

# CLIMATE CHANGE TASK FORCE WORKPLAN OVERVIEW D3 COUNCIL

## CCTF Members:

Co-chair: Diana Stram (NPMFC): [diana.stram@noaa.gov](mailto:diana.stram@noaa.gov)

Co-chair: Kirstin Holsman (NMFS- AFSC) : [kirstin.holsman@noaa.gov](mailto:kirstin.holsman@noaa.gov)

Lauren Divine (Aleut Community of Saint Paul Island)

Scott Goodman (Natural Resources Consultants/BS Fisheries Res. Foundation)

Joe Krieger (NMFS-Regional Office)

Mike LeVine (Ocean Conservancy)

Steve Martell (SeaState)

Brenden Raymond-Yakoubian (Sandhill Culture Craft)

Jeremy Sterling (AFSC Marine Mammal Lab)

Todd Loomis (Ocean Peace, Inc.)



# CCTF MEETINGS TO DATE

- January 2020: spin up meeting and update to Council bodies (Ecosystem Committee, SSC/AP/Council)
- February 2020 CCTF meeting 2:
  - Initial development of framework and proposed process
  - Initial draft of work plan
  - Update to FEP (March meeting)
- December 2020 CCTF meeting 3
- May 2021 CCTF meeting 4



# ATTENDEES May 10 & 13, 2021 (VIRTUAL)

## Taskforce members in attendance:

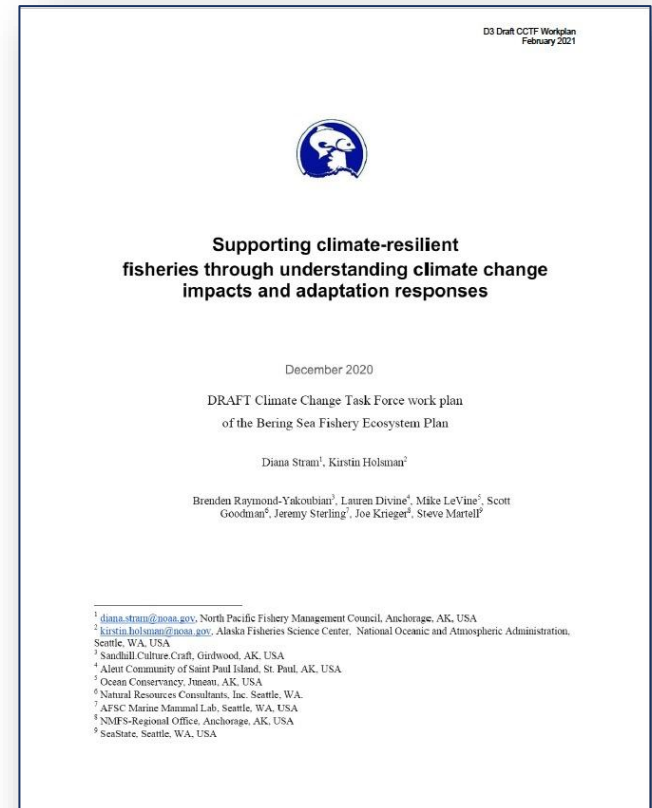
Lauren Divine (Aleut Community of Saint Paul Island), Scott Goodman (Natural Resources Consultants/Bering Sea Fisheries Research Foundation), Kirstin Holsman co-Chair (AFSC-Seattle), Steve Martell (SeaState), Joe Krieger (NMFS-Regional Office), Brenden Raymond-Yakoubian (Sandhill.Culture.Craft), Mike LeVine (Ocean Conservancy), Jeremy Sterling (AFSC Marine Mammal Lab), Diana Stram co-Chair (NPFMC), Todd Loomis (Ocean Peace, Inc.)

