BECI

BASIN-SCALE EVENTS & COASTAL IMPACTS
Ocean Knowledge Integration for Informed Decisions

PICES ANNUAL MEETING — BECI WORKSHOP - OCT 2024

BACKGROUND

Co-developed by PICES and NPAFC
Hosted by PICES

Endorsed by UNDOS

Funded by BC Salmon Restoration & Innovation Fund

Collaborative partners:
    North Pacific Fisheries Commission
   Pacific States Marine Fisheries Council
    Long Live the Kings
    NOAA
    DFO

The Science We Need for the Ocean We Want

BECI
Basin-Scale Events & Coastal Impacts

PICES   NPAFC   2021 2030 United Nations Decade of Ocean Science for Sustainable Development

CLIMATE CHANGE

- Significantly impacting the words oceans and marine resources

- Exploitable fish stocks are projected to decline for most the world's ocean regions this century

- Evident in fish production across the North Pacific

- Shifts in species distribution

- **Challenging traditional fisheries management approach**

Blanchard et al., 2024, Stafford et al, 2022., Hu et al., 2022
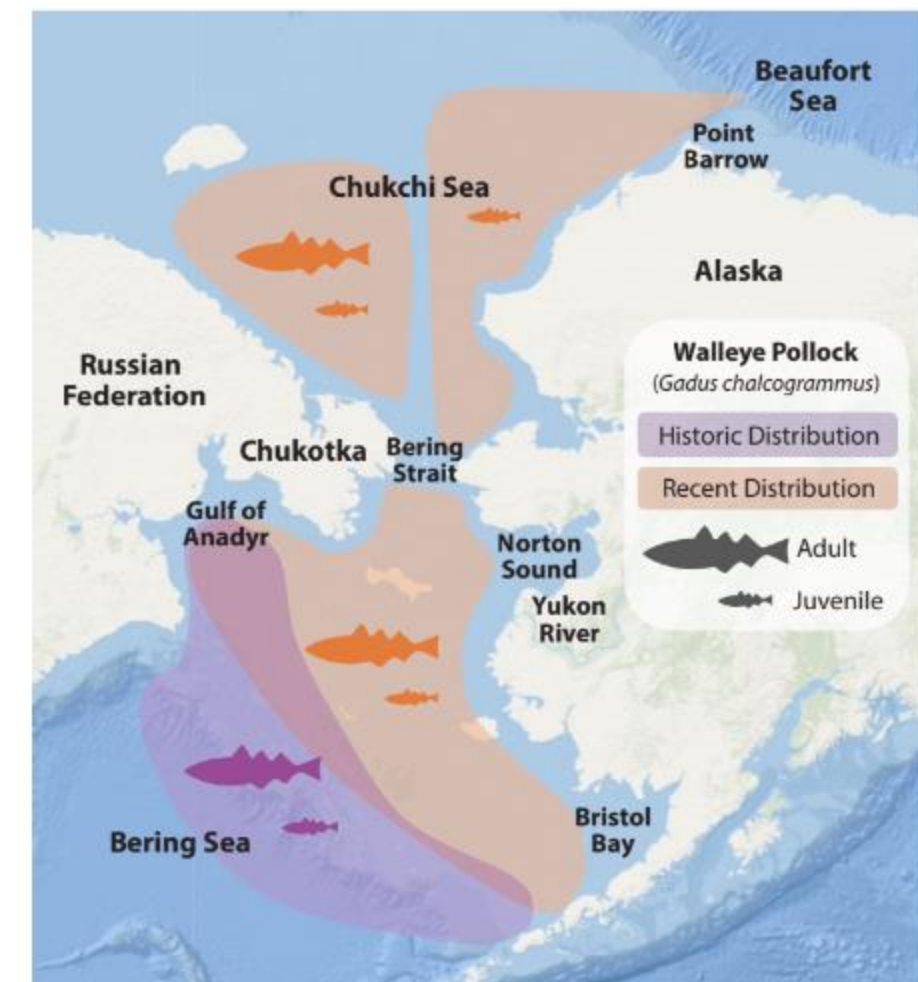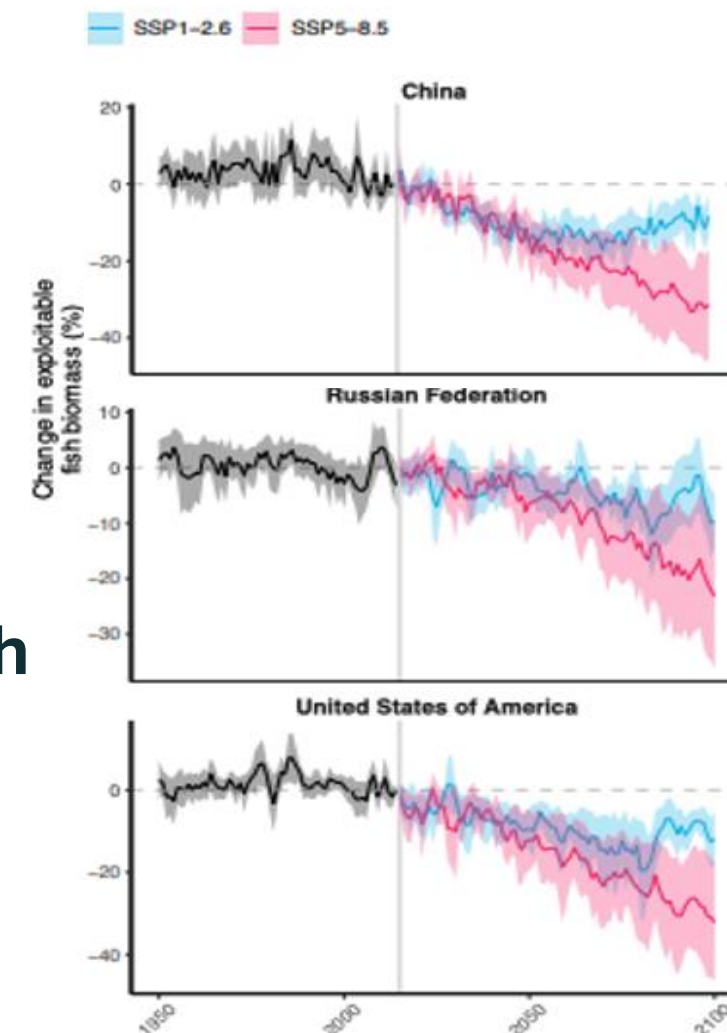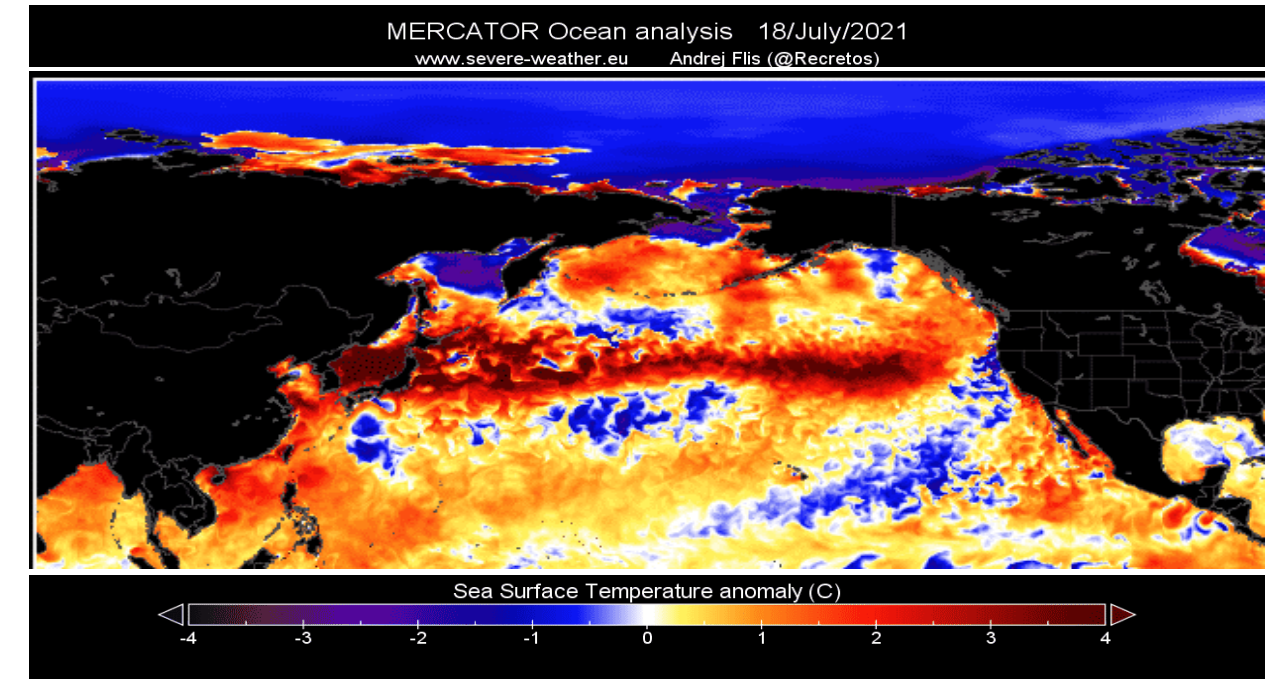
WHAT WE'VE HEARD TO STEER OBJECTIVES

