Tomow Watanabe(Fisheries Agency)/Takami Morita(FRA)

□ 의제 및 논의 결과

○ 각 국의 National Report 발표

- 캐나다(John): 2014~2015년 P-line 관측결과 소개, Blob 현상에 따른 고농도 해수의 연안쪽 접근 경향 소개 및 high concentration core가 양쪽으로 나타나는 원인 등에 대한 소개
- 중국(Wu Men): 2016~2017년 현장조사를 통한 관측결과, WG-30 동안의 중국의 활동을 정리, 2011~2015년 사이에 10회 모니터링을 통하여 축적된 관측자료 소개 및 현장에서 모니터링을 위한 새로운 관측 장비 소개 등
- 일본(Watanabe): 현장관측을 통한 해수 및 해양생물의 농도 현황, 회유성 어종에 미치는 영향에 관한 결과 소개, 해수 및 거의 대부분의 해양생물 체내 농도가 2015년을 경계로 하강하는 추세이며, 후쿠시마 원전 이전과 거의 비슷한 농도 경향을 보이고

- 있음. Skipjack tuna를 이용한 회유성 어종의 장기 모니터링 수행 내용 소개
- 대한민국(Jung): NIFS/KINS의 우리나라 주변 해역 현장관측·분석 결과 및 장기 농도 변화 소개, KIOST 모델 개발결과 및 영양단계별 해양생물의 방사능 농도 산정 관련 연구 소개

○ WG-30 Final Report 관련

- Chair: annual meeting 전에 배포된 최종보고서(안)에 대한 소개 및 향후 추진 방안 등에 대한 설명
- 최종보고서 내에 모든 국가의 material and method가 포함되어야 하며, 일본측의 조사 방법, 분석 방법 등에 대한 기술을 요청. 기여자들의 인적사항 포함 부분은 회람후에 추가 기입 여부 결정. 결론, 배경, 요약 등을 기술하기 위하여 빠른 진행이 필요함
- 서론 부분이 너무 간략히 작성되어 있어, 왜 WG-30이 만들어 졌으며, 무엇을 위해 WG-30이 진행되었으며, 보고서의 작성 배경 등에 대한 추가적인 기술이 필요
- Introduction과 conclusion 부분은 캐나다측(Dr. Smith)가 최종 작성하며, 나머지 본문 의 추가적인 부분은 각 member countries가 작성
- Schedule 확정: 10/20까지 각 member countries는 첫 번째 수정·제안 내용을 중국측 에 제출 → 10/31 중국측은 각 member countries의 내용을 정리하여 작성 완료 후 캐 나다 측에 송부 → 11/15 캐나다 측은 이를 근거로 introduction과 conclusion을 작성 → 11/23 Final draft version에 대한 Review를 요청 → 11/30 각 member countries의 Final version을 취합 → 12월 중에 최종 보고서를 PICES에 제출

○ WG-30 브로슈어에 대한 논의

- Chair: 가제작성된 WG-30의 브로슈어를 배부하며, 각 member countries의 의견을 청취
- 브로슈어 내의 TOR 부분을 향후 만들어질 최종보고서의 conclusion으로 대체
- 그림의 해상도가 극히 낮아 이 부분에 대한 개선 필요
- 각 그림 등에 대한 설명이 너무 개략적으로 되어 있어 이에 대한 자세한 설명 필요
 - * 10/20 최종보고서에 대한 수정·제안 제출 시 브로슈어에 대한 제안 내용도 같이 송부하기로 결정

○ 새로운 WG에 대한 논의

- Chair: WG-30이 1년 연장을 포함하여 올해 4년째로 새로운 해양방사능과 관련한 PICES내의 WG 필요성 설명
- 중국(Wu Men): 새로운 WG의 배경, 주요 추진내용(TOR) 등을 발표. WG-30과의 가장 큰 차별성은 WG-30이 후쿠시마 원전 사고에 대응하기 위하여 운영된 반면, 새로운 WG은 다가오는 새로운 방사능 위협에 대응하기 위한 미래 대응 관련 부분을 중심으로

로 운영할 계획

- 중국은 새로운 WG 추진의 필요성을 강하게 언급하는 반면, 일본측은 새로운 WG에 대하여 강하게 반대하는 입장. 캐나다측은 새로운 WG에 대하여 긍정적으로 평가하는 것으로 판단됨
- 대한민국은 새로운 WG의 타이틀, 내용, 목적 등이 충분히 정리되어 있지 않으며, WG-30과의 뚜렷한 차별성을 찾기 어려움을 피력. 새로운 WG에 대하여서는 회의장에서 바로 결정하는 것이 적절하지 못함을 주장.
- 중국은 새로운 WG의 TOR을 각 members에게 메일로 송부하며, 그에 대한 각 국의 의견을 MEQ meeting이 있기 전인 9월 27일까지 송부해 줄 것을 당부
- 대한민국 member는 mail을 통하여 새로운 WG 추진에 강하게 반대하지는 않으며, 단 이 부분에 대한 충분한 논의가 이루어지지 않은 점을 들어 국내의 관련 전문가들과의 협의가 필요하다는 점을 중국 측에 송부

15 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

□ 개요

- 일시: 2017년 9월 23일(09:00~18:00)
- 참석자: 공동의장 - Masashi Kiyota(일본), Go Suzuki(일본), Tatiana(러시아), Mai Miyamoto(일본), Alex(NPFC Secretariat)

□ 의제 및 논의 결과

- 산호와 해면 중 분포 모델링 관련 연구
 - 모델링을 위한 해저 지역 전반에 걸친 다양한 환경 변수(environmental variables) 수집
 - 북태평양 내에 분류군별 저서무척추동물의 서식유무(presence and absence)를 기록한 자료 추가 확보
 - 저서무척추동물 관련 예비 모델 구축
 - (기타) biogenic habitats*에 중요한 영향을 주는 환경변수로 해저바닥표면과 조류방향 사이의 각도를 측정
 - * 산호, 해면 등 다른 생물들에 의해 형성된 서식처
 - 2018년 WG-32 내에서는 저서무척추동물을 6개의 그룹*으로 나누어 초기모델구축예정
 - * 해면류(glass sponges), 해양류(gorgonian corals), 돌산호류(stony corals), 바다조름류(sea pens), 천해산호류(shallow-water corals)
- 토픽세션 및 논문투고 준비
 - (Topic Session) “Indicators for assessing and monitoring biodiversity of biogenic habitats”
 - 위 주제 관련 회의 참석자 사이에 지표(indicators)*의 범위를 명확히 하기 위한 논의가

있었음

* 종, 군집, 서식처뿐만 아니라 생리적인 것 까지 다양한 카테고리를 포함

- (M. Miyamoto) 황제해산(Emperor Seamounts) 지역에서 냉수성 산호류가 지표생물로서 군집다양성에 중요한 역할을 함을 밝혀내기 위한 새로운 방법을 제안
- 잠재적인 지표생물군을 보여주기 위하여 저서동물 간에 cooccurrence tendencies를 기반으로 저서군집 특성을 평가함. 그 결과 해양류(gorgonians)와 돌산호류(stony corals)가 다양한 저서생물의 서식에 기여함을 밝혀냄
- (T.N. Dautova) 북서태평양 조사 및 연구를 통해 러시아 심해에 다양한 팔방산호류(octocorals)가 분포하며, 특히 Kurile Island는 냉수성 산호의 통로로서 향후 이 지역의 산호에 관한 분류, 생태연구가 중요함을 보여줌
- (G. Suzuki) 천해 산호 종 다양성의 지표(indicator)로서 environmental DNA(eDNA)를 사용하여 실험실과 현장에서 연구하고 있으며, 이는 산호초(coral reefs) 등의 biogenic habitats에 적용하기에 적합함
- (Paper submission)
 - ※ Methods of benthic cover assessment in biogenic habitats
 - ※ Visual survey design for deep water biogenic habitats

○ 북태평양 수산위원회 North Pacific Fisheries Commission, NPFC와 공동연구

- 북태평양 수산위원회에서 PICES에 2018년 북태평양 취약해양생태계(VMEs) 관련 워크샵*에 참석 요청함
 - * (주제) Protection of Vulnerable Marine Ecosystems in the North Pacific Fisheries Commission Area : applying global experiences to regional assessments
- 이는 WG32와 밀접한 관련이 있으며, PICES 전문가들로 하여금 산호와 해면 그리고 이들과 함께 서식하는 생물의 분류 및 생물학적 지식을 넓히는데 도움이 될 것으로 생각됨
- 이 지역 내 생물다양성에 영향을 주는 요인으로 환경뿐만 아니라 인간 활동에 따른 생태계 변화를 분석하고 관리하는데 기여할 수 있을 것으로 예상됨

□ 의견/평가(향후계획)

- NPFC/FAO Workshop 참석
 - (일시/장소) 2018년 3월/Tokyo, Japan
- 2018년 PICES 연차총회를 위한 Topic session 제안 및 준비
 - (주제) Indicators for assessing and monitoring biodiversity of biogenic habitats

- (일시/장소) 2018년 10월/Yokohama, Japan
- (Convenors) Anya Dunhan(Canada), Hye-won Moon(Korea)
- (Invited speakers) Mary Yoklavich(NOAA, USA); Peter Mumby(University of Queensland, Australia); Peter Houk(University of Guam)

16 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

□ 개요

- 일시: 2017년 9월 24일(09:00~17:00)
- 참석자: Richard Rivkin(Memorial Univ./캐나다), Nianzhi Jiao(Xiamen Univ./중국), Uta Passow(UC Santa Barbara/미국), Curtis Suttle(British Columbia Univ./캐나다), Koji Suzuki(Hokkaido Univ./일본), Chuanlun Zhang(South Univ. of S&T/중국) Jizhong Zhou (미국), Angelica Pena(IOUS/캐나다), Jung-Ho Hyun(Hanyang Univ./한국); Sinjae Yoo (Observer_BIO WG; KIOST/한국)

□ 의제 및 논의 결과

- 활동보고서 작성과 관련, WG 활동 종료(2018. 10)시점에 맞춘 Scientific report 작성논의를 통해 Microbial Carbon Pump를 통한 Carbon sequestration을 주제로 한 review paper(or report) 작성 추진방안 및 계획 작성[첨부 1. WS 33_보고서 추진전략 및 일정 참조]
- 활성화 방안과 관련, PICES 2016(SanDiego, CA)에서 본 WG 모임이 열리지 않은 부분에 대해 바람직하지 않았다는 지적과, 활동·경과보고가 부진한 부분에 대해, 본 WG 이 PICES-ICES joint activity인 관계로 유사일정의 중복 등으로 인해 전체 회원들의 참석이 쉽지 않음에 대한 설명이 있었음(2016년의 경우 6월에 홍콩의 Gordon Research Conference에서 대부분의 member들이 참석한 가운데 WG 33 Kick-off meeting을 한 관계로 WG-member들이 유사주제로 11월에 SanDiego에 다시 모이기엔 힘들었던 부분에 대한 설명이 있었음)
- 경비지원과 관련해서, WG 참석 경비지원에 대해 해당 국가에서 지원하기로 합의된

점에 대해, 각국 Member들 간에 잘 인식이 안 되어 있었음(이 부분에 대해 PICES 본부 차원에서 회원국들에 주지하여 줄 필요성이 있음)



WG-33 business meeting 오전 회의 후

□ 학술활동

- Session 13(BIO Topics Session; “Joint PICES-ICES Session on Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Impact on ocean ecosystem services”)에서 울릉분지의 용승과 관련한 부유생물 군집구조와 탄소순환에서 미생물의 역할에 대해 구두발표를 하였음[발표제목: Changes in plankton assemblages and role of microbial loop in biogeochemical carbon cycles associated with coastal upwelling in the Ulleung Basin, East Sea]

[첨부 1]

WG 33_보고서 추진전략 및 일정

An implementation strategy to operationalise quantification of the microbial carbon pump, its contribution to biologically mediated carbon sequestration and its sensitivity to global change

Aim

1. to reduce the time taken to move from science question to experimental testing
2. to excite, lobby and facilitate the international scientific community and funding agencies to write, submit and fund research proposals

Not to produce protocols / recipes / method manuals for essential variables, but to signpost to GOOS, SCOR WGs, OceanObs who are doing this – perhaps identify gaps

Legendre et al., 2015 identified three categories of widely held assumptions relating to the microbial and biological carbon pumps. The current paper provides a roadmap for how to test/confirm/refute these assumptions, and concludes with an example work package structure of a potential integrated international research proposal.

- 1) Assumptions related to overall foodweb production and removal processes and mechanisms of recalcitrance

e.g.

- a) some DOC produced is transformed into RDOC therefore more DOC means more RDOC
- b) successive processing of semilabile and semirefractory DOC by the microbial foodweb produces less and less labile DOC and more and more RDOC

- 2) Assumptions related to specific mechanisms of RDOC production

e.g.

- c) RDOC can be exuded directly from phytoplankton, directly from heterotrophic bacteria, indirectly through viral lysis and zooplankton grazing, or indirectly through microbially derived ectoenzyme processing of POC

- 3) Assumptions related to environmental effects on MCP and feedback effects of MCP on environment

e.g.

- d) RDOC is produced and removed via UV irradiation

- e) nutrient status affects the balance between MCP and BP
- f) longer lived DOC is transported downwards by sinking particles
- g) MCP does not change the chemistry of seawater

We will review the literature since 2015 to ascertain whether any of these assumptions have now been confirmed/refuted and whether any new assumptions have been proposed e.g. the concentration versus composition discussion in Science – how to know when the marine sequestration capacity has been reached ? including the review paper by Zhang et al. (this issue) We will then take each assumption in turn and suggest an approach to test it e.g. identify mechanism, design controlled experiment to test, confirm in real world

Approaches include biomarkers for foodweb pathways, comparison between organic composition and gene analysis (requiring standardisation of primers), contribution to time series stations where BP already determined, RDOC = net effect of production and removal pathways – need to place as much emphasis on removal pathways as on production pathways, manipulation of environment on range of time and space scales –standardised methodologies, multiple stressor bioassays, MECS, in situ manipulation, in situ microbial observatories, confirmation of robust, high throughput ‘proxy’ measurements of RDOC e.g. CDOM, fDOM, COD, sensor development on range of platforms, international ‘institute’ applying for ‘national’ funding, link to model/data development/iteration (Polimene et al., this issue), determine production of DOC older than 100y (Jiao et al., 2014)

Schematic with known unknowns

Schematic of research proposal

References

Legendre et al. 2015 Progress in Oceanography

Legendre et al. 2017 ICES J Mar Sci

Plan of action :

These notes to Richard for ICES/PICES report, and to WG for comment

Carol to draft first structure identifying / delegating sections to specific co-authors – a.s.a.p. /by early/mid October

Carol to collate recent publications – central dropbox folder ?

