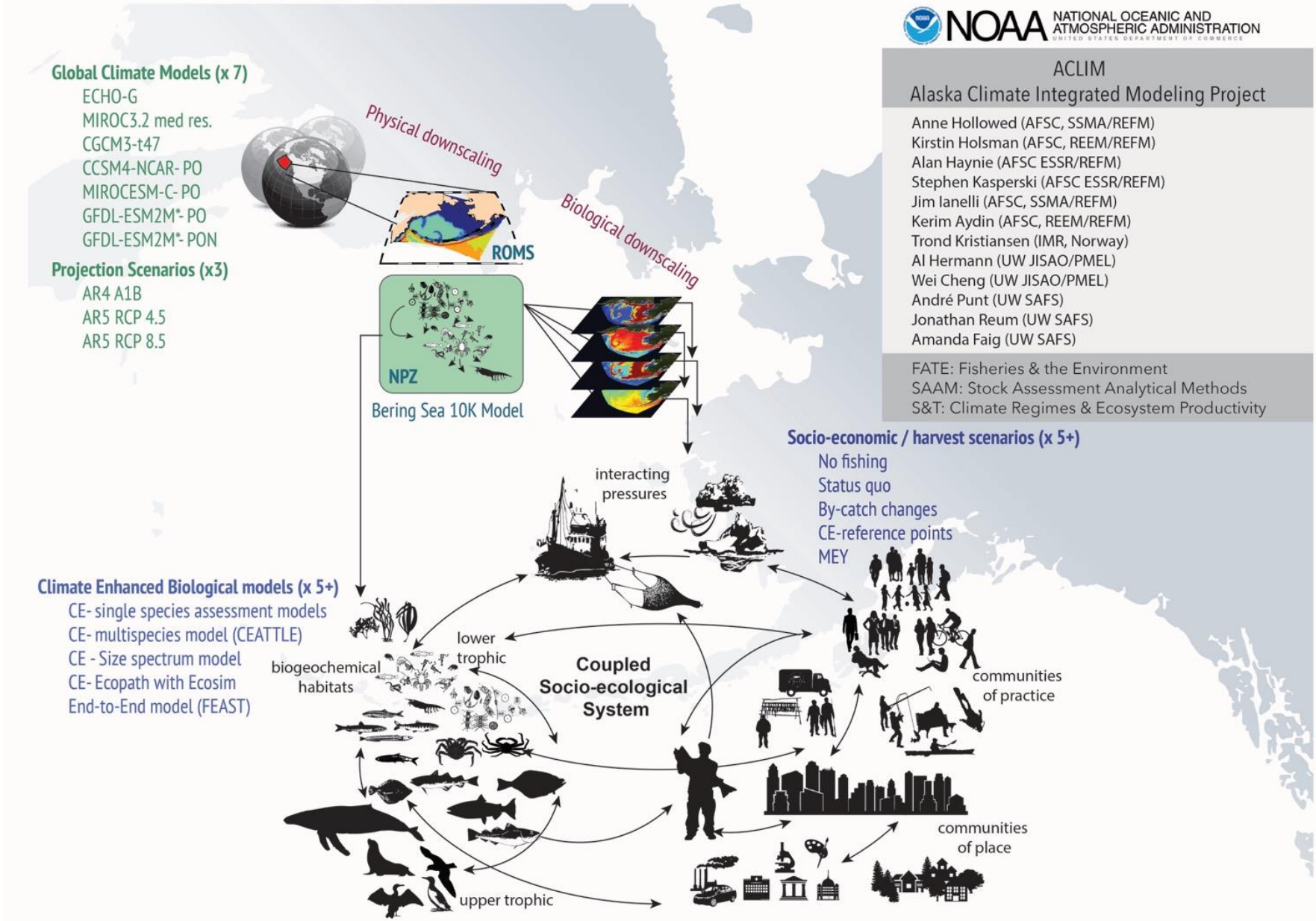
Observation: High latitude oceans are changing

Action: Develop coordinated international ecosystem monitoring programs that include use of advanced technologies to track ecosystem change and provide sufficient information needed to support ecosystem based management of marine resources.

Photo: Mark Holsman

Coupled socio-ecological models are revealing that there is much at stake

Action. Explore the performance of adaptation options under future climate scenarios using socio-ecological models to inform the public of the risks of climate change.


NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE
ACLIM
Alaska Climate Integrated Modeling Project
Anne Hollowed (AFSC, SSMA/REFM)
Kirstin Holsman (AFSC, REEM/REFM)
Alan Haynie (AFSC ESSR/REFM)
Stephen Kasperski (AFSC ESSR/REFM)
Jim Ianelli (AFSC, SSMA/REFM)
Kerim Aydin (AFSC, REEM/REFM)
Trond Kristiansen (IMR, Norway)
Al Hermann (UW JISAO/PMEL)
Wei Cheng (UW JISAO/PMEL)
André Punt (UW SAFS)
Jonathan Reum (UW SAFS)
Amanda Faig (UW SAFS)
FATE: Fisheries & the Environment
SAAM: Stock Assessment Analytical Methods
S&T: Climate Regimes & Ecosystem Productivity
Global Climate Models (x 7)
ECHO-G
MIROC3.2 med res.
CGCM3-t47
CCSM4-NCAR- PO
MIROCESM-C- PO
GFDL-ESM2M*- PO
GFDL-ESM2M*- PON
Projection Scenarios (x3)
AR4 A1B
AR5 RCP 4.5
AR5 RCP 8.5
Physical downscaling
ROMS
Biological downscaling
NPZ
Bering Sea 10K Model
Socio-economic / harvest scenarios (x 5+)
No fishing
Status quo
By-catch changes
CE-reference points
MEY
interacting pressures
Climate Enhanced Biological models (x 5+)
CE- single species assessment models
CE- multispecies model (CEATTLE)
CE - Size spectrum model
CE- Ecopath with Ecosim
End-to-End model (FEAST)
lower trophic
biogeochemical habitats
Coupled Socio-ecological System
communities of practice
communities of place
upper trophic

Timely communication of scientific advancements is needed.

Action: Extend multi-model inter-comparison projects to include regional socio-ecological modeling networks that utilize high resolution ocean habitat models for exploration of climate impacts on future trans-boundary movements and population dynamics through interdisciplinary, international collaborations with global climate modeling teams.