**NEED: NPAFC (Science Plan 2023-2027)**

- Project future salmon production and distribution under climate change to inform management decisions

NEED: IPHC (Engagement, 2024)

- Develop ecosystem-based MSE models to evaluate management strategies under future climate scenarios

- Accessible environmental data to support stock assessment and ecosystem analyses

- Establish regional climate scenario guidance for fisheries projections and management

NEED: NPFC (Engagement, 2024)

- Understand climate effects on transboundary fish populations to guide management

BECI
Basin-Scale Events & Coastal Impacts
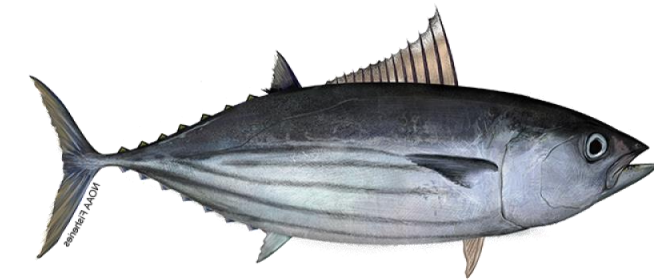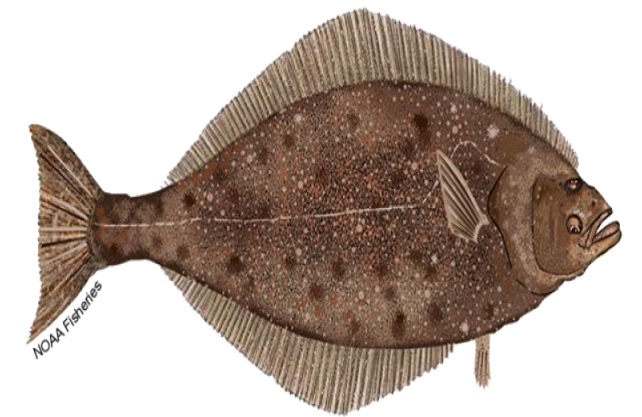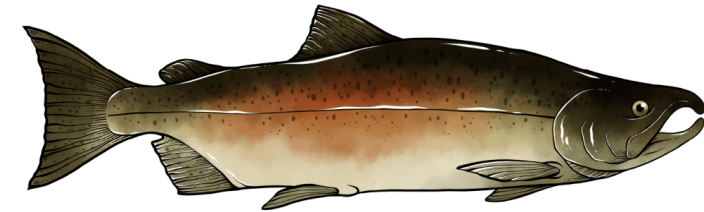
MISSION

Our mission is to provide researchers, resource managers, and policymakers with comprehensive, actionable information and tools to support climate-informed decision-making

OVERARCHING OBJECTIVES

Coordinate international efforts to:

- Assess climate-driven impacts on transboundary and common fishery resources across the North Pacific

- Integrate North Pacific data to enhance ecosystem understanding

- Improve predictions of climate-driven changes at regional and basin scales

- Support sustainable resource management, protect marine biodiversity, and enhance ecosystem resilience

- Support NPAFC Science Plan primary goal:

"Establish a research framework to develop a mechanistic understanding of the impact of changing climate on salmon abundance and distribution trends in the North Pacific Ocean."