## Members of the public and other state and agency staff:

Diana Evans, Kerim Aydin, Raychelle Daniel, Scott Miller, Stephanie Madsen, Steve Marx, Megan Williams

## Goals of CCTF4:

- Review progress since CCTF3
- Address comments to workplan
- Revise fig. 6
- Identify timeline and deliverables



# CCTF Meeting 4 overview

- Workplan finalized, all further revisions will go through linked ‘live’ deliverables document
- “live” glossary of terms added
- plain language added to overview section
- Identified activities for now through Sept 2021
  - ◆ Update table 1 (annual exercise)
  - ◆ FEP Climate Indicators short list
  - ◆ Synthesis of current climate readiness
  - ◆ Outline of Climate change report

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
1	<b>CCTF Timeline</b>																								
2	2021												2022												
3	Q1			Q2			Q3			Q4			Q1			Q2			Q3						
4	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9				
5	Phase 1: Review and collect information		Progress																						
6	Review previous year's Council reports																								
7	Collate new information																								
8	Provide current state of climate readiness report to FEP team for review and comments																								
9	Provide current state of climate readiness to Council																								
10	Draft Table 1: current climate risks and fishery adaptation options																								
11	Draft conceptual model																								
12	Identify climate indicators for FEP																								
13	Phase 2: Climate Change report																								
14	Draft outline of climate change fishery impacts and adaptation report																								
15	Update current state of climate readiness to Council																								
16	Synthesize key risks																								
17	Synthesize key gaps in feasibility or effectiveness of adaptation actions																								
18	Identify tipping points and limits to adaptation																								
19	First order draft: climate change fishery impacts and adaptation report																								
20	FEP review of climate change report																								
21	Public review of climate change report																								



**The goal of the Climate Change Module is to facilitate the Council's work towards climate-ready fisheries management that helps ensure both short- and long-term resilience for the Bering Sea.**



### Objective 1



#### **COLLATE**

Coordinate the review of existing and emergent climate information on impacts, adaptation, and residual risk.

### Objective 2



#### **SYNTHESIZE**

Assess key climate change impacts, adaptation actions, and residual risk.