Co-authors draft sections – by early December

Iteration of drafts through January

Submission to National Science Review by February – aim to be accepted / published by October 2018 when WG33 is scheduled to finish

17 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-34	권유정	국립수산과학원/연구사
WG-34	이성일	국립수산과학원/연구사

□ 개요

○ 일시: 2017년 9월 22일(09:00~14:30)

※ WG-34는 2017년 연례회의 기간 중에 business meeting을 따로 개최하지 않았으며, 워크숍3으로 대체함

○ 참석자: 의장 - Gerard DiNardo(NOAA/미국), Hidetada Kiyofugi(일본), Tetsuichiro Funamoto(일본), Yulina Hane(일본), Chi-lu Sun(대만), Suzan Yeh(대만), Steven Bograd(NOAA/미국), Elliott Hazen(NOAA/미국), Desiree Tommasi(미국), Barbara Muhling(미국), Michael Seki(NOAA/미국), Xiujuan Shan(중국), 이경환(한국), 정석근(한국), 조기표(한국)

□ 의제 및 논의 결과

○ W3 주제: 고도회유성 어종의 분포, 생산과 해양환경의 관계 및 수산자원평가 모델로의 통합(Linking oceanographic conditions to the distribution and productivity of highly migratory species and incorporation into fishery stock assessment models)

○ 워크숍 구성: 연구결과 7편(8편 중 1편 취소) 발표 후 토의 진행함. 발표 주제는 크게 3분야로 나누어짐

- 기후변화가 표층성 어종에 미치는 영향(3편)

- 고도회유성어종 연구를 위한 해양학적 특성의 이용 가능성 및 최적 관리(3편)

- 단일 어류자원의 풍흉에 따른 공간적 구조 비교 연구(1편)

○ 토의 사항

- WG-34의 목적, 목표 및 중간활동 점검, 특히 PICES와 ISC 각각의 책임과 공동작업의 장점을 점검함

- 2018년 PICES 연례회의에서 1일 topic session 개최 및 0.5일 회의(business meeting) 시간 요청에 합의
 - 개최 후 특별호 발간
 - ※ 주제: Applying Ecosystem considerations in science advice for managing highly migratory species
- WG-34(2015~2018) 활동 1년 연장 요청하기로 함
- WG-34의 활동을 정리하기 위한 2020년 국제 심포지엄 개최 가능성 논의

□ 의견/평가

- 관련분야에서 연구하는 우리나라 연구자들의 참여를 독려할 필요가 있으며, 해양물리 (특히 WG-40) 분야와의 시너지 효과가 기대됨

【첨부 1】

W3 Agenda

- 9:00** Challenge and opportunity for fisheries stock assessment in changing environments – Yong Chen (Invited Speaker)
- 9:40** Consequences of environmentally driven uncertainty in productivity for management of North Pacific Albacore tuna -- Desiree Tommasi
- 10:05** Dynamic ocean management applications for the Drift Gillnet fishery in the California Current – Elliott Hazen
- 10:30** **Coffee/Tea Break**
- 10:50** Optimal harvest strategies of sandfish based on a stage-structured model in the East Sea – Giphil Cho
- 11:15** Differences in biological characteristics of Pacific cod (*Gadus macrocephalus*) between the East and the Yellow Sea, Korea --Kyunghwan Lee
- 11:40** Individual-based model of chub mackerel (*Scomber japonicus*) covering from larval to adult stages to project climate-driven changes in their spatial distribution in the western North Pacific -- Sukgeun Jung
- 12:05** Oceanographic influences on the spawning and recruitment of Pacific bluefin tuna – Barbara Muhling
- 12:30** Development of methodology for analyses of larval ambient water temperature of Pacific bluefin tuna using SIMS – Yulina Hane
- 12:55** Lunch
- 2:30** Discussion

18 WG-35

※ WG-35: Working Group on Third North Pacific Ecosystem Status Report

□ 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

□ 개요

- 일시: 2017년 9월 23일(09:00~15:20)
- 참석자: Peter Chandler(공동의장, 캐나다), 유신재(공동의장, 한국), 주세종(한국), 남성현(한국), 이준수(한국), Sonia Batten(S캐나다), Keith Criddle(미국), Steven Bograd(미국), Jeanette Gaan(미국), Nick Bond(미국), Kazuaki Tadokoro(일본), Joji Ishizaka(일본), Guangshui Na(중국), Fei Yu(중국), Yuri Zuenko(러시아), Slava Lobanov(러시아), Igor Shevchenko(러시아), Hal Batchelder(Deputy Executive Secretary/PICES)

□ 의제 및 논의 결과

- WG35의 Terms of Reference 및 하와이 중기 회의 결과 검토
 - WG35의 terms of reference는 크게 2가지 목표로 요약할 수 있음
 1. NPESR3 발간
 2. ETSO(environmental time-series observations) data system의 구축
 - Implementation 일정을 검토함. 지역별 chapter는 2018년 상반기에 발간되고, 종합편은 2019년 상반기에 발간될 예정임
- ETSO 제출 현황 검토 및 대책 토의
 - SG-NPESR은 집계한 국가별 가용 ETSO 목록에 근거하여 수 백개의 ETSO가 제출될 것으로 예상하였으나 9월 중순 현재 67개 만이 제출되어 있음
 - 따라서 ETSO 제출을 독려하는 한편 기존의 방식도 병행하기로 함. 즉, 공저자가 자료를 확보하고 추후에 ETSO system에 입력

- ETSO 제출을 독려할 국가별 coordinator의 역할을 다시 강조하였으며 한국은 강동진 박사가 임명되어 있음
- 지역별 진행상태 보고
 - 15개 지역 중 전환대해역인 #25를 제외한 14개의 지역의 주저자가 지명되어 있고 대부분 다수의 공저자를 확보하고 작성이 진행되고 있음
 - 공통 장(chapter)으로 Human Demension, Climate change 부분도 주저자가 지명되어 진행 중임
 - 대부분의 지역 chapter들이 10월, 11월 말 까지 초고 제출이 가능한 것으로 보고하여 원래의 계획대로 진행될 것으로 판단됨
- 종합장(Synthesis Chapter)를 작성하기 위한 중기 워크샵이 5월에 계획되어 있어 하와이, 또는 시드니(PICES 본부 소재)나 제주에서 개최할 것을 MONITOR, FUTURE에 건의하였음
- FUTURE SSC에 제출할 WS35 발표자료 작성



WG35 회의 참가자

□ 의견/평가

- 동해, 동중국해의 참여가 중요함
 - 동해, 동중국해의 주저자는 러시아(Slava Lobanov, 동해), 중국(Fei Yu, 동중국해)이어서 추후 공저자 유치 및 원고작성이 제출된 ETSO를 중심으로 진행될 수 있으므로 한국측의 ETSO 제출의 독려가 시급함

19 WG-36

※ 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

□ 개요

- 일시: 2017년 9월 23일(09:00~18:00)
- 참석자: 의장 - Mary Hunsicker(NOAA/미국), Vladimir Kulik(극동해양연구소/러시아), Kazumi Wakita(토카이대학/일본), Robert Blasiak(도쿄대학/일본), Elliott Lee Hazen(NOAA/미국), Xiujuan Shan(황해수산연구소/중국), Sukyung Kang(국립수산과학원/한국), Sangchoul Yi(KMI/한국)

□ 의제 및 논의 결과

- WG-36 회의 안건 리뷰
 - 11개 주제 의제 채택
- WG-36 멤버 소개
 - Co-chairs: Xiujuan Shan(China) and Mary Hunsicker(USA)
 - Members: Elliott Hazen(USA), Jennifer Boldt(Canada), Robert Blasiak(Japan), Kazumi Wakita(Japan), Mitsutaku Makino(Japan), Vladimir Kulik(Russia), Yanbin Gu(China), Yan Jin(China), Sangchoul Yi(Korea)
- WG-36 멤버 국가별 현황 및 연구 결과 발표
 - 미, 중, 일, 러 등 각 국가에서 현재 수행중인 연구 내용 발표
- SG-CERP에 대한 배경소개 및 WG-36에 대한 관계 설명
 - SG-CERP는 FUTURE, MONITOR, S-HD 분과 등과 연관성이 있고 특히 FUTURE 목적 1.1 사항인 ‘생태계 복원성과 취약성 수준’ 판단을 위해 결성됨
 - PICES 회원 국가간의 Ecosystem Reference Points(생태계 참조 정보)를 비교 분석하는 방법을 연구

- 연구 그룹(SG-CERP)의 주요 성과는 Ecosystem Reference Points 작성을 위한 초안을 마련한 것임
- WG-36 Terms of Reference 협의
 - 각 년차별(Year1, Year2, Year3 등등) 과업 수행 목표 토의
 - WG-36에서 다루지는 비선형 분석 연구방법론 토의
- Intersessional Workshop 개최 여부 토의
 - WG-36과 관련하여 차기 연차 총회전에 Workshop 개최 필요 여부 토의
- 2018 연차 총회 비즈니스 미팅 및 워크샵 개최 관련 토의
 - 사무국을 통해 1day 비즈니스 미팅과 워크샵 개최를 요청하기로 함
 - 워킹그룹 활동 활성화를 위해 Github을 이용한 협업툴 이용



WG-36 회의 장면

□ 의견/평가

- 타 국가에 비해 한국측 전문가 풀(현재 사회과학 분야 1명)이 제한되어 있어 추가적인 인원 보강(자연과학분야)이 필요
 - 타 멤버국가의 경우 각 국가별 최소 3명의 전문가가 참석하여 관련 주제에 대한 심도 있는 토의 및 기여를 하고 있음
 - 한국의 경우 WG-36에 올해 첫 번째 참석자를 파견했으나 워킹그룹 활동에 비해 인력 규모가 미미한 수준으로 추가적인 전문가 참여 필요

※ 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

□ 개요

- 일시: 2017년 9월 23일(09:00~18:00)
- 참석자: 의장 - Annalisa Bracco(GIT/미국), Hiromichi Ueno(홋카이도 대학/일본)
 회원 - 김성용(KAIST/한국), Tetjana Ross(IOUS/캐나다), Daisuke Hasegawa (TNFRI/일본), Sachihiko Itoh(AORI/일본), Maxim V. Budyansky (POI/러시아), Sergey Prants(POI/러시아), Elena I. Ustinova(PSRFC, TINRO-center/러시아)

□ 의제 및 논의 결과

- Mesoscale and submesoscale processes에 대한 관련 논문의 리뷰 및 참석자별 관심주제와 연구중인 내용의 소개 및 공유
 - 중규모 와동류의 연간 변동성에 대한 지역적 특성연구 필요
 - 와동류의 생성 및 이동 소멸과정중의 주변 환경 변수 및 CHLs의 시간에 따른 변동성을 함께 고려할 필요.
 - 연해주지역의 중규모 와동류에 의한 영향과 fishery와의 연관성 발표
- 과학세션 및 향후 계획 논의
 - S9 Meso-/submeso-scale processes and their role in marine ecosystem 참석 독려
 - 2018 연례회의 전후 회의주제 선정



WG38 회의 각국대표단 및 식사

21 WG-39

※ WG-39: Working Group on an Integrated Ecosystem Assessment for the Central Arctic Ocean

※ 활동기간: 2016.11.~2018.10.

□ 정부대표

참가부문(역할)	성명	소속/직급
WG-39	신형철	극지연구소/책임연구원

□ 개요

- 일시: 2017년 9월 24일(09:00~17:00)
- 참석자: 의장- Sei-Ichi Saitoh(북해도대학/일본), 신형철(극지연구소/한국), Dr. Zhongyong Gao(국가해양국 제3해양연구소/중국), Dr. Guangshui Na (NMEMC/중국), Dr. Fang Zhang(중국극지연구소(PRIC)/중국)

□ 의제 및 논의 결과

- (배경) PICES가 2016년 ICES/PAME(북극해양환경보호) 북극중앙해 통합생태계평가 작업반에 합류하면서, 북극해 어장과 해운 활동 및 환경 취약성과 같은 문제에 대한 과학적 조연을 제공하기 위한 통합 생태계 평가(IEA) 준비에 참여
- 태평양측 북극해역에서 수집된 정보를 제공하고 평가에 기여하는 것이 중요하다는데 공감하고, 해당 정보 제공과 기여는 2017년 10월 예정된 제5차 FiSCAO와 2018년 5월에 계획된 제3차 공동 ICES/PICES/PAME 작업반 회의, 그리고 2018년 말로 예정된 최종보고서를 통해 이루어질 것임
- 이에 WG 39는 두 번의 PICES 워크숍을 제안함. 첫 번째 워크숍은 제3차 공동 회의에 대응하기 위해 2018년 2~3월 중, 두 번째 워크숍을 첫 번째 워크숍의 후속 조치로 또 PICES 학계에 보고하기 위해 PICES 2018 연례회의 기간에 1/2일 개최
- 워크숍 주요 주제
 - 1) Key locations in the Pacific Arctic and the critical processes to determine biological production
 - 2) Characterization of major changes for recent decades
 - 3) Ramifications for the ecosystem monitoring and management in the region

□ 의견/평가

○ 2018년 PICES 워크숍 개최를 위한 후속조치 필요

- 이미 수행한 북극해 연구와 전문가 역량을 어느 정도 갖추고 있으므로 우리나라가 워크숍 추진과 성과물 산출에 선도적인 역할을 할 수 있을 것으로 기대됨
- 북극해에서 과학적 영향력 확대와 질서 형성 과정에 참여하는 기반이 될 것으로 판단되며 39번 작업반 활동에 대한 인정과 지원이 이를 더욱 촉진할 것으로 생각함

22 WG-40

※ 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: 2017년 9월 23일(9:00~18:00)

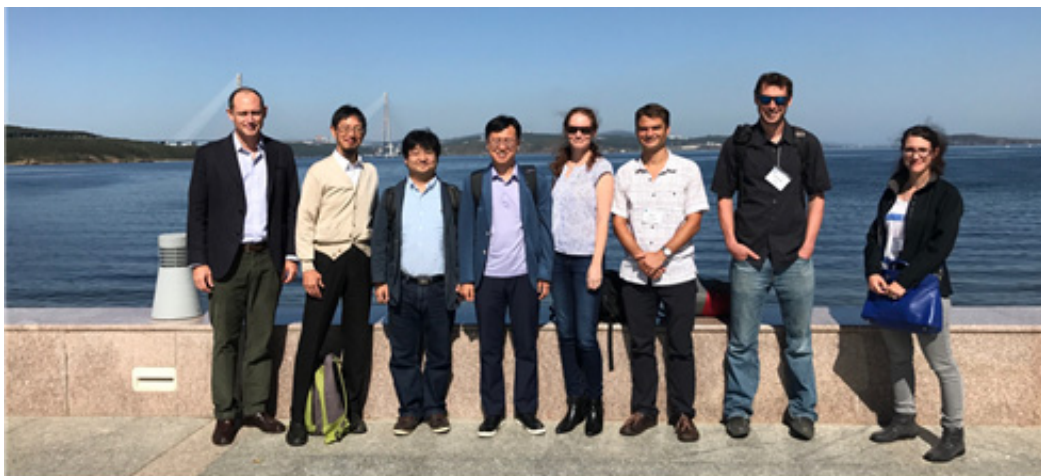
○ 참석자: 총 15명(WG-40 위원: 10명, 기타 참석자: 5명)

- 현장 참석 위원(8명): 권민호(한국 KIOST), 장찬주(한국 KIOST), Michael Jacox(미국 U. of California Santa Cruz/MOAA WSWFSC, 공동 의장), Ryan Rykaczewski(미국 U. of South Carolina, CLIVAR, 공동의장), Masami Nonaka(일본 JAMSTEC, 공동 의장), Emanuele Di Lorenzo(미국 Georgia Institute of Technology), Jim Christian(캐나다 Canadian Centre for Climate Modelling and Analysis), Yuri Zuenko(러시아 Pacific Scientific Research Fisheries Center(TINRO-Center))
- 화상 참가 위원(2명) : Antonietta Capotondi(미국 U. of Colorado, CLIVAR), Shoshiro Minobe(일본 Hokkaido University)
- 위원이외 참가자(5명): Nick Bond(미국 NOAA), Anna Vazhova(러시아), Desiree Tommasi(미국 NOAA), Kate Lowry(미국 WHOI), Jennifer M. Jackson(캐나다 Hakai Institute)

□ 의제 및 논의 결과

- 참석자 소개
 - 참석자 자신 소개 및 화상회의 참가자 확인
- WG-40 제안서 내용 소개(Emanuele Di Lorenzo)
 - 제안 배경 및 TOR 소개

- WG-40 관련 연구 소개
 - 각 나라에서 진행 중인 관련 연구 소개(총 12명 발표)
- Terms of Reference(TOR) 검토
 - TOR 검토 및 각 TOR 목표 실행 방법 토의
 - TOR1에서 shellfish를 명시해야 하는 지에 대한 토론이 있었으며 해양산성화 영향과 밀접하게 연관이 있음을 설명함
 - 내년 2018 PICES 총회에 TOR1 관련 topic session을 제안하기로 하였으며 공동좌장은 Ryan Rykaczewski, Akinori Takasuka, Chan Joo Jang 3인이며, APCC에서 대기 계절 예측 분야 전문가를 한국측이 제안하여 1명을 초청하기로 잠정 결정함
 - 계절 및 수십 년 예측 관련 각국 연구 활동 현황을 조사·수집하기 위해 설문지를 배포하기로 함. 설문지의 포함시킬 항목에 대해서는 메일 교환 등을 통해 추후 논의하기로 함
- WG-40 관련 세션과 워크숍 검토 및 제안서 작성(부록 2 참조)
 - ECCWO 2018(워싱턴, 2018.6.4~8)에서 계절 및 수십 년 예측에 관한 세션이 있을 예정임
 - OSM 2018에 intersessional meeting을, PICES 2018 연례총회에서는 topic 세션을 제안하기로 결정함
- 기타
 - 작업반 위원이 아닌 관련 연구자, 특히 미국의 적극적인 참여 및 발표가 있었음