BECI
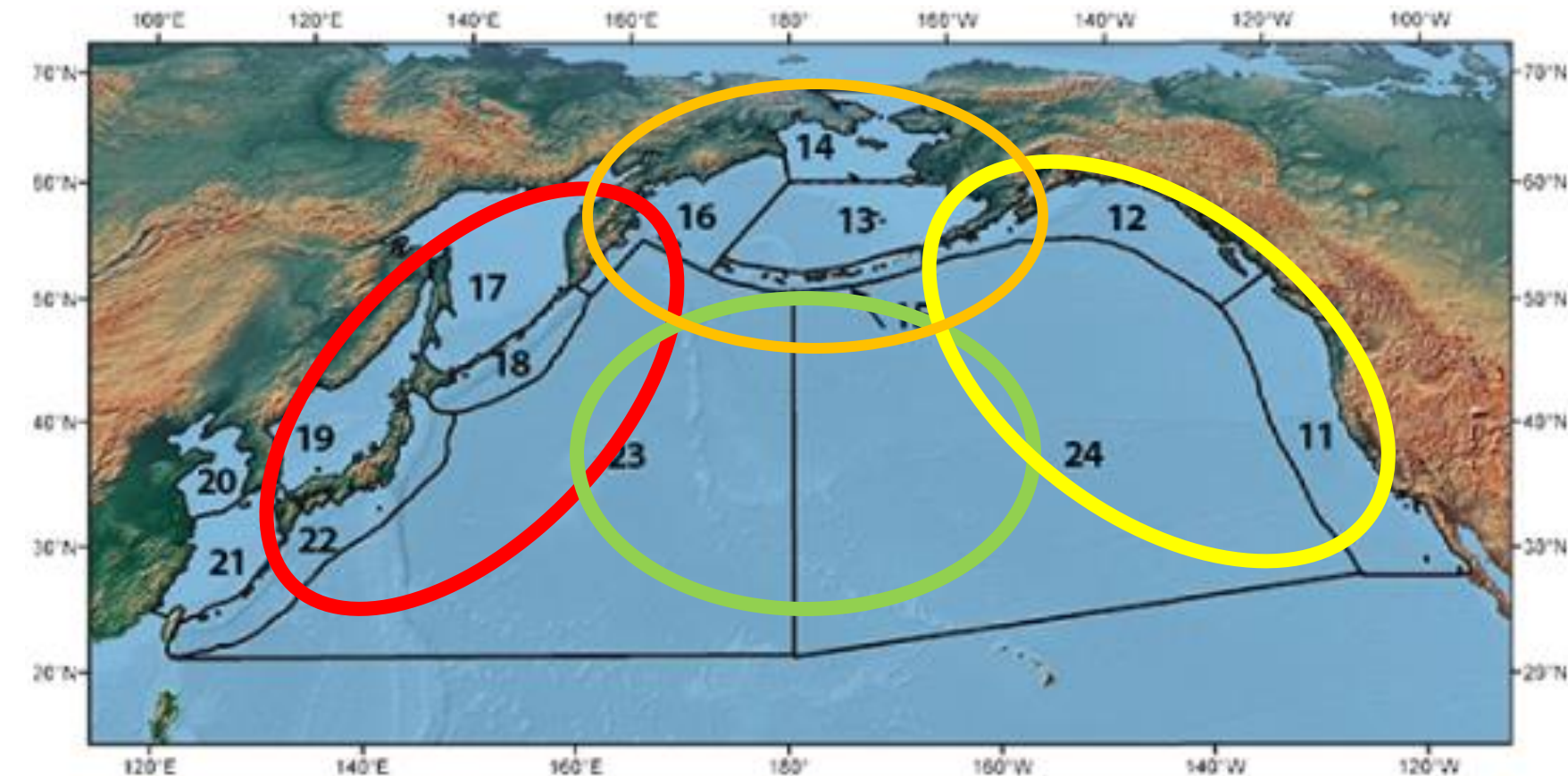Basin-Scale Events & Coastal Impacts
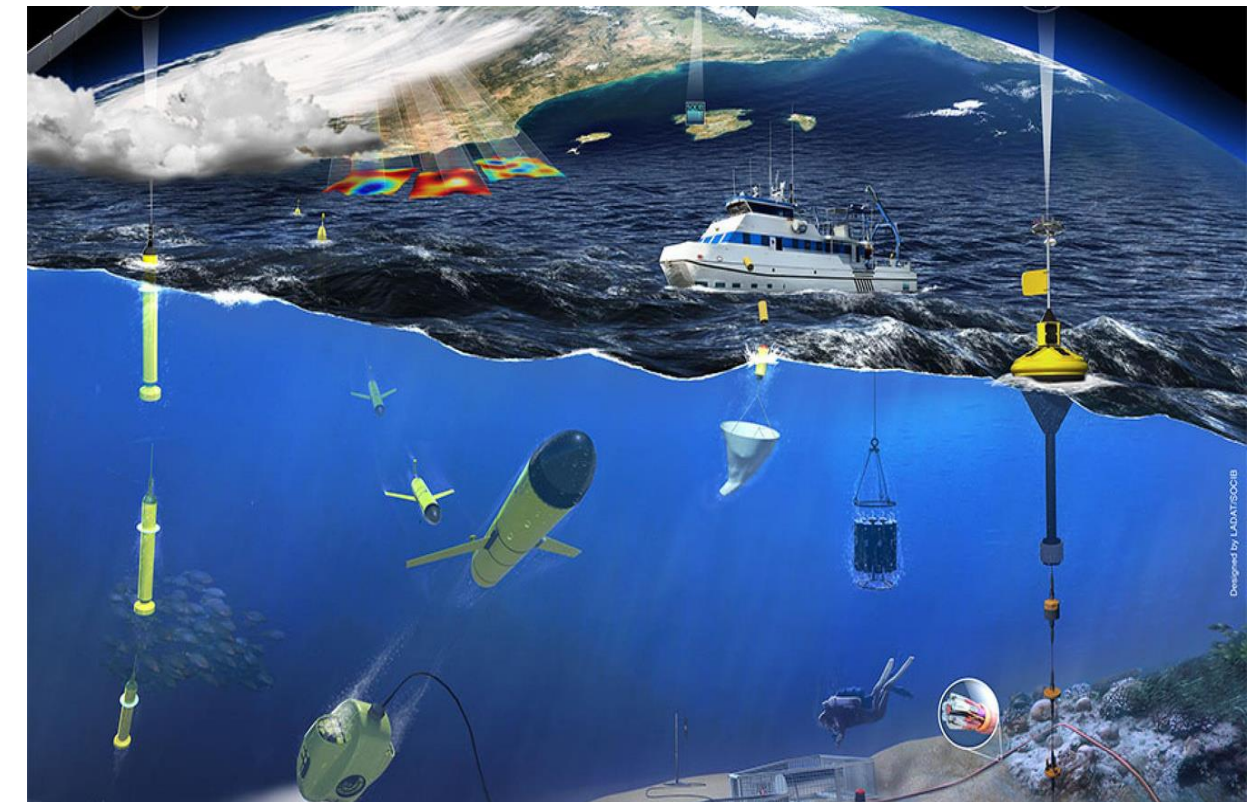
SCOPE