### Objective 3



#### **COMMUNICATE**

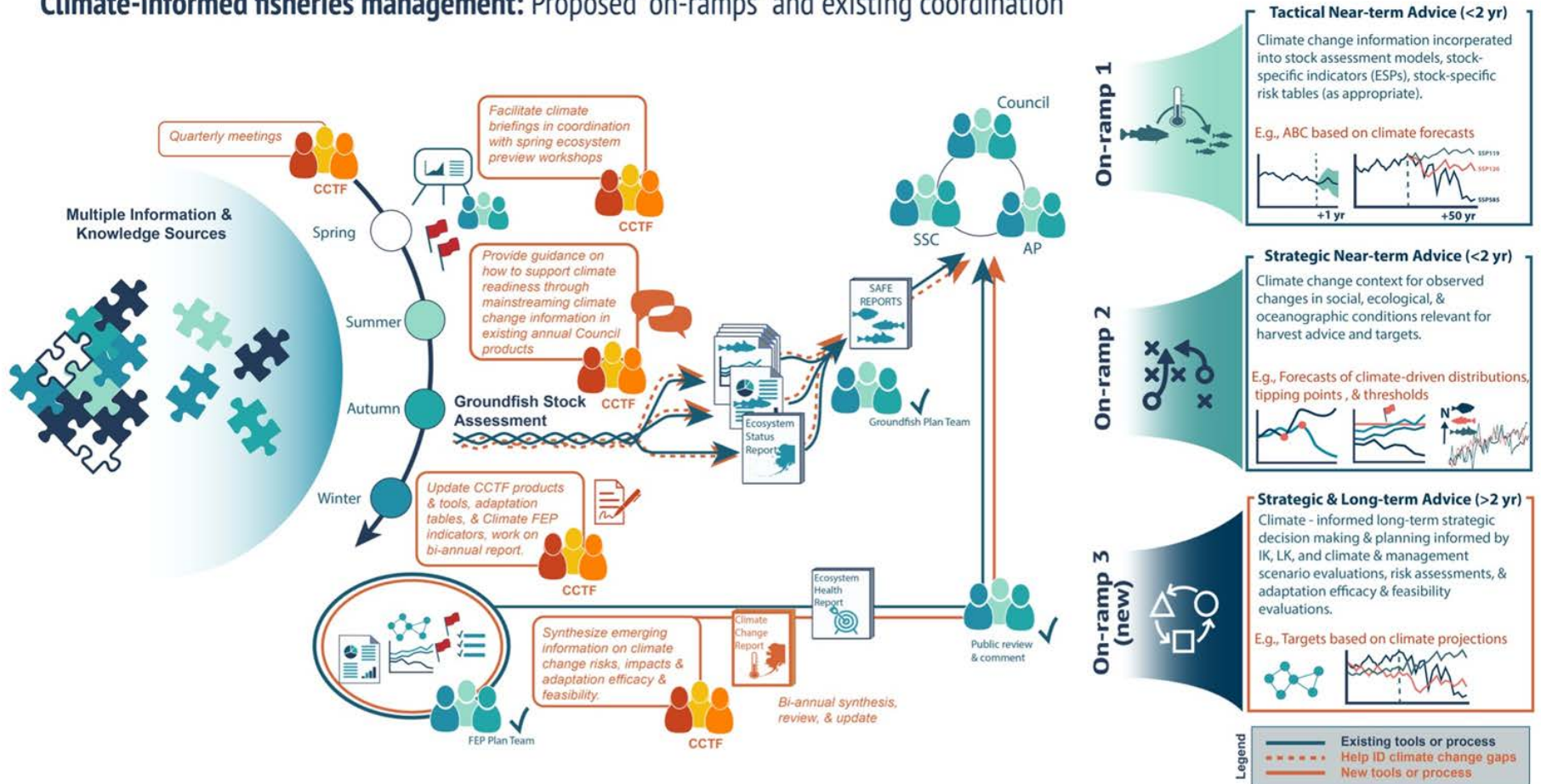
Summarize and communicate potential risks and adaptation actions.

- **Objective 1. Collate:**  
*Evaluate the mechanisms and processes through which climate change information is currently included in the fishery management process, identify gaps, and help create opportunities to increase the inclusion of available information*
- **Objective 2. Synthesize:**  
*Synthesize information about long-term climate change impacts and scenarios and help create pathways for inclusion of that information in the fishery management process.*
- **Objective 3. Communicate:**  
*Identify potential management tools and actions for consideration by the Council that could help increase resilience and adaptation to climate change impacts*