WG-40 참석인 사진: (왼쪽부터) Emanuele Di Lorenzo, Masami Nonaka, 권민호, 장찬주, Kate Lowry, Ryan Rykaczewski, Michael Jocox, Desiree Tommasi

□ 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
- 작업반 목적에 적절한 각 회원국 전문가들이 위원으로 참가하여 관련 연구 활동을 소개하였음. 또한 다양한 국제모임에 관련 세션을 제안 토론이 있었음. 따라서 활발한 활동과 우수한 결과를 기대함
- 지구시스템모형을 이용한 생태변수의 직접 예측은 상당히 어려우므로 생태변수를 예측하기 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	Review of WG Proposal
09:30	Brief summaries of relevant research efforts by WG members (5 minutes each) <i>See order of presentations listed at the bottom of the agenda</i>
10:30	Coffee Break
10:40	Continue research summaries
11:30	Review of WG40 Terms of Reference (with editing, if necessary)
12:30	Lunch
14:00	Discussion of potential products <ul style="list-style-type: none"> • Review paper? • Special Issue? • Common approach to tie efforts in PICES regions together?
14:30	Discussion of possible session ideas for PICES 2018 annual meeting
15:00	Discussion of goals and agenda for an intersessional workshop (in conjunction with the “Effects of Climate Change on the World’s Oceans” symposium; June 2018 in Washington D. C., USA)
15:30	Coffee Break
15:45	Work on tasks <ul style="list-style-type: none"> • Compose two PPT slides for Dr. Bograd to share in S10 • Begin drafting proposal for PICES 2018 session • Begin drafting proposal for intersessional workshop
17:45	Review to-do lists and assignments
18:00	Adjourn

【부록 2-1.】 WG-40 관련 ECCWO 2018 세션

(주제: 계절 및 수십 년 예측) 제안서

제목: From prediction to projection: the role of seasonal to decadal forecasts in a changing climate

Research examining the future impacts of environmental change and variability on ocean ecosystems has historically been focused on making projections on multi-decadal to centennial time scales. Nevertheless, recent years have seen the emergence of the first generation of marine ecosystem predictions working on shorter timescales (i.e. seasonal, annual and decadal scales). These forecasts are tailored to the tactical decision-making timescales of individuals, businesses, sectors or governments and inform strategies for coping with and adapting to climate change and variability. They also form a natural continuum with projections on the climatic timescale: many of the techniques used are similar, and testing predictability in the short-term builds confidence in our ability to project in the long-term. In this session, we welcome contributions on a broad range of potential future impacts on ocean ecosystems, including (but not limited to) ocean warming, circulation changes, acidification, eutrophication, hypoxia, and ecosystem structure or function. We seek research that addresses prediction of these ecosystem impacts as well as its relationship to long-term projections; relevant topics include 1) mechanisms that generate predictability in ocean ecosystems, 2) methods for statistically and/or mechanistically forecasting physical and/or biological variables, 3) case studies of existing biological forecast systems, 4) requirements for forecasts - including end-user needs - and assessment of forecast value, and 5) uses of forecasts within a climate-change adaptation context. Contributions that link the time-scales of prediction and projection and highlight examples of what one field can learn from the other are particularly encouraged.

Conveners:

Mark R. Payne

Erica Ombres

Michael Jacox

Masami Nonaka

【부록 2-2.】 PICES 2018 연례총회 세션 제안서 초안

Title: Investigating the robustness of ecological responses to predictable regional and large-scale climate changes

Duration (days): 1

Convenors and contact info:

Ryan Rykaczewski
University of South Carolina
ryk@sc.edu

Akinori Takasuka
Japan Fisheries Research and Education Agency
takasuka@affrc.go.jp

Chan Joo Jang
Korea Institute of Ocean Science and Technology
cjjang@kiost.ac.kr

Description including background and objectives (<300 words)

In the North Pacific, regional and large-scale climate forcing impacts a wide range of physical and ecological characteristics including temperature, stratification, ocean circulation, upwelling, biogeochemical properties, and primary and secondary production. These characteristics, in turn, can impact the distribution, composition, and productivity of fisheries resources. However, the accuracy of many climate-ecosystem relationships derived from historical observations deteriorates when faced with new observations. Reducing the uncertainty associated with climate-ecological relationships requires an understanding of the mechanisms that govern empirical correlations. In this session, we seek presentations focused on climate-ecosystem relationships and whether such relationships can be expected to persist under future (e.g., months to decades) climate conditions. Many regional and large-scale properties of the physical ocean state can be skillfully predicted over scales of seasons and over years for some properties, and we hope that such ability, with further clarification of predictable properties in different

regions on different timescales, can be used in combination with understanding of robust climate-ecosystem relationships to provide forecasts of marine ecosystems that will be useful to resource management and utilization.

The objectives of this topic session are directly relevant to the foci of the 2018 Annual Meeting, namely improving understanding of “mechanisms of ecosystem responses to natural and anthropogenic forcing across the spectrum of time and space scales in the North Pacific, as well as monitoring, retrospective analysis, and forecasting ecosystem variability.” PICES WG-40 (Climate and Ecosystem Predictability) aims to identify, diagnose, and quantify predictable response in North Pacific marine ecosystems that arise from regional and large-scale climate processes. One of the more significant challenges to accomplishing this task is to identify robust climate-ecosystem relationships that persist over time and permit skillful forecasting. We hope that this session provides some insights to this challenge.

We will also seek to include participation of ECS in this topics session.

Optional information:

Co-sponsoring organizations (and request for convenors): POC and FUTURE are suggested as sponsoring committees

Names of invited speaker(s)

WonMoo Kim from APCC (Busan) - atmospheric forecasting on seasonal timescales

Susan Allen (UBC) - spring bloom prediction for Strait of Georgia

Takeshi Doi (JAMSTEC, Yokohama), near-operational atmosphere-ocean forecasting on seasonal timescales (without travel supports) (recommended by Shoshiro Minobe)

Publication requirements (paper, special issue, PICES scientific report): At the minimum, PICES Press

23 S-MBM

※ 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

□ 개요

○ 일시: 2017년 09월 23일(13:00~18:00)

○ 참석자: (의장 2명) Patrick O'Hara(Canada Wildlife Service/캐나다), Kaoru Hattori
(Japan Fisheries Research and Education Agency(FRA)/일본)

(회원 8명) Robert Suryan(University of Oregon /미국), Andrew Trites(University of British Columbia/캐나다), Selina Agbayani(University of British Columbia/캐나다), Tsutomu Tamura(고래연구소/일본), 안용락 (해양생물자원관/한국), 김미란(국립공원연구원/한국), 안소연 (한국해양과학기술원/한국), 홍미진(경희대학교/한국)

□ 의제 및 논의 결과

○ 2017년 활동 보고

- PICES S12 발표(Andrew Trites 교수, “먹이 이용” 관련 내용)
- 2017 IWC Scientific Committee Meeting 참관 보고

○ 신입 회원 소개

- 바닷새 분야 국립공원연구원 김미란 박사 소개

○ 해양포유류 및 조류 관련 국제 심포지엄 정보 공유

- 태평양 바닷새 그룹 회의(Pacific Seabird Group Meeting)/2018.2.21. 멕시코
- 해양포유류학회(Biennial Marine Mammal Conference)/2017.10.23~27 캐나다

○ 토의 사항

- 2018년 주제 세션 및 워크숍 아이디어 제안
: 해양 포유류 및 조류 전문가를 초청하여 S-MBS 주관 워크숍 개최 논의
- 2017 PICES 회의 진행 동안 타 그룹(BIO)과 연계 논의

○ 기타

- 전년도에 비해 바닷새 관련 전문가 활동 저조하여 활동 장려 필요



S-MBM 회의 장면

□ 의견/평가

- 향후 계획, 일반적인 의견 개진
 - 먹이사슬 변동이 해양생태계 최상위 포식자에 미치는 영향 논의(2018)
 - 기후변화와 먹이사슬 변동이 해양포유류 및 바닷새의 분포와 개체수에 미치는 영향 논의(2019)

24 S-CCME

※ S-CCME: Section on Climate Change Effects on Marine Ecosystems

※ 활동기간: 2011.10.~, 2015.10.~2017.10.(갱신)

□ 정부대표

참가부문(역할)	성명	소속/직급
S-CCME	강수경	국립수산과학원/연구소
S-CCME	김수암	부경대학교/교수
S-CCME	정석근	제주대학교/교수

□ 개요

- 일시: 2017년 9월 24일(09:00~12:30)
- 참석자: 공동의장 - Anne Hollowed(NOAA/미국), Shin-ichi Ito(FRA/일본), Jackie King (PBS/캐나다), Camel Lowe(캐나다), X. Shan(YSFRI/중국), X. Zhang(중국), Jinhui Wang(중국), Jilong Li(중국), 3명의 중국인. Elliot Hazon(미국), 정석근 (제주대학교/한국), 김수암(부경대학교/한국)

□ 의제 및 논의 결과

- 멤버의 교체
 - 캐나다: Helen Joseph -> Nancy Shackell
 - Mike Foreman -> A. Pena
- 활동 수행 및 국제적 활동의 소개
 - 1) 의장은 지난 3월 캐나다 빅토리아에서 개최되었던 Small Pelagic Fish Symposium 동안 S-CCME 회의를 하루 개최했음을 알림
 - 2) S. Saito 교수는 6월 놀웨이에서 개최되었던 제3차 ESSAS 심포지엄을 요약함(19개국으로부터 187명이 모여, workshop 4개를 개최했음). 내년 ESSAS 회의는 6월에 미국 앵커리지에서 개최됨
 - 3) 의장은 내년 6월 미국 Washington DC에서 개최되는 Climate Change Symposium을 소개함. 95개의 theme session 주제 중에서 단지 18개만이 채택되었고, workshop은 8개 승인됨
 - 4) NPAFC 의장인 Camel Lowe는 국제 연어의 해(International Year of salmon: IYS)의

활동에 대해 보고함. 2016~2022년 동안에 수행될 이 프로그램은 2019년에 최고조에 달하는데, 대양에서 5척의 연구선(러시아, 캐나다, 미국, 일본은 긍정적, 한국은 미정)으로 해양조사를 한 달간 수행할 계획임. 그 외에 eDNA, water sample, environment에 대한 연구가 추가로 진행될 예정. 기후변화와 연어의 성숙과정, 성장, 어획율, 어구선택성 등이 추가로 연구될 예정

- 5) 유럽에서는 15개국이 연합하여 2016~2020년 동안에 CERES 프로그램을 수행하면서, 수산업과 양식어업에 대한 연구를 추진함
- 6) 캐나다에서는 2018년부터 기후변화 적응 서비스 프로그램이 시작될 예정. 취약성 분석, 해양화학, 기후변동 모델링, 어류자원량 변동 영향, 생태계 회복력, 적응 등이 연구될 예정
- 7) 미국은 알래스카 지역에서 ACLIM 프로그램이 가동될 예정
- 8) 중국은 2015~2019년 동안에 어류의 초기발생과 환경을 다루는 연구과제가 진행되고 있으며, 2017~2021년에는 기후변동의 취약성, 민감성을 다루는 연구과제가 수행될 예정
- 9) 그 외에, IPCC AR6의 진행과정, FAO 보고서, PICES의 FUTURE SSC 활동, 내년 PICES/ICES의 theme session topic, 기타 진행 중인 국제회의 등이 소개되었음

□ 의견/평가

- 향후, 우리나라에서도 기후변화가 해양생태계에 미치는 영향에 대한 연구과제를 개발하여야, 우리나라 해양생태계가 어떻게 변화할 것인지 예측이 가능하며, 이 결과를 우리 정부의 중장기적 해양·수산계획에 적용시킬 수 있으며, 그 결과를 국제사회에 보고할 수 있음. 현재, 우리나라는 국제사회의 연구주제에 맞추어 이 분야 연구를 추진하고 있는 연구기관, 혹은 대형 연구 프로젝트가 없음

【별첨 1】

회의 순서

S-CCME Business Meeting Agenda
PICES Annual Science Meeting
Bldg. B, Far Eastern Federal University (FEFU), Room D-564

09:00	Introductions
09:05	Review of past accomplishments
09:10-09:20	July meeting in Copenhagen (vulnerability assessments) (Hazen)
09:20-09:30	Lowell Wakefield Symposium (Hollowed)
09:30-09:40	ESSAS Open Science Meeting (Sei-Ichi Saitoh)
09:40-09:50	Open Science Session ICES (Hollowed)
09:50-10:00	ICES / PICES Theme Session A (Hollowed)
10:00	COFFEE
10:20	Plans for 2018
10:20-10:30	4th Effects of climate change on the world's oceans symposium (Hollowed)
10:30-10:45	2018 PICES/ICES theme session proposals for 2018 (King)
10:45	Updates on modeling nodes (10 min each)
10:45-10:55	Overview of European and western Atlantic projects (Hollowed)
10:55-11:05	COCA California Current (Hazen or Jacox)
11:05-11:15	ACLIM Bering Sea Research and Acceleration Transition Plan (RTAP) Operationalization of ACLIM (Hollowed)
11:15-11:25	GOA regional action plan - Baja to Bering (unfunded) (Hollowed)
11:25-11:35	Canada (King or Pena)
11:35-11:45	Russia (Zenko)
11:45-11:55	Japan (TBD)
11:55-12:05	Korea (Sukyung Kang and or Chan Joo Jang)
12:05-12:15	China (Xiujuan Shan)
12:15-12:25	SICCME contributions to IPCC scoping and author team time lines (Hollowed)
12:30	END

25 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

□ 개요

○ 일시: 2017년 9월 23일(09:00~18:00)

○ 참석자: 의장- Douding Lu, Charles Trick, William P. Cochlan(공동 의장)

멤버- Charles Trick(캐나다), William P. Cochlan(미국), Douding Lu(중국), Hao Guo(중국), Chuang jiang Guan(중국), Inna Stonik (러시아), Milissa Peacock(미국), Mitsunori Iwataki(일본), Ryuji Kuwahara(일본), 임월애(한국), Setsuko Sakamoto(일본) (Observers) Masaya Katoh(일본), Xinfeng Dai(중국), Toyomitsu Hori(일본), Polina Kamaneva(러시아), Keigo Yamamoto(일본), Lingjuan Wu(중국), Zijun Xu(중국)

□ 의제 및 논의 결과

○ W4 개최(2017.9.22, 1day)

- PICES 국가들의 적조발생의 장기변화에 대한 연구결과 발표

- 일본 Keigo Yamamoto: 독성 *Alexandrium tamarense*의 장기모니터링과 Osaka bay, 동쪽 세토 내해의 환경요인들
- 미국 Nichola Bond(미국): 북태평양 Gyro Oscillation, 대만난류의 쿠로시오 포함 적조발생과 관련된 해양환경 개념: stress, detention, transport
- 중국 Douding LU: 중국연안의 카레니아 적조발생과 기후변화와와의 관계
- 일본 Setsuko Sakamoto 일본 세토내해에서의 환경요인과 유해적조발생의 장기 변동
- 러시아 Tatiana Orlova: Peter the Great Bay 저서에서의 잠재적 독성 와편모조류의 장기변동과 종조성, 러시아 Amursky bay 에서 *Ostreopsis* sp. 등 시구에테라어독 종이 출현 및 해양 cyano-

bacteria 문제

- 중국 Jinhui Wang: 동중국해에서 적조종 천이 및 관련된 잠재적 외래유입종 보하이만(*Heterosigma akashiwo*), 동중국해(*Karenia mikimotoi*), 남중국해(*Cochlodinium polykrikoides*, *Trichodesmium*)
- 미국 Mark Well: 연안에서 대규모 *Pseudo-nitzschia* 적조를 이끄는 해양학적 조건
- 미국 Melissa B. Peacock: 육지와 바다의 경계에서의 해양조류독소와 다양한 담수
- 미국 William P. Cochlan: 캘리포니아 해류 용승시스템에서 *Pseudo-nitzschia australis*의 독성과 성장에 대한 해양산성화와 온도의 효과