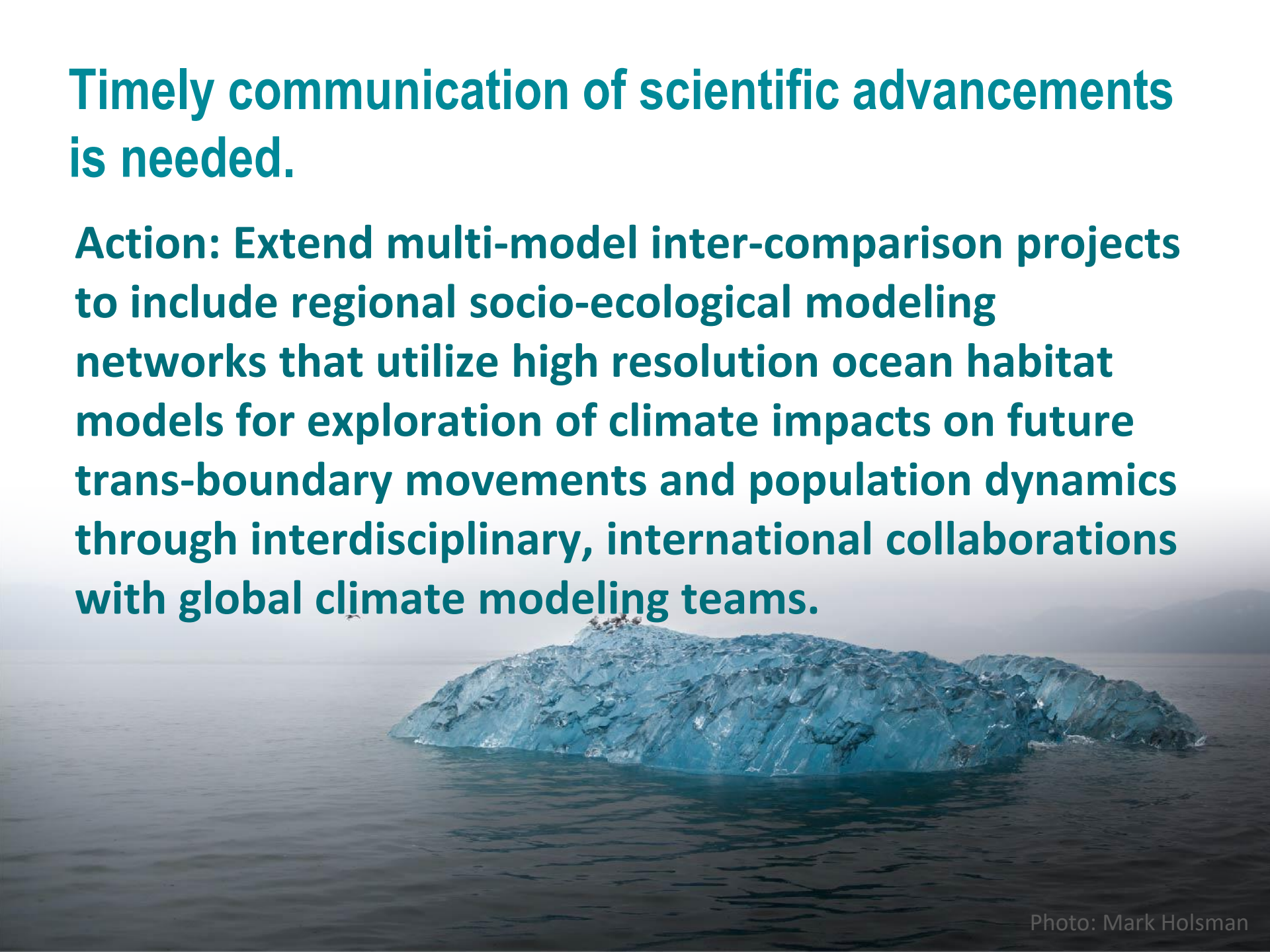