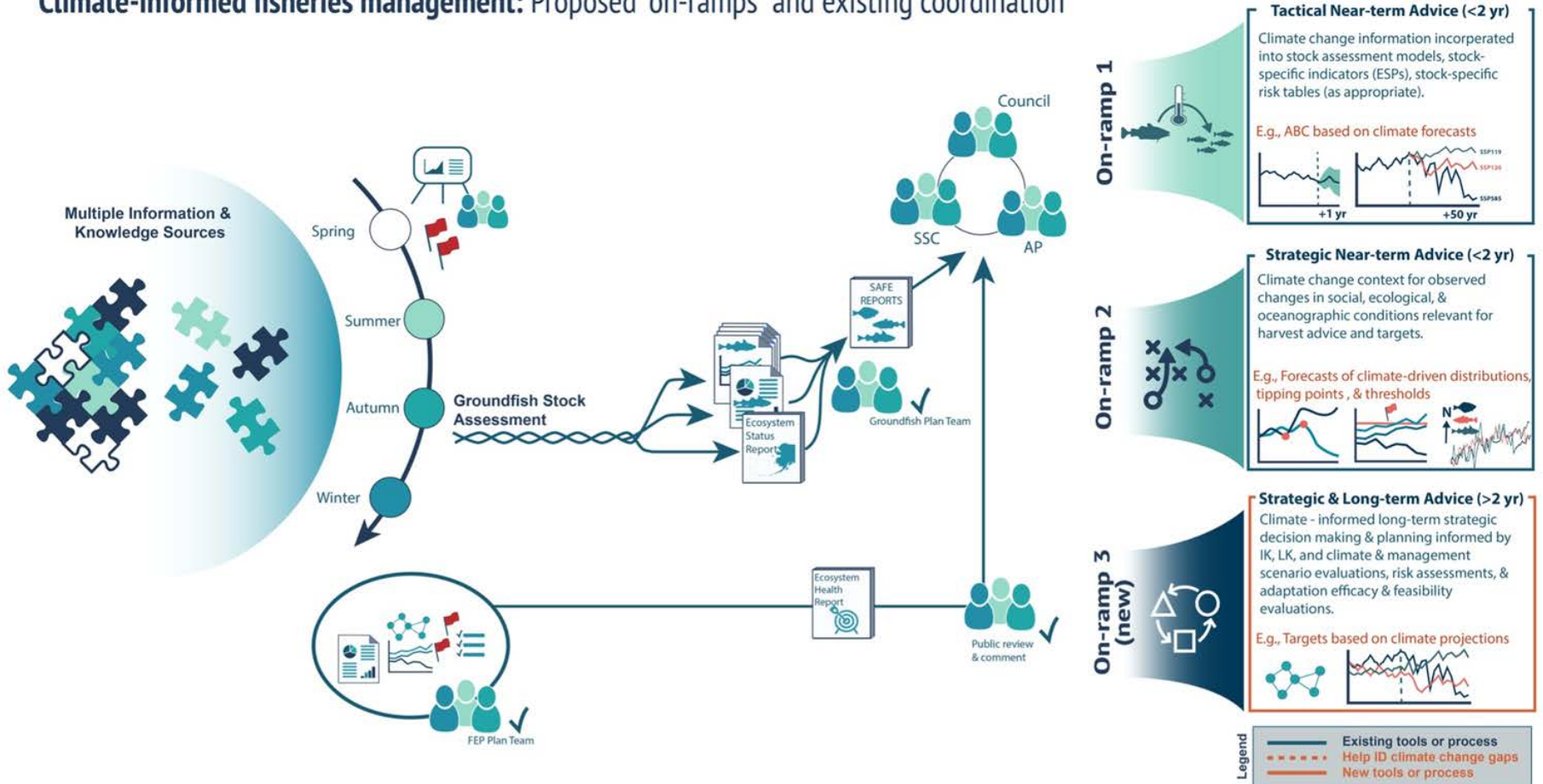




# Climate-informed fisheries management: Proposed “on-ramps” and existing coordination

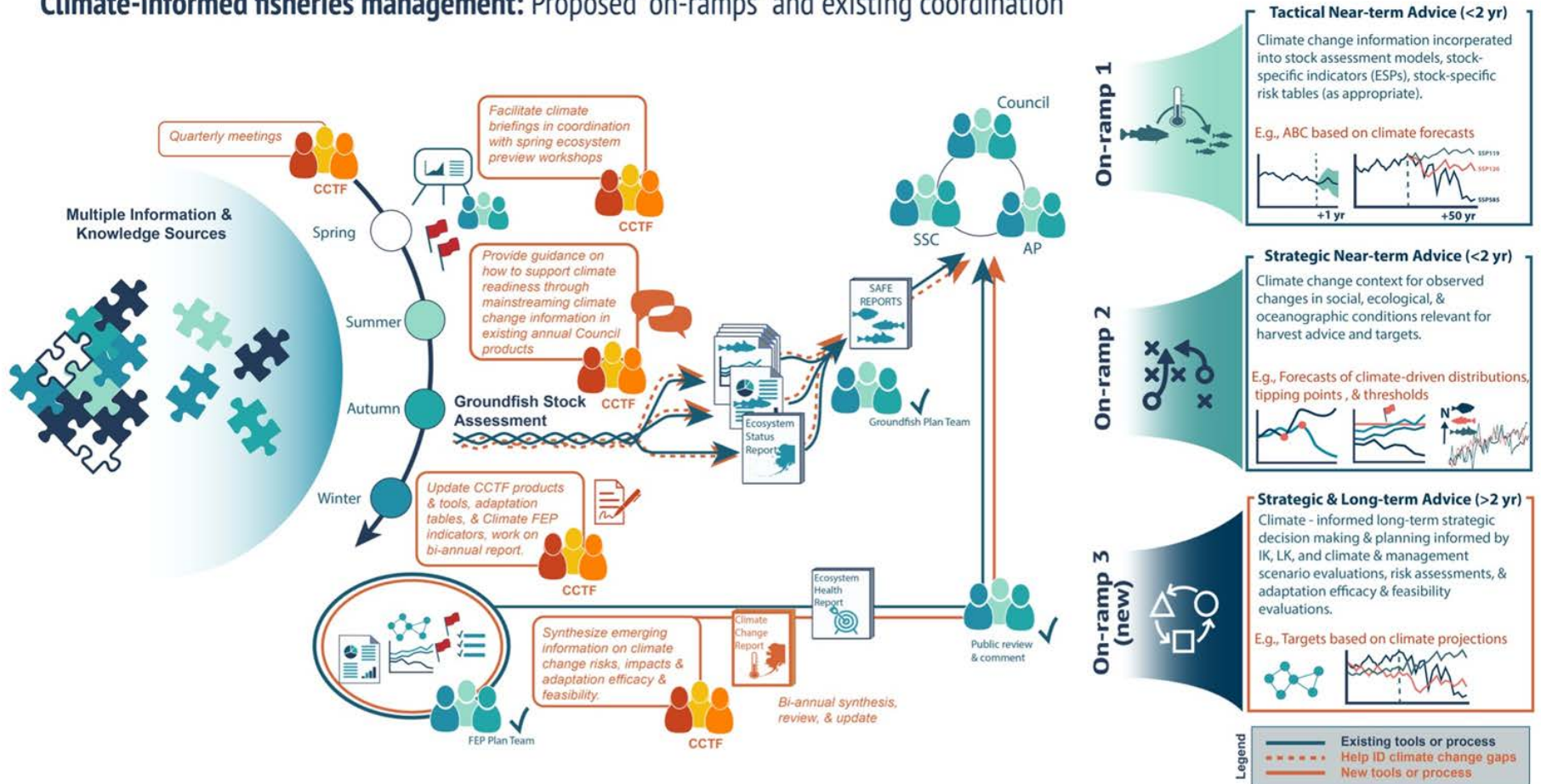


# Climate-informed fisheries management: Proposed “on-ramps” and existing coordination

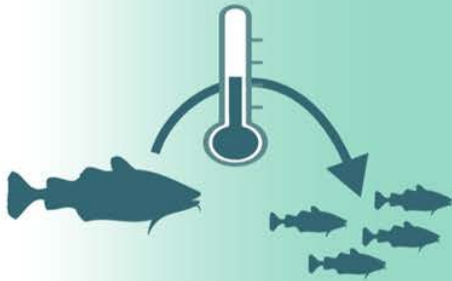




# Climate-informed fisheries management: Proposed “on-ramps” and existing coordination



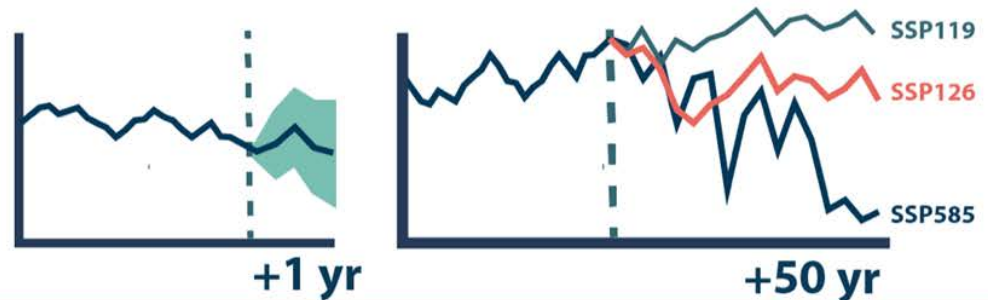
# On-ramp 1



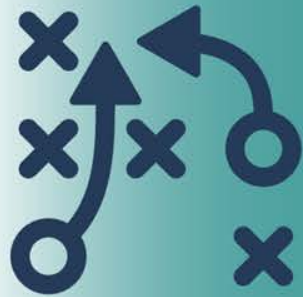
## Tactical Near-term Advice (<2 yr)

Climate change information incorporated into stock assessment models, stock-specific indicators (ESPs), stock-specific risk tables (as appropriate).

E.g., ABC based on climate forecasts



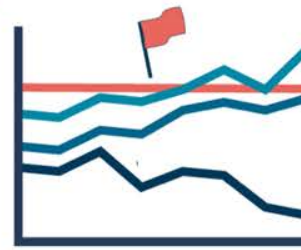
# On-ramp 2



## Strategic Near-term Advice (<2 yr)

Climate change context for observed changes in social, ecological, & oceanographic conditions relevant for harvest advice and targets.

E.g., Forecasts of climate-driven distributions, tipping points, & thresholds



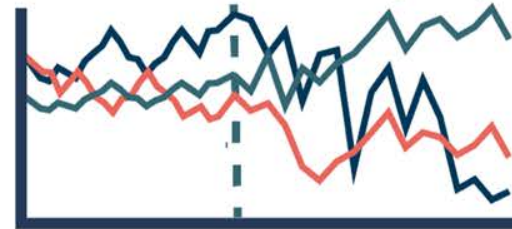
# On-ramp 3 (new)