- GlobalHAB, “Best Practices Manual and for Climate change research”에 대한 소개
 - William Cochlan(샌프란시스코 주립대학)과 Charles Trick(캐나다 웨스턴대학) 발표 및 진행(Mark Well과 Vera trainer 다른 회의 참석으로 대신 진행)
 - 독성오염에 대한 사회적 관점의 접근을 위한 교육시사 프로그램(YOU tube 동영상) 알래스카에서 문제가 되는 ASP를 주민자치 모니터링 프로그램 시스템 운영한 성공적인 사례 소개
- MEQ 내에서의 새로운 TOR과 MEQ 요청사항 논의(새로운 HAB-S 멤버 포함)
- 2018 PICES 동안 워크숍 주제 논의
 - 제안된 주제: Conditions promoting historical Dinophysis events in the western Pacific and new events in the eastern Pacific. 우리나라의 경우 Dinophysis가 유해한 영향이 없어 반대함
 - MEQ 상정 주제: 2018년 워크숍 제안(1day) “Emerging blooms of toxic dinoflagellates in the Pacific: Comparative analysis of their prevalence and ecological impacts in the eastern and western regions”
- Country Report 발표
 - 일본(Setuko Sakamoto), 중국(Hao Guo), 캐나다(Nicky Haigh), 러시아(Tatiana Orlova), 한국(임월애)
- 2개 스페셜 발표
 - Lingjuan Wu/중국: An analysis of dynamic factors influencing the 2013 giant jellyfish bloom near Qinhuangdao in the Bohai Sea, China
 - Mitsunori Iwataki/일본: Ultrastructure and phylogenetic position of a karenian dino-flagellate collected from Japanese coast

- MAFF(Ministry of Agriculture, Forestry and Fisheries, Japan) 최근 활동 및 S-HAB와 관련된 활동 설명(Charles Trick)
 - Marine Ecosystem Health and Human Well Being 관련 활동 설명
 - MAFF와 S-HAB의 공동활동에 대한 설명: 쿠아테말라 연안의 소실된 어업 공동체에 대한 공동체요구평가 실시와 결과 발표 P3 problem: People causing Problem that affect People's health and well-being
- 2017년 HAB-S의 성과
 - 태평양 서쪽과 동쪽의 Pseudo-nitzschia 비교 연구결과 PICES 기고 완료
- FUTURE(Forecasting and Understanding Trends, Uncertainty and Responses of the North Pacific Ecosystem)의 최근 활동에 대한 보고(Dr. Toyomitsu Horii)
 - FUTURE와 기후변화 관련 활동보고(Climature system, Marine ecosystem, Human system) 및 S-HAB와 연계성 설명
- HABMAP 작성 요청(2017.11.15.) 및 HAE-DAT 입력
 - 캐나다(Nicky Haigh), 중국(Chunjiang Guan, Xinfeng Dai), 일본(Setsuko Sakamoto), 한국(임월애, 박태규), 러시아(Tatiana Morozova, Tatiana Orlova), 미국(Vera trainer)

26 SG-MES

※ SG-MES: Study Group on Marine Ecosystem Services

※ 활동기간: 2016.11.~2017.10.

□ 정부대표

참가부문(역할)	성명	소속/직급
SG-MES	김종성	서울대학교/교수
SG-MES	남정호	한국해양수산개발원/연구위원

□ 개요

○ 일시: 2017년 9월 23일(09:00~18:00)

○ 참석자

- 의장 - Shang Chen(FIO/중국)

- 멤버 - 남정호(한국해양수산개발원), Keith Criddle(HD Committee 의장, 미국 알래스카 주립대학/미국), Wei Liu(FIO/중국), Li Jingmei(중국해양대학/중국), Olga N. Lukyanova(태평양과학연구·수산센터/러시아), Funamoto Tetsuichiro(농림수산부 수산청/일본)

□ 의제 및 논의 결과

○ 분과 회의 의제

- MES SG(Study Group) 배경 및 TOR(Terms of Reference) 검토
- MES 방법론 및 평가 사례
- 워크숍(22일) 진행경과 보고
- WG-MES 설립 제안서 개발
- 향후 일정

○ MES SG(Study Group) 배경 및 TOR(Terms of Reference) 검토

- 북태평양해양과학기구(BCPOM)는 다양한 현안을 각 회원국의 전문가들이 참여하여 논의하는 구조를 갖고 있음
 - 해양생태계서비스는 최근 들어 이 이슈가 국제기구의 생물다양성보전과 관련하여 핵심 틀로 자리잡으면서 이를 PICES에 수용하기 위해 Study Group 운영이 제안되었음
- ※ 생물다양성협약의 이행과 관련하여 생태계서비스를 과학적으로 평가하고 이를 정책이행에 활용하기 위해

2019년까지 지역평가의 완료, 평가방법개발을 IPBES(생물다양성과학기구)를 중심으로 진행 중에 있음

※ 유럽연합은 2020년까지 관할 육역 및 해역에 대한 생태계가치의 평가 및 매핑에 관한사항으로 EU 행정 명령으로 채택하였음

- 이 Study Group은 2013년 Human Dimension 설립을 위한 회의에서 해양생태계서비스가 소개된 이후 그간의 정부 간 논의과정을 거쳐 마련되었음

- 2013년 SG 설립에 관한 제안이 캐나다에서 개최한 Science Board 회의에서 수용되었으나 추가 작업은 이루어지지 않았음. 이후 2016년 11월에 새로운 제안서가 Science Board에 제출·채택되었음

※ HD Committee는 2016년 11월에 설치되었음

- 동 분과회의에서 논의한 TOR은 SG의 운영규칙이라기보다는 향후 WG을 구성·운영할 경우 이 WG의 기능에 관한 사항을 다루고 있는데, 주요내용은 아래와 같음

- 북태평양 지역에서 해양생태계서비스(MES) 기존 연구 리뷰
- 북태평양 MES 항목 정리
- MES 평가 수단 및 방법론 개발
- MES 평가 기술지침(technical guideline)마련
- MES의 해양정책·해양관리와 연계 통합
- 제4차 NPESR(북태평양생태계현황보고서)의 MES 분야 작성에 기여

○ MES 방법론 및 평가 사례

- 개별 연구자에 의한 MES에 대한 논문이나 보고서 작성 사례는 상당수 있는 것으로 파악되었으나, 이를 개별 국가의 해양관리 정책으로 채택하여 방법론을 확정하거나 평가한 사례는 중국이 유일함

- 중국은 “해양생태자본평가기술지침”을 제정하고 2012년 이를 토대로 전국 연안해역의생태계서비스 가치를 평가했다고 보고했음.

- 미국은 2015년 오바마 행정부 시절 백악관의 관련 실(Office)이 생태계서비스를 연방정부정책에 수용하겠다는 MOU를 체결했지만, 현재 트럼프 정부에서 이에 관한 진전은 없는 것으로 판단됨

- 우리나라는 국가생물다양성전략 및 「생물다양성 보전 및 이용에 관한 법률」에서 ‘생태계가 제공하는 서비스’로 규정되어 있으나, 해양관련 법률에서는 이에 관한 근거규정이 없음.

- 현재 해양수산부는 ‘해양공간계획 및 관리에 관한 법률’을 입법예고하였고, 향후 해양관리에서 생태계서비스 가치 평가결과를 활용하기 위한 연구개발을 2017년부터 착수했음

- 러시아와 일본도 해양생태계서비스의 가치를 평가하고 이를 정책에 활용한 사례는 없는 것으로 보고되었음

○ 워크숍(22일) 진행경과 보고

- 22일 워크숍에서 3개의 연구가 발표되었는데, 중국은 해양생태자본평가지침의 주요 내용, 매립에 의한 손실 연구사례를 발표했고, 일본은 수산자원의 경제적 가치에 관한 내용을 발표한 것으로 보고되었음

○ MES 워킹그룹 설립 제안서 개발

- 동 의제와 관련하여 워킹그룹 제안서 소개, 워킹그룹 설립제안서 논의, 2018년 총회에서 발표세션 검토 등이 이루어졌음

- 이 중 가장 많은 논의가 이루어진 주제는 워킹그룹 설립제안서였는데, 주요 논의 내용 및 그 결과는 아래와 같음

- 워킹그룹의 명칭: 워킹그룹의 명칭은 WG-MES(Working Group on Marine Ecosystem Services, 해양생태계 워킹그룹)으로 결정

※ 이 워킹그룹은 HD Committee가 후원하는 최초의 워킹그룹임

- 워킹그룹 운영기간: 당초 5년으로 제안되었으나, 일반적으로 다른 워킹그룹의 운영기간은 3년을 기본으로, 필요에 따라 연장운영하고 있는바, 기본 운영기간을 3년으로 설정하는 것으로 결정되었음

- 관련 협조 기구: 초안은 10여개의 기구로 제안되었으나, 활동기간과 예산 역량 등을 고려하여 3개의 기구로 제한-ICES(International Council for the Exploration of the SEa), IMBER(Integrated Marine Biosphere Research), IPBES(Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services under UNEP)

- FUTURE 프로그램에 대한 기여: 동 워킹그룹을 통해 FUTURE 프로그램의 목표 1(북태평양에서 핵심적인 생태적 과정에 대한 이해), 목표 2(상태보고서, 전망, 예측 및 관리)를 지원

※ 2009년 총회에서 채택된 FUTURE(Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystem)은 기후변화 · 북태평양생태계 · 인간과의 상호작용을 규명하기 위해 운영되는 과학프로그램임

- 기능 및 역할

- 북태평양 지역에서 해양생태계서비스(MES) 기존 연구 리뷰
- 북태평양 MES 항목 정리
- MES 평가 수단 및 방법론 개발
- MES 평가 기술지침(technical guideline) 마련

- MES의 해양정책 · 해양관리와 연계 통합 촉진
- PICES의 보고서 및 배포자료에 MES 분야 작성에 기여
- 구성원 및 리더
 - 각국은 3~5인의 전문가를 추천하고, 이 중 2명의 구성원이 공동의장(북서태평양 1인, 북동태평양 1인)을 맡도록 함. 잠정적으로 중국의 Shang Chen(중국 제1해양연구소), 미국의 Dan Lew 박사(NOAA 알래스카 지부)를 추천
 - 현재 캐나다 1인, 중국 5인, 대한민국 2인, 일본 2인, 러시아 2인, 미국 1인이 추천되었음.
- 향후 일정
 - 2017년 10월 HD, SB, GC에서 워킹그룹 채택
 - 2018년 1월 : 구성원 및 의장 추천
 - 2018년 3월 : 사업 착수
 - 2018년 4월 : 2일의 워크숍 개최(중국 청도)
TOR, 활동계획 작성 및 HD에 제출
 - 2018년 10월 : 총회에서 1일의 워킹그룹 회의
생태계서비스 평가 방법론 및 사례 리뷰, 정책 및 관리에 활용사례 종합 등
 - 2019년 10월 : 총회에서 1일의 워킹그룹 회의
생태계서비스 평가 기술 지침 초안 틀 협의
 - 2020년 5월 : 3일기간 워크숍(중국 청도) 기술지침 초안 완료
 - 2020년 10월 : 총회에서 1일의 워킹그룹 회의
- 예상 성과물
 - 북태평양지역 기술지침 초안 작성
 - PICES 보고서에 생태계서비스 분야 내용 작성
 - 해양관리 및 정책분석에 MES 정보의 통합연계 활용을 위한 기술보고서 작성

□ 시사점

- PICES는 향후 생태계 평가과정에서 해양생태계서비스에 관한 사항을 핵심 내용으로 수용할 것으로 판단
- NPESR(북태평양생태계현황보고서)는 현재까지 3회 발간되었는데, 제4차 NPESR은 UNRP, IPBES의 진행상황을 고려할 때 해양생태계서비스 개념이 수용될 것으로 전망됨

- 즉, 2019년 IPBES가 지역보고서와 방법론을 개발할 경우 이를 토대로 북태평양생태계현황보고서 작성 작업이 추진될 것으로 판단됨
 - 특히 FUTURE 프로그램은 사회·경제활동이 해양생태계와 자원상태에 미치는 영향을 종합적으로 분석, 예측하여 정책에 활용하는 것으로 목적으로 하고 있는바, 이를 정량적으로 파악하고 정책활용의 효과성을 높이기 위해 생태계서비스 가치개념을 활용할 가능성이 높음
- WG-MES에 우리나라 전문가 추가 추천 및 2018년 청도 회의 적극 참석
- 현재 우리나라는 잠정적으로 2명만 추천되어 있는데, 경제학자, 생태학자, 정책전문가 등을 포함하여 5인의 전문가를 추천하여 워킹그룹 운영에서 아국의 기여가 안정적으로 이루어질 수 있도록 해야 함



SG-MES 참석자

【별첨 1】

MES SG 의제

PICES Study Group of Marine Ecosystem Services (SG-MES)
First Meeting

September 23, 2017, 09:00-12:30 and 14:00-18:00

Room B537, Bldg. B, Far Eastern Federal University (FEFU)

Chair: Dr. Shang Sunny Chen (schen@fio.org.cn)

Tentative Agenda

1. Self-introductions (5 minutes each) (All)
Please be prepared to introduce yourself and to describe your recent, ongoing, and upcoming projects relating to SG-MES key tasks
2. Background of SG-MES and overview of Terms of Reference (Sunny)
Terms of Reference
 1. Review MES studies from the North Pacific region.
 2. Convene two workshops: (1) an intersessional workshop during the UNESCO/IOC/WESTPAC Conference and, (2) a workshop at the 2017 PICES Annual Meeting. These workshops will examine the provision of MES in North Pacific waters and the scientific tools/methodologies for analyzing them.
 3. Develop a typology of marine ecosystem services and tools/methodologies that can be used to analyze them.
 4. Develop the terms of reference for a potential Working Group on MES and identify potential members of that WG who would reflect wider interests of scientists in PICES member nations, including relevance to the FUTURE mandate.
3. Review of MES methodologies and assessment cases (Jingmei Li)
Methodologies of MES: Introduction and summary Jingmei Li
Case studies of MES in China Benrong Peng
Jungho Nam & Jong Seong Kim
Case studies of MES in Korea
Case studies of MES in Canada Miriam O
Case studies of MES in USA Dan Lew
Case studies of MES in Russia and Japan
4. Report on W2 (Workshop on coastal ecosystem services) (Wei Liu)
5. Development of a proposal of establish a WG-MES (Sunny)
 - a Introduction of the proposal of establish a WG-MES Wei Liu
 - b Discussion and adoption the proposal of establish a WG-MES (All)
 - c Review of topic session proposal for PICES-2018, Yokohama Japan (Wei Liu)
6. Upcoming meetings on MES (Sunny)

9th ESP world conference, 11-15 Dec 2017, Shenzhen, China
T7 Role of social sciences in the ecosystem services valuation
a Co-chairs: Sebastian Villasante (Spain), Shang Chen, Hua Zheng (China)
b Natural Capital Symposium, March 19-22, 2018, Stanford Univ. USA
PICES-2018, HD's topic session and business meeting, Yokohama Japan,
c Oct 25 - Nov 4, 2018

- 7. Others (Sunny)
- 8. Concluding remarks (Sunny)

WG-MES 제안서

Proposal to Form a Working Group on Marine Ecosystem Service, PICES

Proposal to Establish a Working Group on Marine Ecosystem Services (WG-MES) of PICES' HD Committee

Draft for discussion

1. Group type and name

Working Group on Marine Ecosystem Services (WG-MES).

2. Reporting to

The WG-MES will be the first working group sponsored by Human Dimensions Committee (HD) of PICES and will report to HD and its co-sponsors.

3. Term

The term for this working group is expected to be 3 years.

4. Linkages to other organizations

WG-MES' success depends upon broad support from international organizations in marine science. WG-MES and its members will seek to interact, cooperate, and exchange information on MES with other international organizations in marine science with similar interests in MES. These organizations include:

- a. ICES (International Council for the Exploration of the Sea)
- b. IMBER (Integrated Marine Biosphere Research)
- c. IPBES (The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services under UNEP, which assesses the state of biodiversity and of the ecosystem services it provides to society, in response to requests from decision makers)

IMBER has expressed strong interest in the WG-MES if approved by PICES. It has indicated interest in serving as a co-sponsor of the group and may provide about 3K USD to support the participation of young scientists in the WG-MES' meetings.