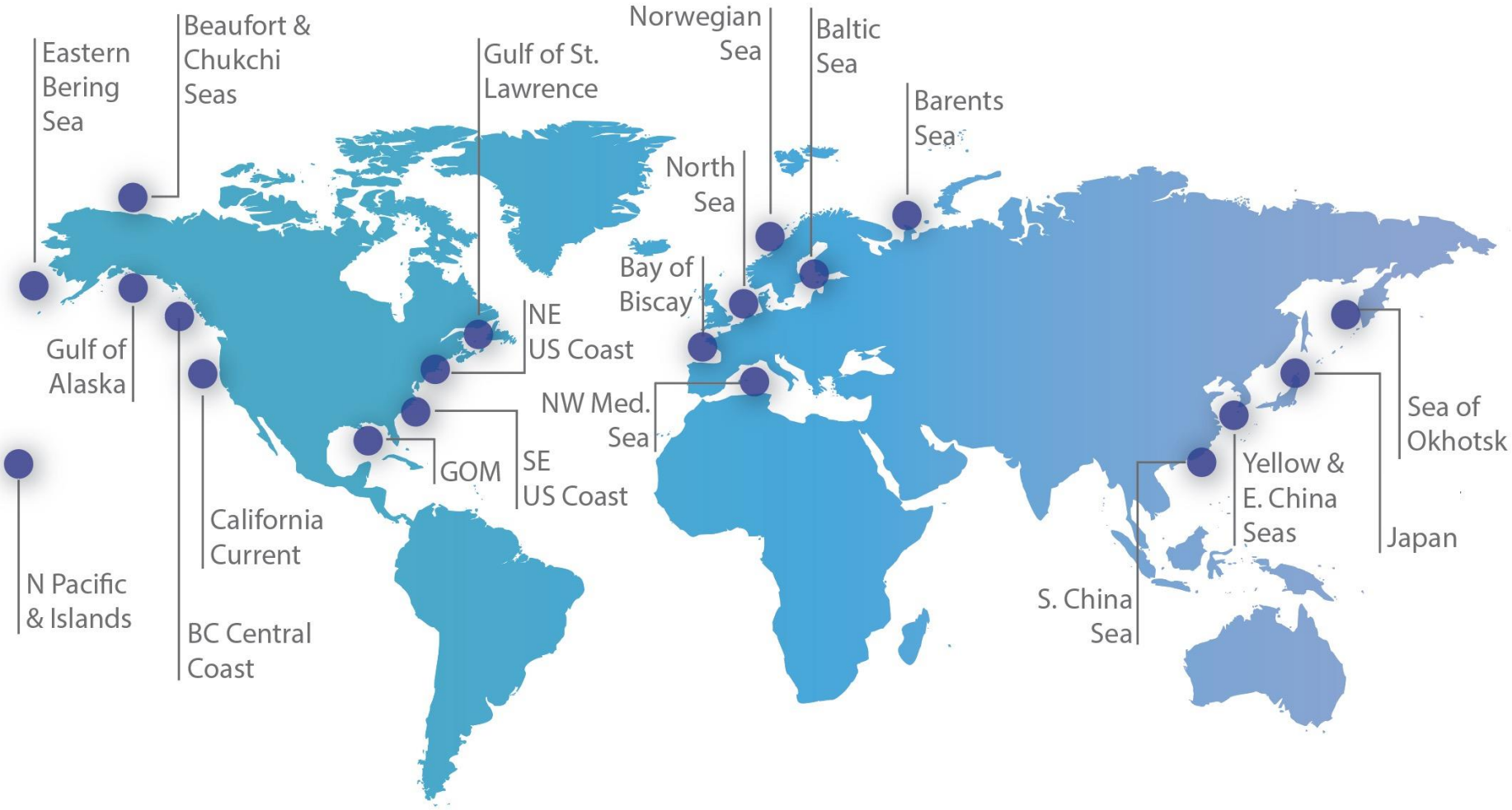