## Strategic & Long-term Advice (>2 yr)

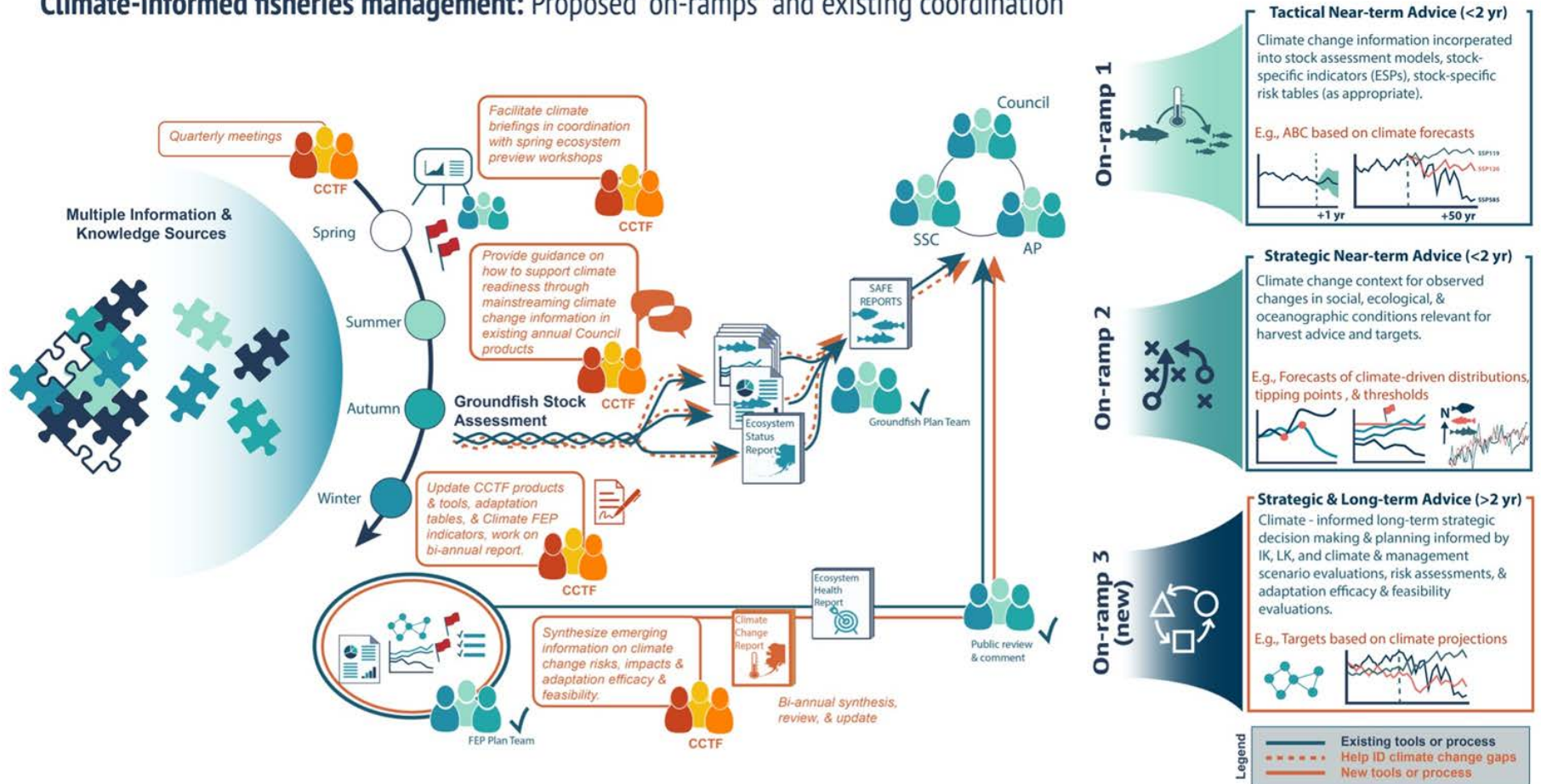
Climate - informed long-term strategic decision making & planning informed by IK, LK, and climate & management scenario evaluations, risk assessments, & adaptation efficacy & feasibility evaluations.

E.g., Targets based on climate projections





# Climate-informed fisheries management: Proposed “on-ramps” and existing coordination





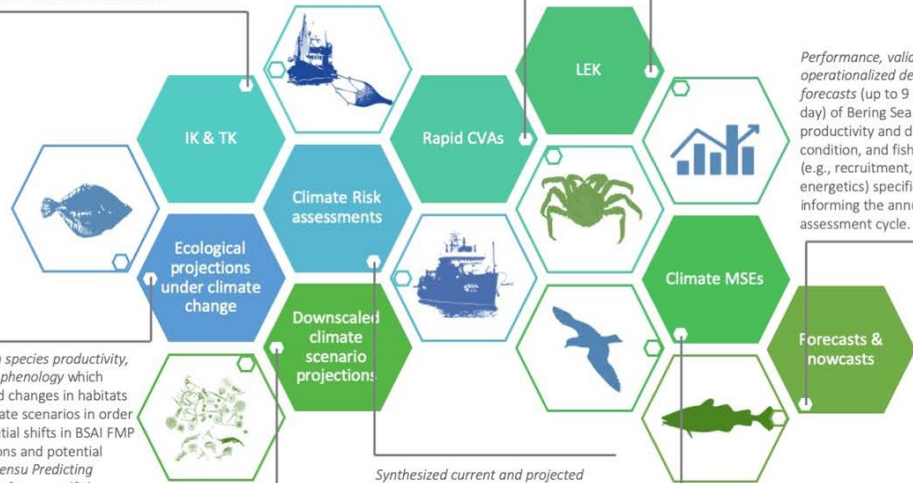
# Examples of sources of climate information (Fig. 5)



Indigenous and traditional knowledge of environmental change, climate impacts, adaptation responses, and risks, including direct and cascading impacts of change and response on social and ecological processes and connections.