5. Contributions to the FUTURE program

The WG-MES will help meet the FUTURE program Objective 1 (Understanding Critical Processes in the North Pacific) and Objective 2 (Status Reports, Outlooks, Forecasts, and Engagement). Ecosystem services represent an important dimension of the third key scientific question under FUTURE Objective 1 (How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?). In addition, case studies on the assessment of ecosystem services in the North Pacific ecosystem will be added as a new section in PICES' Reports.

6. Motivation and Goals

Marine ecosystems provide direct or indirect benefits to people. Ocean ecosystems provide human populations with ecological goods and services, such as seafood, climate regulation and air quality maintenance, storm damages prevention, waste purification, recreation and leisure opportunities, and biodiversity maintenance, among others. The accounting for anthropogenic values of MES in policy and management decisions has become an emergent issue recognized as critical from a social, economic, and cultural perspective, but also one that poses challenges both from a scientific and policy perspective. As a result, MES has unsurprisingly become a hot topic of many international meetings and organizations. The United Nation (UN)'s Millennium Ecosystem Assessment focuses on the change of global ecosystem services' status and trends. Similarly, the ongoing World Ocean Assessment expresses urgent need for knowledge on marine ecosystem services. The United Nations Environmental Programme (UNEP) established the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2012. The IPBES aims to develop and use knowledge about ecosystem services and biodiversity to improve ecosystem-based management at national, regional and global scales. PICES has already contributed to these efforts but more substantial work is needed.

Since 1992, PICES as a scientific organization has become more important in promoting marine science and better understanding of the marine environment in the Pacific region, as well as in the world. One of PICES' strategic goals is to establish a scientific-policy integrated platform to provide sound scientific support to national and regional policy decision making processes in the Pacific region. To meet the demand of members from PICES, The Human Dimensions Committee (HD) was established under the PICES Science Board (SB) in November 2016. HD's area of responsibility is to promote and coordinate interdisciplinary research that leads to increased understanding of the relationship between North Pacific marine ecosystems and the people, communities, and economies that are part of those systems and rely on the resources and services they provide. Last November, a Study Group on MES (SG-MES) was established by the SB to promote and coordinate research to improve MES assessment methodologies and to mainstream the MES in marine management and policy. SG-MES was also charged with developing the terms of reference for a working group that would continue these efforts.

HD and S-HD have organized several topic sessions/workshops on marine ecosystem services during PICES annual meetings. One of them also attracted support from IMBER as a co-sponsor. Consequently, the importance of ecosystem services in PICES' FUTURE program was recognized, so much so that "Ecosystem Services" was prominent in the title of the 2017 PICES annual meeting, "*Environmental Changes in the North Pacific and Impacts on Biological Resources and Ecosystem Services.*"

Based on the SG-MES's one-year work, HD proposes the establishment of a working group (WG-MES) to promote studies related to science and policy of marine ecosystem services.

WG-MES will facilitate exchange of information and share the experiences of case studies on MES in North Pacific waters in order to promote ecosystem service science and improve the

consideration of MES in decision making related to marine integrated management. There are differences in methodology and practice of MES studies among North Pacific countries. Therefore, one of the goals of the WG-MES is to establish a set of regional technical guidelines on MES assessment and the integration and utilization of MES information in the policy process, as well as to provide technical support to national and regional bodies engaged in these activities. Formation of the WG-MES will allow PICES to attract more researchers with specific interest in MES.

7. Terms of Reference

- a. Review MES studies on the North Pacific waters, the scientific tools/methodologies for analyzing them and integrating MES information in policy and management assessments.
- b. Identify the provision of MES from the North Pacific waters.
- c. Develop a typology of marine ecosystem services and tools/methodologies that can be used to analyze them.
- d. Develop regional technical guidelines to assess marine ecosystem services.
- e. Promote the integration of MES into marine policy and marine integrated management.
- f. Contribute the ecosystem service section/paper to PICES' reports and Press.

8. Membership and Leadership

Each member country recommends 3-5 scientists with backgrounds in marine ecology, marine economics, marine law and management to be the members.

Two members will serve as co-chairs: One from the western North Pacific (Potential Candidate: Dr. Shang Sunny Chen, HD, S-HD, SG-MES Chair, FIO, SOA, China) and the other from the eastern North Pacific (Potential Candidate: Dr. Dan Lew, SG-MES, NOAA Alaska Fisheries, USA).

Each co-sponsor is expected to recommend 2-3 scientists as the member of WG-MES to participate the WG-MES activities and finish their tasks based on the negotiation.

Potential members:

Canada:

Ms. Miriam O (SG-MES, Fisheries and Ocean Canada, miriam.O@dfo-mpo.gc.ca)

China:

Dr. Shang Chen (HD, S-HD, SG-MES Chair, FIO, SOA, China, schen@fio.org.cn)

Prof. Jingmei Li (HD, Ocean Univ. of China, jingmeili66@163.com)

Prof. Bengrong Peng (Xiamen Univ., China, brpeng@xmu.edu.cn)

Dr. Wei Liu (SG-MES, FIO, SOA, China, weiliu@fio.org.cn)

Dr. Jie Chen (SG-MES, South China Sea Institute, SOA, chenjie-1984@hotmail.com)

Korea:

Dr. Jungho Nam (SG-MES, KMI, Korea, jhnam@kmi.re.kr)

Prof. Jong Seong Kim (SG-MES, School of Earth, SNU, Korea, jskocean@snu.ac.kr)

Japan:

Associate Professor Kazumi Wakita (Tokai University, Japan, kazumiw@tokai-u.jp)

Dr. Shion Takemura (SG-MES, National Research Institute of Fisheries Science, Japan, shiontakemura@affrc.go.jp)

Russia:

Dr. Olga Lukyanova (S-HD, HAB-S, MEQ, WG-31, Pacific Scientific Research Fisheries Center (TINRO-Center, Russia, olga.lukyanova@tinro-center.ru)

Professor Elena Anferova (Far Eastern Federal University, Russia, anferova@mail.ru)

USA:

Dr. Dan Lew (SG-MES, Alaska Fisheries Science Center, NOAA Fisheries, USA, Dan.Lew@noaa.gov)

Co-sponsors:

TBD

9. Timeline

- a. October 2017: Working group approval from HD, SB, and GC.
- b. January 2018: Nominate/finalize membership and chairmanship.
- c. March 2018: Initiate work by correspondence
- d. Apr 2018: Organize a 2-day workshop in Qingdao to discuss and examine the TOR, tasks, and workplan. Submit the TOR, tasks, and workplan of WG-MES to HD for approval.
- e. Oct 2018: Organize a 1-day business meeting during PICES annual meeting in Japan. The meeting will screen the methodology and cases of MES, and share assessment cases and practices on integration of MES into marine policy and marine management.
- f. Oct 2019: Organize a 1-day business meeting during the PICES annual meeting. The meeting will discuss the drafting framework of the regional technical guidelines of MES assessment. The integration of MES into marine policy and marine management will be discussed too.
- g. May 2020: organize a 3-day workshop in Qingdao to discuss and finalize the regional technical guidelines of MES assessment.
- h. Oct 2020: Organize a 1-day business meeting during PICES annual meeting. The meeting will focus on drafting the WG-MES final report and the ecosystem service section/paper to PICES' report/Press and discussing the regional technical guidelines of MES assessment.

10. Possible financial support

State Oceanic Administration of China would like to support this working group's activities together with PICES, co-sponsors, and other partners, such as covering expenses related to meeting facilities, invited speakers' travel, etc.

11. Expected outcomes/outputs

- a. Regional technical guidelines for marine ecosystem services assessment(draft);
- b. The ecosystem service section/paper to PICES reports or Press and so on;
- c. A technical report on the methods used for, and case studies of, the assessment of MES, and the integration of MES information in marine management and policy analytic frameworks.

Ⅲ. 첨부자료

GC Appendix A**2017 Governing Council Decisions**

(The following decisions were taken at the Governing Council Meeting at PICES-2017 in Vladivostok, Russia September 30 and October 1, 2017)

2017/A/1: 2016 Auditor's Report

Council accepted the audited accounts for *FY 2016*.

2017/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 to report metrics to characterize the increase in science activities of the Organization.

2017/A/3: Budgetary considerations

- i. Council accepted the estimated accounts for FY2017.
- ii. Council approved the FY 2018 budget of \$922,000. The amount of \$133,600 will be transferred from the Working Capital Fund to balance the budget, setting the total annual contributions at \$788,400 and the 2018 annual contribution at \$131,400 per Contracting Party.
- iii. Council approved a transfer from the Working Capital Fund to the Trust Fund to recover the 2017 expenses and restore the Trust Fund to the level of \$110,000.
- iv. Council approved:
 - a. a lump sum employer contribution of \$20,000 from the FY 2018 General Fund budget to the International Fisheries Commission (IFC) Pension Plan to pay down unfunded liabilities;
 - b. an additional lump sum payment in FY 2018 from the Working Capital Fund (up to \$25,000) to the IFC Pension Plan, if there is a FY 2017 surplus in the General Fund, as determined by the Auditor's Report for 2017; and
 - c. this practice be continued until PICES receives the next actuarial valuation and recommendations, which are currently expected in 2017.
- v. Council requested that Council members from Canada and the U.S.A. consult with the International Fisheries Pension Society to develop advice and options to address the pension shortfall and identify implications for the Organization. These Parties are asked to report to the Chair of the Finance and Administration Committee prior to PICES-2018.

2017/A/4: Future PICES Annual Meetings and 2018 Inter-sessional Science Board meeting

- i. Council approved the proposal from Japan to hold the 2018 PICES Annual Meeting from October 25 – November 4, 2018, in Yokohama.
- ii. Council approved the expenditure of up to \$40,000 from the General Fund to defray the costs of the 2018 Meeting, as requested by Japan.
- iii. Council accepted the offer from Canada to host the 2019 PICES Annual Meeting in Victoria from October 16-27. Canada requests up to \$40,000 from PICES to defray the costs of the 2019 Meeting.
- iv. Council requested China to confirm by March 31, 2018 their intention to host the 2020 PICES Annual Meeting in China.

- v. Council agreed to keep the same registration fee structure for PICES-2018 as for PICES-2010 through PICES-2017:

Type of registration fee	CDN \$
Regular	275
Early	200
Student	50
Spousal/guest	50

- vi. Council requests that the Executive Secretary prepare an analysis to provide 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.
- vii. Council approved an Inter-sessional Science Board meeting to be hosted on May or June, 2018 at a location to be determined.
- viii. 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.

2017/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 2018/2019 term. To ensure continuity of the program, an earlier starting date, such as early May was suggested. Following the existing rotation cycle, China was requested to nominate an intern by February 28, 2018.
- ii. Council instructed the Executive Secretary to invite Contracting Parties to provide voluntary contributions to the Trust Fund to support the Intern Program in 2018 and beyond.

2017/A/6: Staffing in the PICES Secretariat and impacts on Annual Contributions

Council instructed the F&A Chair and the Executive Secretary to:

- i. Provide additional documentation on how the work of the Secretariat has evolved over time to meet strategic objectives and organizational needs.
- ii. Undertake comparisons on staffing levels and activities of similar organizations.
- iii. Develop draft recommendations on the additional funding required to address the staffing challenges and impact on annual fees for both current and anticipated organizational needs and strategic objectives.

The documentation and draft recommendations are to be circulated to the Finance and Administration Committee for Review and comment by the end of December 2017. Recommendations from F&A to Governing Council are to be submitted by the end of February 2018.

2017/A/7: Policy for approval and management of Special Projects

Council approved the policy and procedures detailed below for the approval and management of Special Projects:

I. Definition and Principles

A Special Project (hereinafter as the Project) is a limited duration project supported through voluntary contributions by a Contracting Party and conducted under the authority of PICES in support of the scientific mission of the Organization.

The Project welcomes the participation of all Contracting Parties in accordance with the principle of equity, given due consideration of the interests and balance between PICES and the proponent.

The Project will use the existing mechanisms of PICES with the objective of minimizing any additional workload in the PICES Secretariat which cannot be compensated through the overhead retained by the Organization from the project funding.

The ownership of the outputs of the project, including materials, data, copyright and intellectual property rights shall be specified in the Project Proposal.

For the purposes of evaluation, approval and implementation, Projects will be divided into two categories:

- Projects with budgets below CAD \$50,000.
- Projects with budgets of CAD \$50,000 or above.

II. Approval Procedures

1. The proponent shall provide the Project Proposal.
2. Projects with budgets below CAD \$50,000 will be evaluated and approved by the PICES Chair, Science Board Chair and Executive Secretary, with notification to the members of Governing Council.
3. For Projects with budgets of CAD \$50,000 and above, the following approval process will apply:
 - a. Science Board is responsible for reviewing and evaluating the Project Proposal and providing recommendations to Governing Council.
 - b. The Chair of Finance and Administration Committee and Executive Secretary are also required to review the Project Proposal, with a focus on financial aspects, workload and operational feasibility, forwarding recommendations to Governing Council.
 - c. Governing Council is responsible for approval of the Project. The PICES Chair will consult with all Contracting Parties for consensus to make a decision in accordance with PICES procedures.

III. Implementation

1. For Projects with budgets below CAD \$50,000, the following management processes will apply:
 - a. Project funds will be deposited in the PICES Working Capital Fund.
 - b. The Secretariat is responsible for reporting on financial aspects of the Project to the Finance and Administration Committee, who provide recommendations to Governing Council.
 - c. The identified parent committee is responsible for reporting on scientific progress to Science Board, who provides recommendations to Governing Council.
2. For Projects with budgets of CAD \$50,000 and above, the following management processes will apply:
 - a. Project funds will be deposited in a separate account.
 - b. The Secretariat is responsible for reporting on financial aspects of the Project to the Finance and Administration Committee, who provide recommendations to Governing Council.

- c. A Project Science Team (hereinafter as PST) will be established, who is responsible for the detailed planning and execution of the project, and reporting on scientific progress to the identified parent Committee.
- d. Science Board is responsible for recommending the members of PST, with the agreement of relevant Committee(s). If the Project does not have members from all PICES Contracting Parties, then any Contracting Party who does not have a member on the PST will have the opportunity to name a member or provide a statement declining this opportunity.
- e. A representative of the proponent organization may serve as a co-chair of the PST.
- f. The Secretariat may designate certain personnel to take responsibility for the Project implementation and financial management, as well as keeping close contact with the proponents.
- g. Science Board or the designated parent Committee will take responsibly for oversight of the scientific activities of the Project, and to review the reports.
- h. Science Board is responsible for reporting to Governing Council on the progress and achievements of the Project. The Finance and Administration Committee is responsible for reporting to Governing Council on the financial and management aspects of the Project.

IV. Sharing the achievements of the Project

- 1. The PST shall submit scientific reports of the Project to the relevant Committees, Science Board and the proponent agency.
- 2. Science Board is responsible for reviewing the scientific report and reporting results to the Governing Council.
- 3. Governing Council will approve reports as part of the normal process for approval of the PICES Publication plan.

2017/A/8: Data Management Policy

Council postponed a decision on the proposed Data Management Policy until PICES-2018 to allow for incorporation of results from a TCODE Workshop that will more fully review the policy and implementation requirements.

2017/A/9: Election of Vice-Chairman of PICES

Dr. Enrique Curchitser (U.S.A.) was elected to the position of Vice-Chairman of PICES.

2017/A/10: Intersessional Governing Council Meeting

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 staffing challenges in the Secretariat and the impact on annual fees for both current and anticipated organizational needs and strategic objectives.