North Pacific Ocean and marginal seas

Focus: salmon, halibut, Pacific saury, tuna

Strategy:

- Break NPO into nodes based on fish / region of interest

- Coordinated international working groups where scientists work together within / across nodes

- Collaboration across PICES project / working groups

BECI INITIATIVES & COMPONENTS

Information Integration & Analytics

Decision Science

International Collaboration & Knowledge Exchange

Predictive Modelling

Environmental Monitoring & Research

BECI
Basin-Scale Events & Coastal Impacts

INITIATIVES — ECOLOGICAL MODELLING

1) Ensemble models of salmon under climate scenarios to inform management of fisheries and linked species of concern

Objective:

Apply coupled climate-biological-social multi-model ensembles to explore long-term climate change effects on various regional management questions related to Pacific salmon.

2) North Pacific Ocean Marine Ecosystem Model Ensemble (NOMEME)

Objective:

Develop a NOMEME at the basin scale, linked to earth system models, to inform transboundary fisheries management across the Northeast Pacific, and outline protocol for expansion to Northwest Pacific.

Collaborators: NOAA, DFO, FishMIP, CSIRO, your affiliation here - please join our effort :D

BECI
Basin-Scale Events & Coastal Impacts

**North Pacific Ocean Integrated Information System (NPO IIS)**

Develop a framework for a federated North Pacific Ocean integrated information system to bring together environmental, climate, and fisheries data from across the North Pacific region

NPO IIS Goals

- Improve data sharing capabilities and collaborative efforts
- Enhance interoperability of diverse data sets
- Enable synthesis and robust predictions of climate change impacts on marine ecosystems and fish productivity
- Outputs to inform near term decisions, medium term strategies, and long-term planning
- Support more rapid ecosystem status reporting

Collaborators:
PSMFC, NCEAS, DFO, USGS, GOOS, AST

Adapted from Enrique Curchister
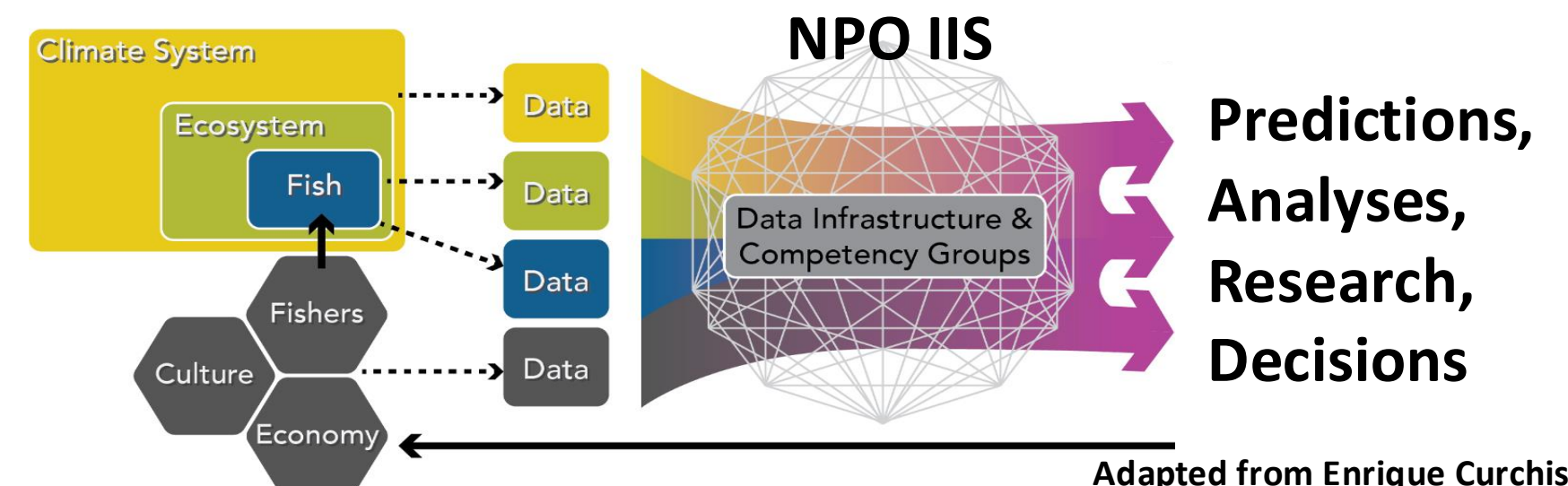
BECI PROGRESS & NEXT STEPS

2024 → 2025

2024

BUILD BECI SCIENCE OFFICE

INDIGENOUS ENGAGEMENT STRATEGY

DEVELOP SCIENCE PLAN

DATA INTEGRATION FRAMEWORK

RE-ENGAGE WITH SCIENTISTS

ENGAGE WITH RFMO

FORM WORKING GROUPS

SEEK FUNDING

2025

IMPLEMENTATION PLAN

CONTINUE DATA INTEGRATION DEV.

CONTINUE MODEL DEVELOPMENT

SEEK FUNDING

BECI
Basin-Scale Events & Coastal Impacts

BECI / PICES – NEXT STEPS

- Strengthen engagement with PICES scientists, projects and working groups

- Collaborate with PICES working groups

Upcoming opportunities:

- Let's connect this week!