Photo: Mark Holsman

SICCME/S-CCME

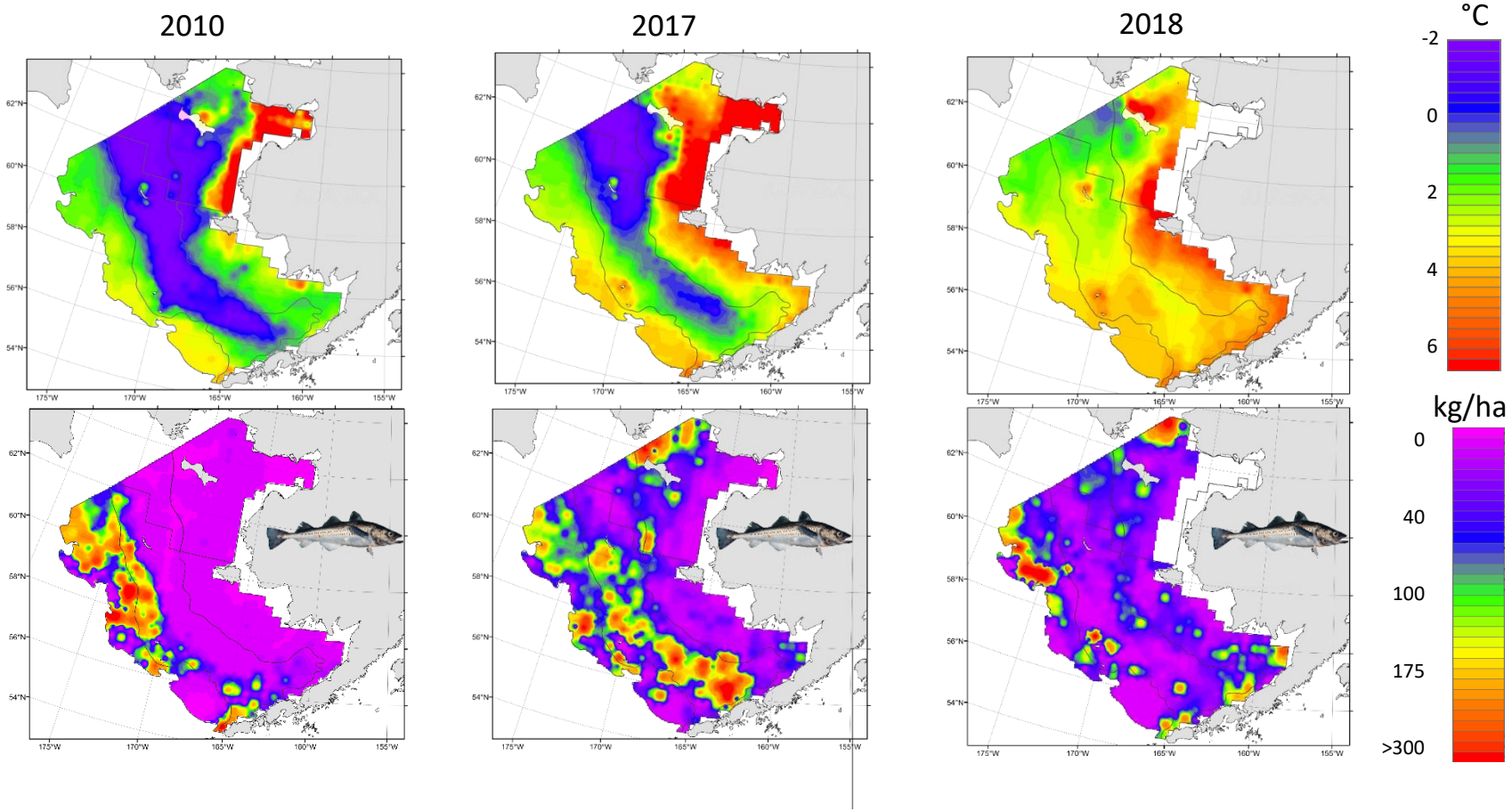
Regional Modeling Nodes



ICES-PICES Strategic Initiative on
Climate Change Effects on Marine Ecosystems

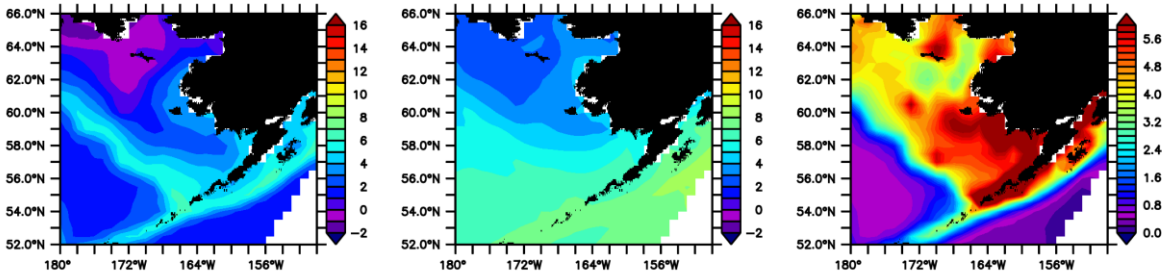
Observed Eastern Bering Sea bottom trawl survey
Mean bottom temperature and pollock CPUE

Stevenson and Lauth, In revision Polar Biology; Data from Robert Lauth, Alaska Fisheries Science Center