2017/S/1: 2018 PICES Annual Meeting

- i. The following scientific sessions are to be convened at PICES-2018:
 - ¾-day Science Board (SB) Symposium on *Towards integrated understanding of ecosystem variability in the North Pacific*;
 - 1 - day Topic Session on *Fish production through food web dynamics in the boundary current systems*;

- ½ -day Topic Session on *Science communication for North Pacific marine science*;
 - 1 - day Topic Session on *Indicators for assessing and monitoring biodiversity of biogenic habitats*;
 - 1 - day Topic Session on *Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific*;
 - ½ - day Plenary Topic Session on *The FUTURE of PICES: Next steps in understanding, forecasting and communicating climate impacts on North Pacific marine ecosystems*;
 - 1 - day Topic Session on *Ecological responses to variable climate changes and their applicability to ecosystem predictions*;
 - 1 - day Topic Session on *Ocean mixing processes and its impacts on biogeochemistry, climate and marine ecosystems* (co-sponsored by the OMIX Project of AORI; to be merged with the proposed session on internal tides and waves);
 - ½ - day Topic Session on *Integration of science and policy for sustainable marine ecosystem services* (potential co-sponsor IMBeR);
 - 1 - day Topic Session on *Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps* (co-sponsored by ICES);
 - 1 - day Topic Session on *Influence of climate and environmental variability on pelagic and forage species*;
 - 1 - day Topic Session on *Applying ecosystem considerations in science advice for managing highly migratory species* (co-sponsored by ISC);
 - 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-2018:
- 1 – day Workshop on *Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean*;
 - ½-day Workshop on *PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment*;
 - 1 – day Workshop on *Development of a systematic approach to data management in PICES* ;
 - 1 – day Workshop on *Synthesizing projected climate change impacts in the North Pacific*;
 - 1 – day Workshop on *Identifying common reference points and leading indicators of ecosystem change*;
 - 1 – day Workshop on *Synthesizing projected climate change impacts in the North Pacific*;
 - ½-day Workshop on *Regional evaluation of secondary production observations and application of methodology in the North Pacific*;
 - 1 – day Workshop on *Diets, consumption, and abundance of marine birds and mammals in the North Pacific*;
 - 1 – day Workshop on *Emerging blooms of toxic dinoflagellates in the Pacific: comparative analysis of their prevalence and ecological impacts in the eastern and western regions*.
- iii. The following business meetings are to be held at PICES-2018:
- 3-hour overture meeting, ½-day meeting and a 1-day meeting of Science Board;
 - 1-day FUTURE SSC meeting;
 - 2-hour overture meetings and ½-day meetings of Standing Committees;
 - 1-day meeting of the Section on *Marine Birds and Mammals* (S-MBM);
 - 1-day meeting of the Section on *Ecology of Harmful Algal Blooms in the North Pacific* (S-HAB);
 - 1-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);
 - 1-day meeting of the Working Group 32 on *Working Group on Biodiversity of Biogenic Habitats*;

- ½-day meeting of the Working Group 33 - Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration*;
 - 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*;
 - 1 -day meeting of the Working Group 38 on *Mesoscale and Submesoscale Processes*;
 - 1 -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 *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)*;
 - 1-day meeting of the *Study Group on Marine Microplastics (SG-MMP)*;
 - 1-day meeting of the *Joint PICES-NPFC Study Group on Scientific Cooperation in the North Pacific Ocean (SG-PICES-NPFC)*.
- * - request that WG 36 and WG 40 share 2 hours of their business meetings to identify synergies and collaborations

2016/S/2: Inter-sessional symposia/session/workshops and meetings

Council approved the following activities:

Activity	Dates	Location	PICES Role	Support to be provided
Intersessional PICES Expert Group Workshops and Business Meetings				
NPESR3 International Synthesis Workshop	Spring 2018	TBD- Jeju/Honolulu/Vladivostok; *With ISB-2018, FUTURE, or BOTH	PICES High Priority Project	10 chapter lead authors at \$5K each
FUTURE SSC Business Meeting	Spring 2018	*With ISB, NPESR, or BOTH	PICES High Priority Project	Some funding may be required from FUTURE Fund in WCF
Intersessional Science Board-2018	Spring 2018	*With FUTURE, NPESR, or BOTH	Core PICES activity	Most support from national funds of travelers;
Intersessional Governing Council Meeting	Spring 2018	With ISB or other meeting – TBD	GC Meeting	none
WG36 Intersessional Workshop: Quantifying thresholds in driver-response relationships to identify reference points (2 days)	June 2018	Washington, DC, USA; ECCWO	PICES expert group activity	Partial travel support for four; ~6.5K CAD
WG40 Intersessional	June 2018	Washington, DC, USA;	PICES expert	Partial travel support; ~5K

Workshop: Census of Marine Ecosystem Forecasting Efforts in the North Pacific (1 day)		ECCWO	group activity	CAD
POC/HD/FUTURE/WG40 Intersessional Workshop: Regional ocean/climate forecasting and its application to HAB predictions in the North Pacific (3 days)	15-18 May 2018	Qingdao, China	PICES expert group activity	Partial travel support; ca. 5K CAD
WG41: Taking Stock of Marine Ecosystem Services in the North Pacific—exploring examples and examining methods (2 days)	April or May 2018	Qingdao, China	PICES expert group activity	Partial travel support; ~5K CAD
WG39 Intersessional Workshop: PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (First) – (1.5 days)	Spring 2018	Sapporo, Japan/Incheon, Korea	PICES expert group activity	No financial request
Summer Schools and Capacity Building				
PICES AP-NPCOOS Summer School: <i>“Coastal Ocean Observing Systems and Ecosystem Monitoring”</i> -6 th PICES Summer School	9-13 July 2018	Victoria, BC, Canada	PICES Capacity Building	\$10K for student travel and \$5K for local costs already approved at PICES-2016
SOLAS (Surface Ocean-Lower Atmosphere Study) 7 th Summer School	23 July – 4 August 2018	Cargese, France	Co-Sponsored Capacity Building	\$5K CAD for (up to 3) student travel support from PICES countries;
IMBER ClimEco6 Summer School <i>“Interdisciplinary approaches to achieving ocean sustainability for societal benefit”</i>	1-8 August 2018	Accra, Ghana	Co-Sponsored Capacity Building	\$5K CAD for student travel support from PICES countries;
PICES AP-CREAMS summer school on <i>“Satellite Oceanography”</i>	4 th week of August 2018	Seoul Natl Univ, Korea	PICES Capacity Building	~12K CAD for 5 non-Korean Student travels and 2 lecturers
Pacific Ecology and Evolution Conference	Late Feb/March 2018	Bamfield, BC, Canada	Co-Sponsored Capacity Building	1.5K CAD for partial support of conference logistics
Co-sponsorship of other Organizations activities				

SCOR WG EBUS (<i>Eastern Boundary Upwelling Systems</i>)	3 years	various	Co-sponsored activity with key partner	Partial support of 1 Associate Member from
SCOR WG P-OBS (<i>Integration of Plankton Observing Sensor Systems to Existing Global Sampling Programs</i>)	3 years	various	Co-sponsored activity with key partner	Partial support of 1 Associate Member from PICES
SCOR WG FLOTSAM (<i>Floating litter and its oceanic transport analysis and modeling</i>)	3 years	various	Co-sponsored activity with key partner	No financial request
Joint NPFC-FAO-PICES Workshop on Protection of VMEs	12-15 Mar 2018	Yokohama, Japan	Co-sponsored activity with key partners	5K CAD partial travel support for two PICES participants
Marine and Freshwater Invasive Species Conference	May 2018	Beijing, China	Co Sponsor	\$5K CAD support for partial travel support for two PICES participants
6 th International Marine Debris Conference— Session sponsorship (“ <i>The risks of marine debris mega-pulse events: lessons from the 2011 Great Japan Tsunami</i> ”)	12-16 Mar 2018	San Diego, USA	Co-sponsored activity; showcase for results from Special Project	\$12.5K from MoE ADRIFT Project is secured for this
Other Financial Support Requests				
GlobalHAB Meeting	Mar 2018?	TBD; prob. China	Contributor	1 S-HAB member (Vera Trainer); up to \$2K CAD
IPHAB Best Practices Manual	TBD	TBD	Contributor	1 S-HAB member (Mark Wells); up to \$3K CAD
Travel Support for Up to 3 conveners for sessions at the ICES-2018 meeting in Hamburg, Germany	Sept 2018	Hamburg, Germany; Note, ICES has not provided the complete list of accepted Theme Sessions to PICES yet	PICES Co-sponsorship of up to three ICES Sessions at 2018 ASC	~3K CAD per convener, or up to 9K CAD all-together

2017/S/3: Publications

- i. The following publications are to be produced in or submitted to primary journals in 2017–2018:
 - a. A Special Issue in Deep Sea Research II on Small Pelagic Fish resulting from the Small Pelagic Fish Symposium in March 2017.
 - b. A Special Issue in Marine Ecology Progress Series on Small Pelagic Fish resulting from the Small Pelagic Fish Symposium in March 2017.
 - c. A Special Issue in Progress in Oceanography dedicated to the memory of Dr. William Peterson.
 - d. Marine Pollution Bulletin – special issue of selected papers on “*The Effect of Marine Debris caused by the Great Tsunami of 2011*”.
 - e. Aquatic Invasions - special issue on “*Transoceanic Dispersal of Marine Life from Japan to North America and the Hawaiian Islands as a Result of the Japanese Earthquake and Tsunami of 2011*”.

- f. Papers resulting from the 6th Zooplankton Production Symposium, Bergen, Norway, May 2016, to be published in the ICES Journal of Marine Science.
- g. FUTURE Synthesis Paper; currently being developed by FUTURE SSC. Submission for publication is anticipated in the first quarter of 2018.
- h. Special Issue of Oceanography Magazine on “International Cooperation in Harmful Algal Bloom Science; Article titled “*GlobalHAB: A new program to promote international research, observations, and modelling of harmful algal blooms in aquatic systems*”;
- ii. The following publications are to be produced in the PICES Scientific Report series in 2018–2019:
 - a. ADRIFT Scientific Report in the PICES Special Publication Series
 - b. MarWeB Scientific Report in the PICES Scientific Report Series
 - c. Working Group 30 on *Assessment of Marine Environmental Quality of Radiation around the North Pacific* final report in the PICES Scientific Report Series
 - d. Working Group 31 on *Emerging Topics in Marine Pollution* final report in the PICES Scientific Report Series
- iii. The following products are to be produced in 2017-2018:
 - a. MarWeB Advisory Report as an outreach brochure
 - b. ADRIFT Factsheet as an outreach brochure
 - c. ADRIFT Videoscribe as an outreach video
 - d. Brochure for WG 30 on *Assessment of Marine Environmental Quality of Radiation around the North Pacific*.

2017/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 Study Group on *Marine Ecosystem Services* shall be disbanded on completion of their final report.

2017/S/5: New Expert Groups

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

- i. Joint PICES-NPFC Study Group for *Scientific Cooperation in the North Pacific Ocean* (SG-PICES-NPFC)
- ii. Study Group on *Marine Microplastics* (SG-MMP)
- iii. Working Group on Marine Ecosystem Services (WG 41)

2017/S/6: Chairmanship and membership for Science Board, Standing Committees and expert groups

- i. Dr. Xianshi Jin (China) elected as Chair of the Fisheries Science Committee (FIS), replacing Dr. Elizabeth Logerwell (USA);
- ii. Dr. Jacquelynn King (Canada) was elected as Vice-Chair of the Fisheries Science Committee (FIS), replacing Dr. Xianshi Jin (China);
- iii. Dr. Jacquelynn King (Canada) was elected Co-Chair of Section on Climate Change and Marine Ecosystems (S-CCME), replacing Dr. Anne Hollowed (USA);
- iv. Dr. Thomas Therriault (Canada) was elected Vice-Chair of the Marine Environmental Quality Committee (MEQ), replacing Dr. Darlene Smith (Canada);
- v. Dr. Vera Trainer’s (USA) term as Co-Chair of Section on Harmful Algal Blooms (S-HAB) has ended. A North American replacement has not been identified yet;
- vi. Dr. Lydia Yebra was approved as an ICES ex-officio member of WG 37 on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions* or the duration of the Working Group.

GC Appendix B

Joint PICES-NPFC Study Group for Scientific Cooperation in the North Pacific Ocean (SG-PICES-NPFC)

Parent Committee: Science Board

Duration: 1 year

Description

The purpose of a joint PICES-NPFC Study Group for Scientific Cooperation of PICES and NPFC is to develop a framework of enhanced collaboration between the two organizations to achieve a greater understanding of pelagic ecosystem structure and variability, and its effect on the dynamics and production of fisheries target species, for sustainable use of high seas fish production. The Study Group will review each organization's scientific needs and identify where similar key questions or scientific issues might be explored jointly by both organizations.

Terms of Reference

1. Review the scientific interests and objectives of each organization;
2. Identify potential areas and specific topics for scientific cooperation;
3. Identify potential collaborative methods (such as representation at each other's meetings, holding of joint workshops or symposia, development of a Memorandum of Understanding (MOU) between the organizations or other formal agreements, establishment of joint working groups);
4. Clarify practical steps to advance the cooperative activities identified above;
5. Provide advice on how information produced by PICES can be shared and applied in NPFC;
6. Make a specific proposal to each organization for further consideration.

Proposed Co-Chairs: TBD (PICES), TBD (NPFC)

Products

PICES-NPFC Framework for Scientific Cooperation in the North Pacific Ocean

PICES Press article

Annual Report

Other Publications (if desired)

Study Group on Marine Microplastics (SG-MMP)

Parent Committee: Science Board

Duration: 1 year

Proposed Chair: TBD

Description

Along with microplastic topic sessions in 2014 and 2017 PICES Annual Meeting, there has been a growing need to establish an expert group on microplastic pollution in the North Pacific region which is considered one of the 'hot spots' on the globe. While SG-MMP will focus on impacts of microplastics and their associated chemicals on marine environment and biota, linkages will be established with other efforts that describe socio-economic impacts of microplastic pollution.

The purpose of the proposed SG-MMP is to identify major microplastic issues in the North Pacific including marginal coastal seas and to identify knowledge gaps. The Study Group will establish a list of priority research needs in PICES member countries as well as world society by avoiding duplication of the other international and regional working groups and programs on microplastics. This will help to fill urgent knowledge gaps through further expert group involvement and activity in PICES. Input from regional and international bodies such as ICES (International Council for the Exploration of the Sea), GESAMP (Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection) and NOWPAP (Northwest Pacific Action Plan), will increase efficiencies and the scientific value of the SG-MMP outcome.

The establishment of SG-MMP is consistent with the FUTURE Science Plan component 3 (How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?), and contribute insight into the structure, function and resilience of ecosystems as in components 1 and 2. This will provide a critical evaluation of highly complex microplastics, clarify priority concerns in the North Pacific, and provide a platform to evaluate the relative importance of microplastics compared to other stressors.

Linkages to the FUTURE Science Plan

Component 3: How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?

Terms of Reference

1. Identify knowledge gaps and establish research priority for impacts of microplastics and their associated chemicals on marine environment and biota
2. Identify interactions within PICES scientific committees and expert groups that will complement the Study Group
3. Explore potential partnerships with other professional or multilateral organizations (e.g., ICES, GESAMP, NOWPAP) which could lead to joint activities (working group, sessions, publications), improve efficiencies and strengthen scientific outcomes.
4. Develop recommendations for a possible PICES WG on marine microplastics.

Working Group on Marine Ecosystem Services (WG-MES/ WG 41)

Parent Committee: HD

Duration: 3 years

Proposed Chair: TBD

Motivation and Goals

Marine ecosystems provide direct or indirect benefits to people. Ocean ecosystems provide human populations with ecological goods and services, such as seafood, climate regulation and air quality maintenance, storm damage prevention, waste purification, recreation and leisure opportunities, and biodiversity maintenance, among others. The accounting for anthropogenic values of marine ecosystem services (MES) in policy and management decisions has become an emergent issue recognized as critical from a social, economic, and cultural perspective, but also one that poses challenges both from a scientific and policy perspective. As a result, MES has become a hot topic of many international meetings and organizations. The United Nation (UN)'s Millennium Ecosystem Assessment focuses on the change of global ecosystem services' status and trends. Similarly, the ongoing World Ocean Assessment expresses urgent need for knowledge on marine ecosystem services. The United Nations Environmental Programme (UNEP) established the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2012. The IPBES aims to develop and use knowledge about ecosystem services and biodiversity to improve ecosystem-based management at national, regional, and global scales. PICES has already contributed to these efforts but more substantial work is needed.

Since 1992, PICES as a scientific organization has become more important in promoting marine science and better understanding of the marine environment in the North Pacific, as well as in the world. One of PICES' strategic goals is to establish a scientific-policy integrated platform to provide sound scientific support to national and regional policy decision-making processes. To meet the demand of members from PICES, The Human Dimensions Committee (HD) was established under the PICES Science Board (SB) in November 2016. HD's area of responsibility is to promote and coordinate interdisciplinary research that leads to increased understanding of the relationship between North Pacific marine ecosystems and the people, communities, and economies that are part of those systems and rely on the resources and services they provide. In November 2016, a Study Group on MES (SG-MES) was established by the SB to promote and coordinate research to improve MES assessment methodologies and to mainstream the MES in marine management and policy. SG-MES was also charged with developing the terms of reference for a working group that would continue these efforts.