- Follow up NOMEME meetings

- Model Ensemble themed UNDOS workshops

- Planning phase for various working groups – winter 2024/2025

BECI
Basin-Scale Events & Coastal Impacts

BECI SCIENCE OFFICE

Dr Kathryn Berry

Science Director

Dr Viv Tulloch

Project Scientist

(Modelling Lead)

Kate Scheps

Engagement Lead

Jaid Conn

Program
Coordinator

Dr Isobel Pearsall

Salmon Specialist

Camille Jasinski

Communications
Officer

HTTPS://BECI.INFO

BECI
Basin-Scale Events & Coastal Impacts

VISION

A North Pacific Ocean where interdisciplinary science, collaborative partnerships, and advanced analytics support sustainable fisheries, effective conservation, and ecosystem resilience in a changing climate.

BECI
Basin-Scale Events & Coastal Impacts

CONTACT INFORMATION

HTTPS://BECI.INFO

OUTSTANDING QUESTIONS — GUIDE SCIENCE PLAN

What is the most important information for managers?

a. Spatial/predictive information (e.g., on where fish will be?)

b. Dynamic tool (e.g., to identify high risk areas vs areas of high likelihood of fish presence?)

c. Predict black swan events?

d. Management strategy evaluation for certain stocks?

e. Dynamic spatial zoning/MPAs?

BECI
Basin-Scale Events & Coastal Impacts

OCEAN OBSERVATIONS
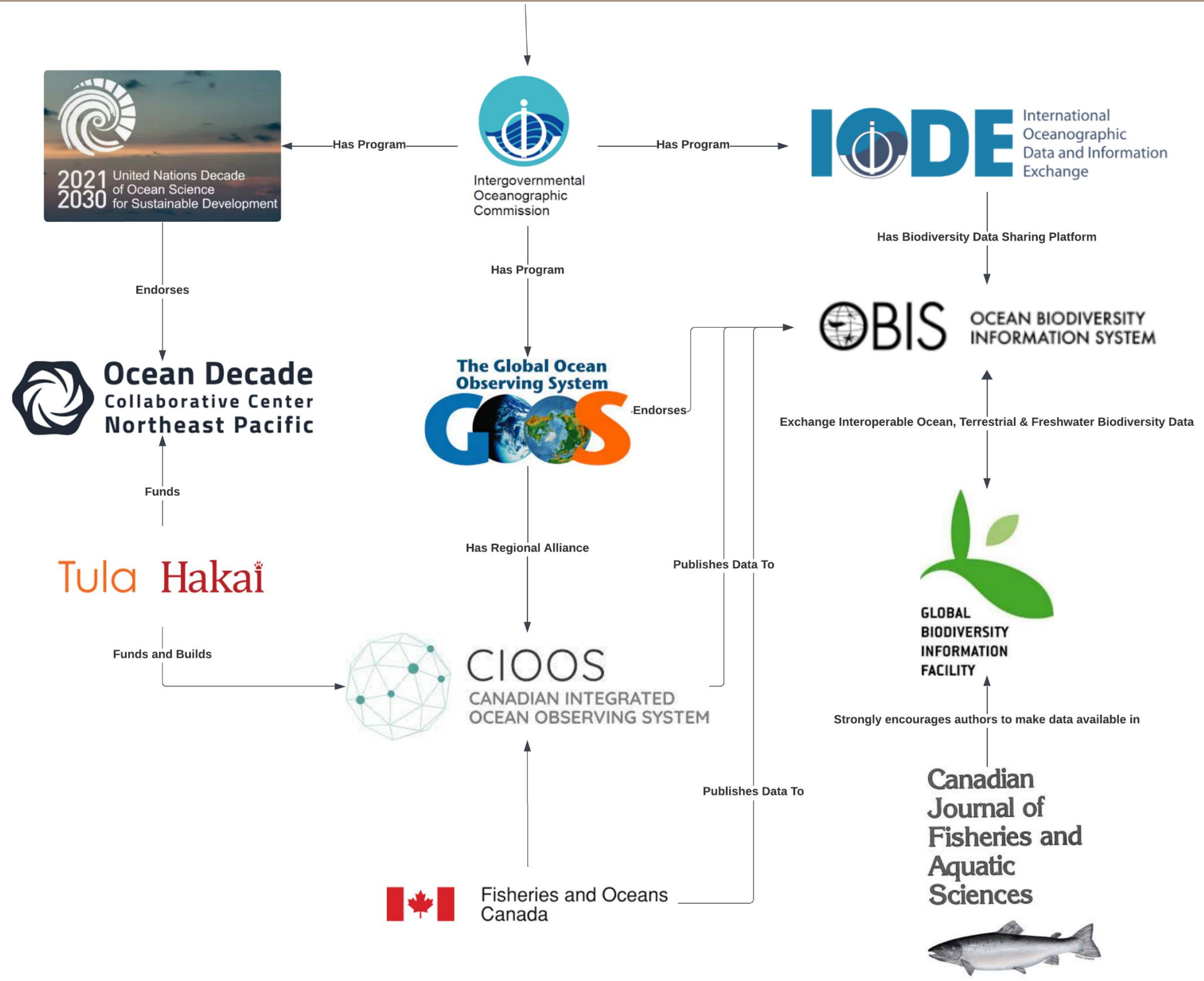
Ocean Data Organizations for BECI context