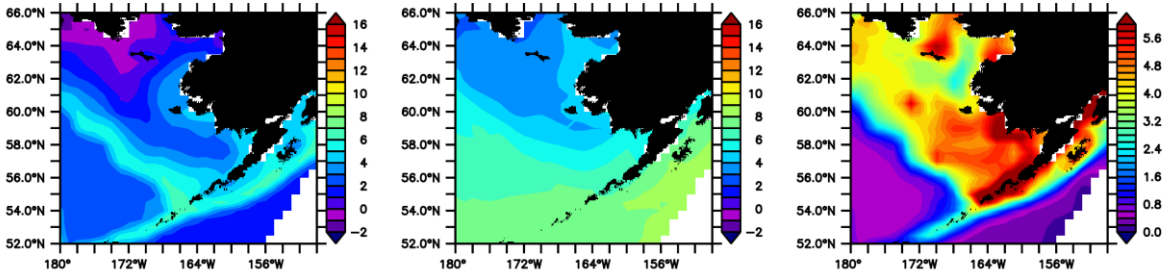


Bottom Temp. Surface Temp. Sum Lg Zooplankton

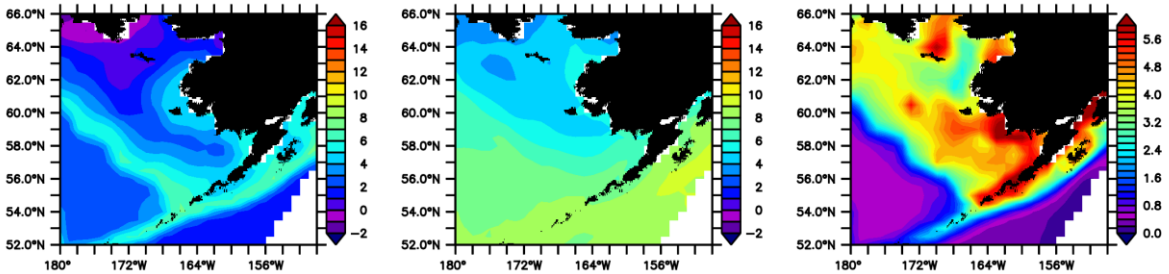
2010-2019



2050-2059



2080-2100

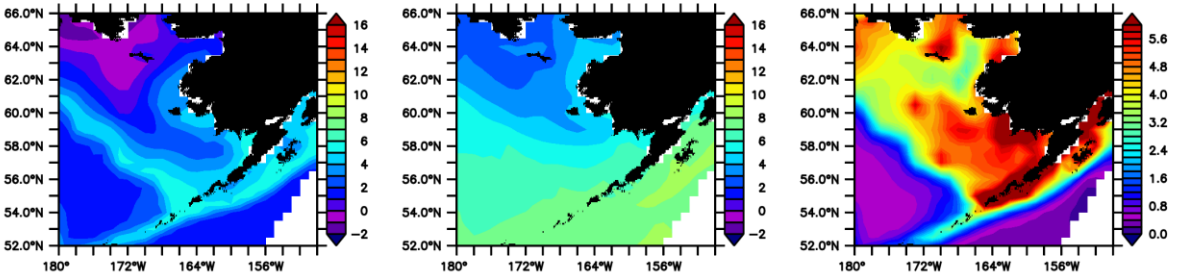


Hermann et al.
In Revision, ICES J Mar Sci.

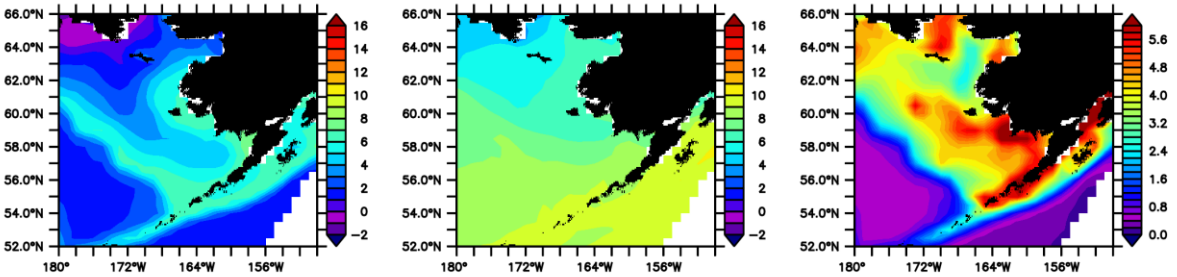
Annual Ensemble of Vertical Averages (MIROC & GFDL) RCP 4.5

Bottom Temp. | Surface Temp. | Sum Lg Zooplankton

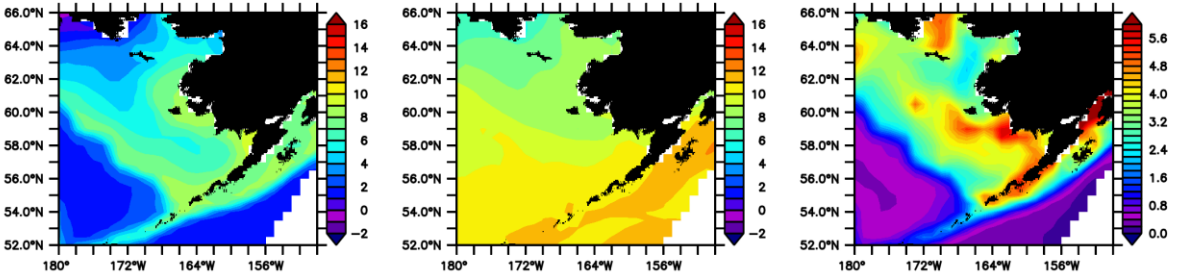
2010-2019



2050-2059



2080-2100



Hermann et al.
In Revison, ICES J Mar Sci

Annual Ensemble of Vertical Averages (MIROC, CESM & GFDL) RCP 8.5