HD and S-HD have organized several topic sessions/workshops on marine ecosystem services during PICES annual meetings. One of them also attracted support from IMBER as a co-sponsor. Consequently, the importance of ecosystem services in PICES' FUTURE program was recognized, so much so that "Ecosystem Services" was prominent in the title of the 2017 PICES annual meeting, "*Environmental Changes in the North Pacific and Impacts on Biological Resources and Ecosystem Services.*"

Based on the SG-MES's one-year work, HD proposes the establishment of a working group (WG-MES) to promote studies related to science and policy of marine ecosystem services. WG-MES will facilitate exchange of information and share the experiences of case studies on MES in North Pacific waters in order to promote ecosystem service science and improve the consideration of MES in decision making related to marine integrated management. There are differences in methodology and practice of MES studies among North Pacific countries. Therefore, one of the goals of the WG-MES is to establish a set of regional technical guidelines on MES assessment and the integration and utilization of MES information in the policy process, as well as to provide technical support to national and regional bodies engaged in

these activities. Formation of the WG-MES will allow PICES to attract more researchers with specific interest in MES.

Contributions to FUTURE

The WG-MES will help meet the FUTURE program Objective 1 (Understanding Critical Processes in the North Pacific) and Objective 2 (Status Reports, Outlooks, Forecasts, and Engagement). Ecosystem services represent an important dimension of the third key scientific question under FUTURE Objective 1 (How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?). In addition, case studies on the assessment of ecosystem services in the North Pacific ecosystem will be added as a new section in PICES' Reports.

Linkages to other organizations

The WG-MES will be led by PICES and will focus on the MES issues in the North Pacific Ocean. However, WG-MES could benefit from engagement with other international organizations and programs that include MES expertise. It is anticipated that WG-MES activities will attract participation from within PICES and from outside.

IMBER has expressed strong interest in the WG-MES if approved by PICES. If PICES agrees, WG-MES would like to accept IMBER's support, such as co-sponsorship of topic sessions, workshops, and intersessional meetings, sending group members, observers and/or sending experts to participate in WG-MES meetings. If PICES agrees, WG-MES would like to seek the similar collaboration with ICES because they have many experts in MES.

Terms of Reference

1. Review MES studies of North Pacific marine ecosystems, identifying the scientific tools and methodologies employed, and the role these studies have played in policy analyses, management, or natural resource damage assessment.
2. Develop a typology of marine ecosystem services, tools and methodologies (e.g., environmental accounting/natural capital, non-market values, replacement cost/Natural Resource Damage Assessment, productivity change methods, etc.) that can be used to analyze marine ecosystem services, and the strengths and weaknesses of those tools and methodologies.
3. Illustrate (2) by applying two or more methods to the assessment of marine ecosystem services in identical case studies in multiple regions of the North Pacific.
4. Collaborate with WG-36 (Common Ecosystem Reference Points) and WG-40 (Climate and Ecosystem Predictability) to explore development of an indicator-based framework to study the resilience of social ecological systems and to advance integration envisioned in the FUTURE science program.
5. Complete a detailed technical report on the results of the analyses detailed in TORs (1), (2), and (3) and scoping requested in (4). The report should include practical recommendations for characterizing the status and trends of marine ecosystem services in the North Pacific. In addition, the WG will contribute articles on ecosystem services to PICES Press.

Proposed membership

Each member country recommends 3-5 members with backgrounds in marine ecology, marine economics, marine law, or management.

Proposed members

1. Timeline

- a. October 2017: Working group approval from HD, SB, and GC.
- b. January 2018: Nominate/finalize membership and chairmanship.
- c. March 2018: Initiate work by correspondence
- d. April or May 2018: Hold a 2-day workshop in Qingdao to develop a work plan to address the TORs, including preliminary discussion of possible case study sites and methods. Review MES studies of North Pacific marine ecosystems (TOR-1). Submit the work plan to HD for approval.
- e. October 2018: Hold a 1-day business meeting and a ½-day topic session during PICES annual meeting in Yokohama. The business meeting will be used to draft a typology of marine ecosystem services, tools and methodologies that can be used to analyze marine ecosystem services, and the strengths and weaknesses of those tools and methodologies (TOR-2). Selection of case study sites and analytic methods will be finalized during this meeting (TOR-3). The WG-MES will meet with WG-36 and WG-40 to begin exploration of synergies (TOR-4).
- f. Fall 2019: Hold a 1-day business meeting during the PICES annual meeting. The meeting will review progress on case studies (TOR-3). The WG-MES will meet with WG-36 and WG-40 to continue exploration of synergies (TOR-4).
- g. May 2020: Hold a 3-day workshop (at an eastern Pacific location TBD) to review results of case studies (TOR-3) and to draft the technical report (TOR-5).
- h. Fall 2020: Hold a 1-day business meeting during PICES annual meeting to finalize the technical report (TOR-5).

Possible financial support

The State Oceanic Administration of China has indicated it might support this working group's activities together with PICES, such as covering expenses related to meeting facilities, invited speakers' travel, etc.

Expected outcomes/outputs

- a. A technical report on the methods used for, and case studies of, the assessment of MES, and the integration of MES information in marine management and policy analytic frameworks.
- b. The ecosystem service section/paper to PICES Scientific Report series and/or PICES Press.

**DRAFT Report of the Finance and Administration Committee
September 28, 2017**

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 September 26 and 09:00- 10:30 on September 27, 2017 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 and approved the provisional agenda (*F&A Endnote 2*)

FA AGENDA ITEM 3: AUDITED ACCOUNTS FOR FY2016

The FY 2016 financial statements were submitted to the auditor Hale & Hughesman on March 31, 2017 and the audit was completed on June 9, 2017. The report (*F&A Endnote 3*) was electronically circulated to all Contracting Parties on June 16, 2017. 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, 2016, 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 recommended that the Auditor's Report be approved by Governing Council (hereafter Council).

FA AGENDA ITEM 3(A): 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, 2016. All Contracting Parties met their financial obligations for FY 2017 (*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.

FA AGENDA ITEM 3(B) – VOLUNTARY CONTRIBUTIONS AND FUND-RAISING ACTIVITIES

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

Korea noted that they intend to annually contribute \$5,000 CAD per year to support the PICES Intern Program, beginning in 2017. Korea requests the Executive Secretary to prepare and send an invoice for this contribution.

FA AGENDA ITEM 3(C) – THE GENERAL FUND –IN 2016

The committee reviewed the budget and expenditures in the General Fund for 2016, noting that expenditures were within the budget tolerance for all categories.

AGENDA ITEM 3(D): WORKING CAPITAL FUND AND ENCUMBERED FUNDS FOR PICES ACTIVITIES

F&A-2017

The Executive Secretary provided information on the amount of funds in the Working Capital Fund restricted for specific purposes (encumbered funds) at the beginning of *FY* 2017 and the estimated amount of the encumbered funds for the fiscal year end.

The committee recommends that the surplus in the 2017 PICES/ICES Early Career Scientist Conference fund be re-allocated as follows:

- The surplus arising from the Korean contributions be re-allocated to support upcoming Summer Schools in 2018. This will ensure that funding advanced by Korea for Capacity Building will be explicitly used for this purpose.
- The remaining surplus should be re-allocated to the Working Capital Reserve.

The committee recommends that the surplus from the 2017 PICES/ICES Small Pelagics Symposium be re-allocated within the Working Capital Fund to support the 2018 Pacific Transition Areas Symposium.

FA AGENDA ITEM 3(E) – 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 3(F) – RELOCATION AND HOME LEAVE FUND- IN 2016

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

FA AGENDA ITEM 3(G) – JAPAN MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES (MAFF) MARWEB IN 2016

This item was discussed under FA Agenda Item 5.

FA AGENDA ITEM 3(H) – JAPAN MINISTRY OF ENVIRONMENT (MOE) ADRIFT IN 2016

This item was discussed under FA Agenda Item 5.

FA AGENDA ITEM 4 – ESTIMATED ACCOUNTS FOR 2017

The committee reviewed the status of the estimated accounts for 2017.

FA AGENDA ITEM 5 – SPECIAL PROJECTS COMPLETED IN 2017

The committee reviewed the history and output products for the MarWeb and ADRIFT projects.

FA AGENDA ITEM 6 – FINANCIAL RESERVE PLANNING

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

FA AGENDA ITEM 7: SCHEDULE, STRUCTURE AND FINANCING OF FUTURE ANNUAL MEETINGS

The Canadian member confirmed that Canada will host PICES-2019 from October 16 – 27, 2019 in Victoria, Canada. The Committee also recommends approving a request from Canada for up to \$40,000 from PICES to defray the costs of hosting the 2019 annual meeting.

In keeping with the six -year rotation cycle (Decision 1994/A/6), China was asked if it was willing to return to the original cycle, hosting the Annual Meeting in 2020. China has tentatively agreed to host PICES-2020. The Committee recommends that Council formally request China to explore the possibility of hosting the 2020 Annual Meeting, and inform the Secretariat on this matter by March 31, 2018. China also requested up to \$40,000 from PICES to defray the costs of hosting the 2020 annual meeting.

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 and recommends keeping the same structure for PICES-2018 as for PICES-2010 through PICES-2017. The Committee further recommends that the Executive Secretary conduct an analysis and provide options for how unexpected revenue from meetings with high attendance might be re-allocated to the host country to support increased participation at subsequent PICES meetings.

Type of registration fee	CDN \$
Regular	275
Early	200
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 2017. Science Board has already indicated the importance of having an inter-sessional meeting in 2018. The Committee supports the request by Science Board and recommends it to Council for approval. Russia has indicated their willingness to host the meeting at the TINRO facilities in Vladivostok at a date to be determined. There may also be a cost-effective options to combine an Intersessional Science Board Meeting with the 2018 Pacific Transition Areas Symposium in La Paz, Mexico or with other intersessional activities.

FA AGENDA ITEM 8(A) DATA MANAGEMENT

The Committee reviewed that Data Management Policy and decided to postpone a recommendation to Governing Council until PICES-2018, so as to incorporate results of a proposed TCODE Workshop that will more fully review the policy and its implementation requirements.

FA AGENDA ITEM 8(B) – TRACKING THE ACTIVITY OF THE SECRETARIAT

The committee reviewed the data on the indicators developed and recommended that the Executive Secretary continue to report on these indicators on an annual basis.

FA AGENDA ITEM 8(C) – STAFFING IN THE PICES SECRETARIAT AND FA AGENDA ITEM 8(D) – INTERNATIONAL FISHERY COMMISSIONS PENSION SOCIETY (IFCPS) – PENSION PLAN STATUS

The Committee reviewed presentations from the Executive Secretary on staffing challenges in the Secretariat and the pension plan deficit. While both issues are important, the staffing issue is considered to be more urgent, so the Committee recommends separate approaches to address each of these issues.

Regarding staffing levels in the Secretariat:

The committee acknowledged that the current Secretariat staffing was unsustainable and the impending departure of the Report and Publications Editor will place the operations of the organization at significant risk and, as such, requires a near term resolution. The committee reviewed three options:

1. Scale back the activities of the organization to fit the staffing levels and budget that are presently available.
2. Seek a step increase to the annual fees that will cover the costs associated with increasing the staffing levels in the Secretariat.
3. Seek Voluntary Contributions to cover the increased costs.

There was no support for Option 3 -addressing the financial issue through voluntary contributions (or other temporary measures). The Committee favoured a long-term, reliable, predictable solution to this issue. While there was some support for Option 1, the committee recognized that decreasing the scope of the operations of the Secretariat below that which has been approved by Governing Council requires Governing Council direction.

Implementation of Option 2 - a step increase in annual fees – would require immediate action due to the relative long planning cycles in member countries (up to three years).

F&A-2017

Accordingly, the Committee recommends:

- F&A Chair and the Executive Secretary to provide additional documentation on how the work of the Secretariat has evolved over time to meet strategic objectives and organizational needs.
- F&A Chair and the Executive Secretary undertake comparisons on staffing levels and activities of similar organizations.
- F&A Chair and Executive Secretary to develop draft recommendations on the additional funding required to address the staffing challenges and impact on annual fees and assuming no adjustments to organizational needs and strategic objectives.

To accommodate the financial planning requirements of Contracting Parties, the earliest date at which a fee increase could be implemented is 2020, and would require the following actions to be completed in the timeframes indicated below:

- The documentation and draft recommendations listed above to be circulated to F&A for review and comment by end of December, 2017.
- Comments received and incorporated and recommendations to be adopted by F&A by end of January, 2018.
- Recommendations to be submitted for Governing Council consideration and decision by the end of February, 2018.

Regarding the Pension plan deficit:

F&A recommends that Canada and USA engage with International Fisheries Commissions Pension Society to develop advice and options to address the pension shortfall and identify implications for the organization. These parties are asked to report to F&A prior to PICES-2018.

FA AGENDA ITEM 8(E) – INTERN PROGRAM AND CAPACITY BUILDING

The Committee reviewed the information presented as well as the announcement from Korea that they intend to make regular contributions to the Intern Program beginning in 2017.

The Committee recommends that Council instruct the Executive Secretary to invite Contracting Parties to provide voluntary contributions to the Trust Fund to support the Intern Program in 2018 and beyond by December 1, 2017.

FA AGENDA ITEM 9 - APPOINTMENT OF THE F&A COMMITTEE CHAIRMAN

In accordance with Rule 19(iii), Dr. Carmel Lowe began her two year appointment as F&A Chairman in November, 2016 after PICES-2016 and her term will expire in November, 2018, when an election must be held. Dr. Lowe is eligible for a second term of two years, which would take her to November, 2020.

FA AGENDA ITEM 10 - OTHER BUSINESS

No additional items were introduced at the meeting.

FA AGENDA ITEM 11 - PROPOSED BUDGET FOR FY2018 AND FORECAST BUDGET ESTIMATE FOR FY2019

The Committee reviewed the proposed *FY 2018* budget of \$922,000 (*F&A Endnote 5*) and recommends its approval by Council. The amount of \$133,600 will be transferred from the Working Capital Fund to balance the budget, setting the total annual contribution at \$788,400 and the 2018 annual fee at \$131,400 per Contracting Party. The annual fee increase is a 1.5% increase from the *FY 2017* level and the increase is based on the monthly average CPI from July 2016 to June 2017 reported by Statistics Canada.

The Executive Secretary presented the forecast *FY* 2019 budget of \$952,000 and noted that this budget is prepared based on preliminary information available as of September, and is approximately 1.5% higher than the *FY* 2018 budget. If the inflation rate in Canada stays at the level of ~1.5%, under the adopted guidelines (Decision 1999/A/2(ii)), the 2019 annual fee could be set at the level of \$133,400 per Contracting Party. The total 2019 contribution will be \$800,400 and a transfer of \$151,600 from the Working Capital Fund will be required to balance the budget.

F&A-2017

F&A ENDNOTE 1

2017 F&A participation list

Canada

Andrea White (F&A member)
Lesley MacDougall (advisor)

Japan

Tetsuichiro Funamoto (F&A member)
Chieko Kondo Yamasaki (advisor)
Hiroya Sugisaki (advisor)
Chika Fujimitsu (advisor)

People's Republic of China

Rui Zheng (F&A member)
Fangli Qiao (advisor and GC Delegate)
Chuanlin Huo (advisor)

Republic of Korea

Wonjoon Shim (F&A member)
Kyung Jin Kim (advisor)
Joongho Moon (advisor)
Hoi Soo Jung (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)
Hal Batchelder (Deputy Executive Secretary)

F&A ENDNOTE 2:

PICES Twenty Sixth Annual Meeting (PICES-2017)

Vladivostok, Russia

Tuesday, September 26 (14:00 – 18:00), 2017

Wednesday, September 27 (09:00-12:30), 2017

FINANCE AND ADMINISTRATION COMMITTEE (F&A)

Agenda

1. Welcome and opening remarks
2. Adoption of agenda and meeting procedures
3. Audited accounts for FY 2016
 - a. Annual contributions
 - b. Voluntary Contributions and Fund-raising activities
 - c. General Fund in 2016 – Details
 - d. Working Capital Fund in 2016 –Details
 - e. Trust Fund in 2016 – Details
 - f. Relocation and Home Leave Fund – Details
 - g. MAFF Fund in 2016– Details
 - h. MoE Fund in 2016 – Details
4. Estimated accounts for 2017
5. Special Projects completed in 2017
 - a. MAFF MarWeb
 - b. MoE ADRIFT
6. Financial Reserve Planning
7. Schedule, structure and financing of future Annual Meetings [Decision 2015/A/4(vi)]
8. 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
9. Appointment of F&A Committee Chairman (information only)
10. Other business
11. Proposed budget for FY 2018 and forecast budget estimates for FY 2019

F&A-2017

F&A ENDNOTE 3

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION
FINANCIAL STATEMENTS
DECEMBER 31, 2016**

F&A 8

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION
FINANCIAL STATEMENTS
DECEMBER 31, 2016**

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A PARTNERSHIP:
ELAINE V. HUGHESMAN LTD.
JANINE E. MORRIS LTD.