DATA & ANALYTICS
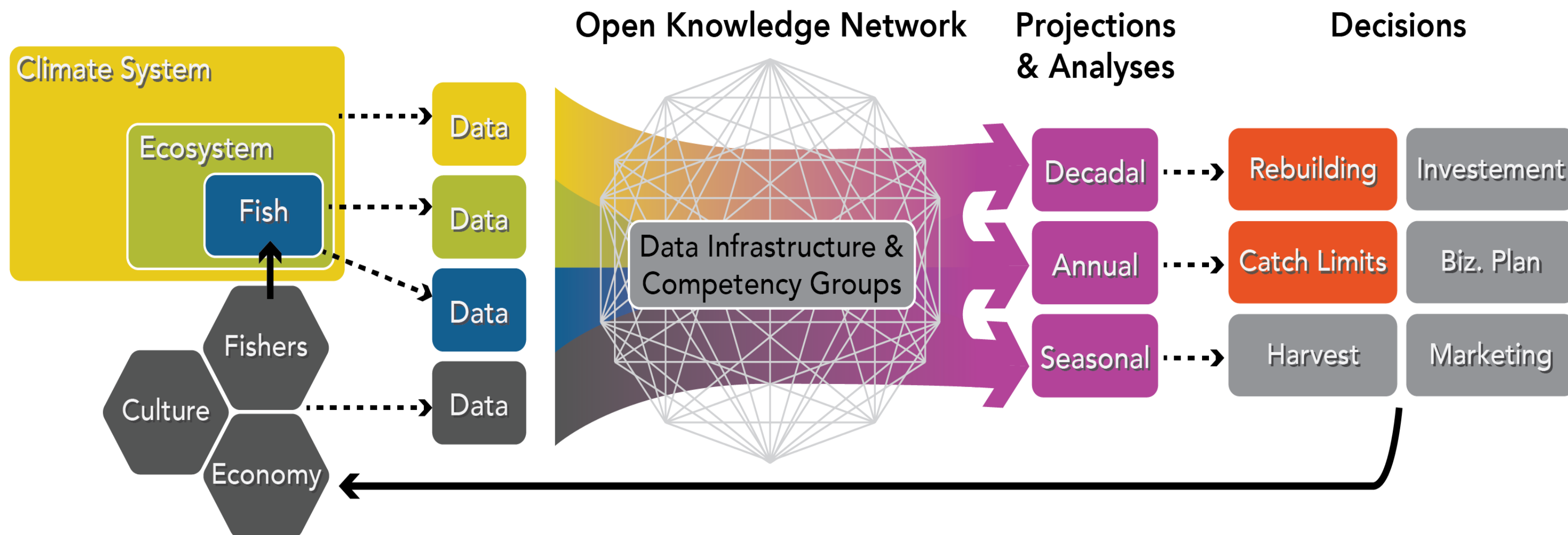
- Develop data infrastructure - support transformative advances in fisheries decision-making
- Integrate data to produce products (i.e. forecasts and scenario testing)
  - Inform near term tactical decisions, medium term strategies, and long-term planning.

Figure courtesy of Dr. Curchister, Rutgers University

BECI – DATA & AI– DEVELOPMENT PHASE

1. Identify use cases for application of OKN.

2. Identify relevant data and variables.

3. Identify key features of OKN.

4. Identify existing data

5. Host data workshop to develop salmon ontology – Goal: dataset to do AI with

6. Determine best tools for AI