PROVIDING SOLUTIONS THAT FIT

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, 2016 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, 2016, and the results of its operations and changes in fund balances for the year then ended.

Sidney, B.C.
May 18, 2017

Hughesman Morris

Hughesman Morris
Chartered Professional Accountants

**NORTH PACIFIC MARINE SCIENCE ORGANIZATION
STATEMENT OF FINANCIAL POSITION
AS AT DECEMBER 31, 2016**

ASSETS	2016	2015
CURRENT ASSETS		
Cash and short term deposits (note 4)	\$ 2,205,697	\$ 2,266,389
Accounts receivable	172,372	95,788
Prepaid expenses	3,185	14,155
	\$ 2,381,254	\$ 2,376,332
LIABILITIES		
CURRENT LIABILITIES		
Accounts payable	\$ 26,715	\$ 104,630
Funds held for Contracting Parties (note 3)	259,000	255,400
	285,715	360,030
FUND BALANCES		
WORKING CAPITAL FUND (note 4)	1,396,424	1,513,304
TRUST FUND	110,000	110,000
RELOCATION AND HOME LEAVE FUND	340,552	90,249
MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES FUND	35,140	39,310
MINISTRY OF ENVIRONMENT FUND	213,423	263,439
	2,095,539	2,016,302
	\$ 2,381,254	\$ 2,376,332

See accompanying notes

1

**STATEMENT OF OPERATIONS AND CHANGES IN FUND BALANCES
FOR THE YEAR ENDED DECEMBER 31, 2016**

	General Fund	Working Capital Fund	Trust Fund	Relocation and Home Leave Fund	Ministry of Agriculture, Forestry and Fisheries Fund	Ministry of Environment Fund	2016 Total	2015 Total
	\$	\$	\$	\$	\$	\$	\$	\$
FUND BALANCES, beginning of year	-	1,513,304	110,000	90,249	39,310	263,439	2,016,302	1,772,054
SOURCES OF FUNDS								
Voluntary contributions and grants (note 5)	-	1,072,730	74,222	-	66,989	1,290,927	2,504,868	2,226,919
Contributions from Contracting Parties	766,200	-	-	-	-	-	766,200	754,800
Interest and other income (note 6)	-	199,672	104	-	-	1,303	201,079	218,513
Budgeted transfer to General Fund (note 7)	113,300	(113,300)	-	-	-	-	-	-
	879,500	1,159,102	74,326	-	66,989	1,292,230	3,472,147	3,200,232
FUND BALANCES, before expenditures	879,500	2,672,406	184,326	90,249	106,299	1,555,669	5,488,449	4,972,286
EXPENDITURES								
Annual Meeting	10,689	-	-	-	-	-	10,689	37,001
Foreign exchange gain (note 8)	(1,536)	-	-	-	-	-	(1,536)	(30,568)
Intern program	-	-	40,915	-	-	-	40,915	35,854
MAFF Fund expenditures (note 9)	-	-	-	-	71,159	-	71,159	89,182
MOE Fund expenditures (note 10)	-	-	-	-	-	1,342,246	1,342,246	1,278,081
Office and administration	23,735	5,288	94	-	-	-	29,117	40,135
Personnel services	556,811	20,894	-	-	-	-	577,705	551,831
Projects (note 11)	-	1,025,258	-	-	-	-	1,025,258	718,633
Publications / Communication	40,591	-	-	-	-	-	40,591	8,257
Relocation	-	-	-	9,697	-	-	9,697	-
Special meetings/travel	171,795	-	75,274	-	-	-	247,069	227,578
	802,085	1,051,440	116,283	9,697	71,159	1,342,246	3,392,910	2,955,984
NET FUNDS AVAILABLE	77,415	1,620,966	68,043	80,552	35,140	213,423	2,095,539	2,016,302
TRANSFER TO								
WORKING CAPITAL FUND (note 4)	(77,415)	77,415	-	-	-	-	-	-
INTERFUND TRANSFERS (note 7)	-	(301,957)	41,957	260,000	-	-	-	-
FUND BALANCES, end of year	-	1,396,424	110,000	340,552	35,140	213,423	2,095,539	2,016,302

NORTH PACIFIC MARINE SCIENCE ORGANIZATION
NOTES TO THE FINANCIAL STATEMENTS
DECEMBER 31, 2016

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.

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.

(b) Capital Assets

Capital assets acquired by the Organization are expensed in the year of acquisition. During the current year the Organization purchased \$14,020 of capital assets.

2. ACCOUNTING POLICIES, continued

(c) Contributions

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

(d) Income Tax

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

(e) 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.

(f) 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.

(g) 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 \$129,500 and China in the amount of \$129,500.

4. WORKING CAPITAL FUND

Of the total amount in the Working Capital Fund, \$982,526 of cash and short term deposits is restricted for specific designated projects.

Pursuant to decision 2016/A/8(ii) of the Governing Council, \$131,100 of the funds held in the Working Capital Fund will be transferred to the General Fund at the beginning of the 2017 fiscal year to balance the budget, setting the total annual contribution at \$777,000, and the 2017 annual fee at \$129,500 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, 2016

5. VOLUNTARY CONTRIBUTIONS AND GRANTS

	Working Capital Fund	Trust Fund
BC Government Tsunami Debris Fund	\$ 49,047	\$ -
Contributions to Intern Program:		
DFO (Canada)	-	15,000
NOAA (U.S.A.)	-	19,344
KIOST (Korea)	-	14,000
SOA (China)	-	10,000
Contributions for the North Pacific CPR Project:		
DFO (Canada)	57,500	-
DFO Tsunami Debris Fund	25,000	-
Early Career Science Conference:		
NPRB (U.S.A.)	6,719	-
SOA (China)	-	8,980
FUTURE Program:		
DFO (Canada)	15,000	-
PICES 2016:		
NOAA (U.S.A.)	268,237	-
U.S. State Department	52,436	-
U.S. OAR	52,436	-
PICES 2019:		
DFO (Canada)	150,000	-
PICES 25th Anniversary:		
DFO (Canada)	10,000	-
Korea	25,000	-
PICES Publication Program:		
DFO (Canada)	30,000	-
Small Pelagics Symposium 2017:		
DFO (Canada)	25,000	-
FAO	3,999	-
IMBER	3,999	-
Japan	2,311	-
NOAA (U.S.A.)	51,976	-
NPFC	2,462	-
NPRB (U.S.A.)	13,251	-
SCOR	6,665	-
WWF	5,000	-
Registration fees	26,504	-
Special project coordination:		
Overhead from MOE (Japan) project	167,821	-
Tax levy	22,367	-
Zoop Symposium:		
SCOR	-	6,898
	\$ 1,072,730	\$ 74,222

6. INTEREST AND OTHER INCOME

	Working Capital Fund	Trust Fund	Ministry of Environment Fund
PICES 2016 registration fees	\$ 112,025	\$ -	\$ -
Income tax levies	51,793	-	-
GST/HST & PST rebates	12,675	-	-
Interest income	11,410	104	1,303
Overhead from MAFF Project	8,709	-	-
Miscellaneous income	3,060	-	-
	\$ 199,672	\$ 104	\$ 1,303

7. INTERFUND TRANSFERS

The Governing Council approved the transfer of \$113,300 at the beginning of 2016 from the Working Capital Fund to the General Fund (Decision 2015/A/3/ii) to balance the budget, setting the total annual contribution at \$766,200, and the 2016 annual fee at \$127,700 per Contracting Party.

The Governing Council approved the transfer of \$260,000 from the Working Capital Fund to the Relocation and Home Leave Fund (Decision 2016/A/8/iii) in order to provide for severance and excess vacation leave expenditures expected in the 2017 fiscal year.

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 2016 (Decision 2016/A/8/iv). The amount of the transfer was \$41,957.

8. FOREIGN CURRENCY TRANSACTIONS

At year end all funds held in foreign currency (USD \$66,487), receivables (USD \$61,858) and payables (USD \$764) are converted to Canadian dollars using the December 31st exchange rate. A foreign exchange gain 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.

9. MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES FUND EXPENDITURES

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

	2016	2015
Miscellaneous	\$ 914	\$ 183
Contractual services	27,413	44,478
Overhead to PICES	8,709	9,776
Special meetings/travel	34,123	34,745
Total MAFF expenses	\$ 71,159	\$ 89,182

NORTH PACIFIC MARINE SCIENCE ORGANIZATION
NOTES TO THE FINANCIAL STATEMENTS
DECEMBER 31, 2016

10. MINISTRY OF ENVIRONMENT FUND EXPENDITURES

	2016	2015
Contractual services	\$ 1,099,098	\$ 986,782
Equipment	-	11,494
Miscellaneous	4,232	2,188
Other workshops	9,998	-
Overhead to PICES	167,821	167,821
Special meetings/travel	61,097	109,796
Total MOE expenses	\$ 1,342,246	\$ 1,278,081

11. PROJECTS

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

	2016	2015
BC Government Tsunami Debris Mapping	\$ 12,025	\$ 15,953
Climate Change Symposium Series	-	161,673
Development of FUTURE	21,461	20,658
DFO Tsunami Debris	25,000	-
Early Career Scientist 2017	4,489	-
HABS Symposium	-	214
ICES/PICES SICCOME Workshop	-	54,342
North Pacific CPR Project	61,035	260,345
North Pacific Ecosystem Status Report	16,349	25
PICES 2016 USA	467,221	-
PICES 25th Anniversary	181,182	14,473
PICES Publication Program	33,952	24,979
Small Pelagics Symposium	34,994	-
Special Project Coordination	167,550	165,971
	\$ 1,025,258	\$ 718,633

12. 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.

The International Fisheries Commissions Pension Society will develop a financial plan during 2017 to reduce the unfunded pension liability.

Pursuant to decision 2016/A/8(v), Council approved a lump sum employer contribution of \$20,000 from the fiscal year 2017 budget to pay down unfunded liabilities. An additional lump sum payment (up to \$25,000) is approved if there is a fiscal year 2016 surplus in the General Fund, as determined by the 2016 Auditors' Report.

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

13. 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 \$470,601. This value is determined using current wage rates. The amounts actually paid will be calculated using the wage rates in affect at that time and therefore could change significantly.

14. 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 8 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.

15. 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&A ENDNOTE 4

PAYMENT SCHEDULE OF ANNUAL FEES 2005–2017

	Canada	China	Japan	Korea	Russia	USA
2005	Dec. 24, 04	Sept. 22, 05²	Mar. 2, 05	Mar. 30, 05	Mar. 31, 05³	Jan. 10, 05
2006	Dec. 28, 05	Aug. 1, 06	Dec. 15, 05	Feb. 8, 06	Feb. 28, 06	Jan. 30, 06
2007	Jan. 23, 07	Jul. 3, 07	Dec. 5, 06	Apr. 3, 07	Feb. 13, 07	Jan. 10, 07
2008	Jan. 16, 08	May 15, 08	Dec. 20, 07	Feb. 15, 08	Feb. 13, 08	Jan. 7, 08⁴
2009	Jan. 5, 09	Jun 3, 09	Dec. 11, 08	Apr. 1, 09	Mar. 27, 09	Dec. 24, 08
2010	Apr. 1, 10	Aug. 5, 10	Dec. 14, 09	Mar. 2, 10	Mar. 26, 10	Dec. 11, 09
2011	Feb. 8, 11	Jun 30, 11	Dec. 3, 10	Mar. 25, 11⁵	Feb. 9, 11	Dec. 7, 10
2012	Jan. 3, 12	Aug. 31, 12	Nov. 22, 11	Oct. 11, 12	Mar. 29, 12	Nov. 16, 11
2013	Jan. 7, 13	Oct. 11, 13	Nov. 21, 12	May 14, 13	Apr. 12, 13	Dec. 17, 12
2014	Feb. 18, 14	Jul 11, 14	Dec. 6, 13	Apr. 11, 14	Mar. 5, 14	Dec. 20, 13
2015	Feb. 16, 15	Nov. 26, 14	Dec. 8, 14	Mar. 25, 15	May 1, 15⁶	Dec. 31, 14
2016	Mar 30, 16	Nov 13, 15	Dec. 4, 15	Jul 8, 16	Apr 8, 16	May 5, 16
2017	Mar 14, 17	Dec 15, 16	Dec 16, 16	Jul 5, 17	May 4, 17	Jan 9, 17

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 FY2018 BUDGET		
Sources for General Fund (GNF)	Amount	Notes
National contributions (\$131,400 per Contracting Party)	\$788,400	(FY 2017 fee of \$129,500 x 1.5%)
Transfer from Working Capital Fund	\$133,600	
Total	\$922,000	
Category	GNF Allotment	WCF Allotments
Personnel Services	\$600,000	benefit adjustments, liabilities reduction
Annual Meeting	\$40,000	registration fee revenue as needed/available
Special Meetings/Travel	\$190,000	encumbered funds as needed/available
Publications/Communications	\$42,000	
Office/Administrative	\$50,000	
Projects		
Total	\$922,000	

Estimated interest and other income	\$163,000
Net income tax levies	\$50,000
Tax (GST, PST) rebate	\$13,000
Interest	\$10,000
Registration fees for PICES-2018	\$90,000
Overhead from the PICES/MAFF project	\$0

FY 2019

The forecast FY 2019 budget of \$952,200 is prepared based on insufficient information that was available as of August 15, 2017 (lists of special meetings, publications and travel requests for 2019 will only be reviewed by Science Board, and finally approved by Council at PICES-2018), and is ~3.25% higher than the proposed for FY 2018 (\$922,000). If the inflation rate in Canada stays at the level of ~1.5%, under the adopted guidelines (Decision 1999/A/2(ii)), the 2019 annual fee could be set at the level of \$133,400 per Contracting Party. Then the total 2018 contribution will be \$787,800 and a transfer of \$133,100 from the Working Capital Fund will be required to balance the budget.

FORECAST FY 2019 BUDGET		
Sources for General Fund (GNF)	Amount	Notes
National contributions (\$133,400 per Contracting Party)	\$800,400	(FY 2018 fee of \$131,400 x 1.5%)
Transfer from Working Capital Fund	\$151,600	
Total	\$952,000	
Category	GNF Allotment	WCF Allotments
Personnel Services	\$640,000	benefit adjustments, liabilities reduction
Annual Meeting	\$30,000	registration fee revenue as needed/available
Special Meetings/Travel	\$190,000	encumbered funds as needed/available
Publications/Communications	\$42,000	
Office/Administrative	\$50,000	
Projects		
Total	\$952,000	

Estimated interest and other income	\$153,000
Net income tax levies	\$50,000
Tax (GST, PST) rebate	\$13,000
Interest	\$10,000
Registration fees for PICES-2019	\$80,000
Overhead from the PICES/MAFF project	\$0

**PICES Membership
(as of October 2017)**

Canada

Sonia D. Batten (MONITOR)

Represents SAHFOS

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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 (준치목적)

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. 집행이사회는 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. 집행이사회는 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 구성 및 절차)

- 1. 각 협약국은 집행이사회 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 3이상의 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) 납부 의무를 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 PICES공탁소(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
delegat ¹	- 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 ²	- 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

¹ Wherever in Rules 1-22 the term “delegate” appears, it applies equally to alternate delegate.

² 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.

³ 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) Qualified⁴ 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.

⁴ 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. PICES협약개정 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 GC회원국대표나 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 SB성원 중에서 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 보고 책임을 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 SB의 장후보로 지명받거나 출마를 결심하면, 선거가 행해질 연차회의 개최 60일전

- 에 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)