Rapid Climate Vulnerability Assessments, which use expert knowledge to identify species and communities vulnerable to climate change and prioritize research needs.

Local knowledge, experiences, and testimonials of climate change impacts and adaptation measures.

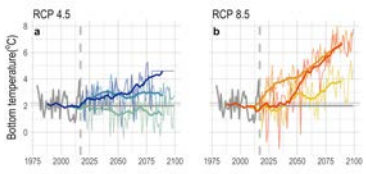
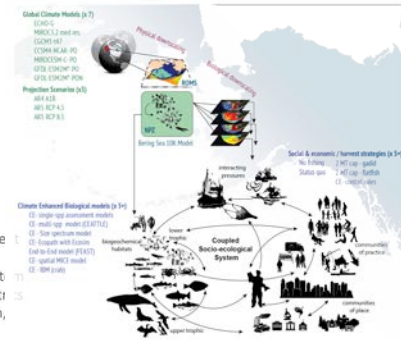


Project changes in species productivity, distributions, and phenology which includes projected changes in habitats under future climate scenarios in order to estimate potential shifts in BSAI FMP species distributions and potential fishing grounds (*sensu* Predicting changes in habitat for groundfishes under future climate scenarios using spatial distribution modeling).

Synthesized current and projected climate change impacts on the coupled social-ecological Bering Sea system such as Ecosystem Status reports, regional chapters of the National Climate Assessment, and other peer-reviewed synthesis reports of climate impacts on Bering sea social and ecological systems.

Performance, validation, and operationalized delivery of weekly forecasts (up to 9 months from present day) of Bering Sea conditions, fish productivity and distribution, ecosystem condition, and fisheries relevant metrics (e.g., recruitment, predation, growth, energetics) specifically aimed at informing the annual groundfish assessment cycle.

Management strategy evaluations aimed at testing near- and long-term performance of climate informed management tools under different climate scenarios. Evaluation criteria would include social and economic impacts (or opportunities) to inform tradeoff evaluations.



Downscaled high resolution projections of oceanographic and lower-trophic level conditions under future climate scenarios of global carbon mitigation (based on the Coupled Model Intercomparison Projects). Downscaling allows for resolution of sea ice and cold-pool dynamics as well as seasonal patterns in productivity.

# E.g., Fishery Climate Adaptation Tools

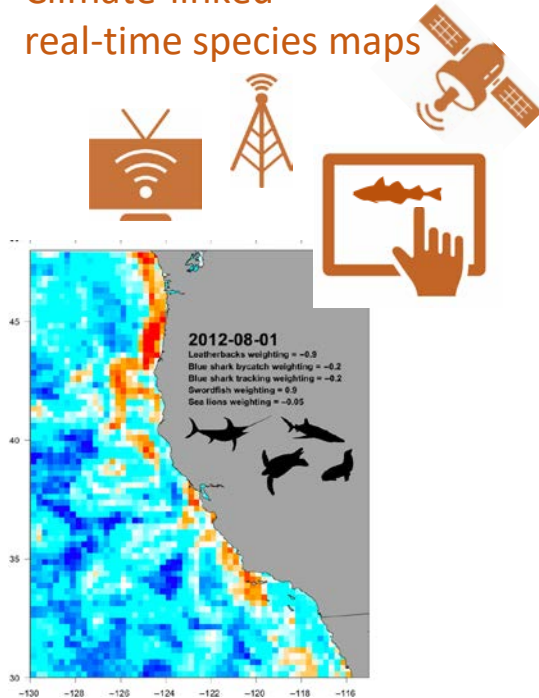


Adapt in real-time  
(incremental adaptation)

Minimize impacts through holistic planning  
(transformational adaptation)

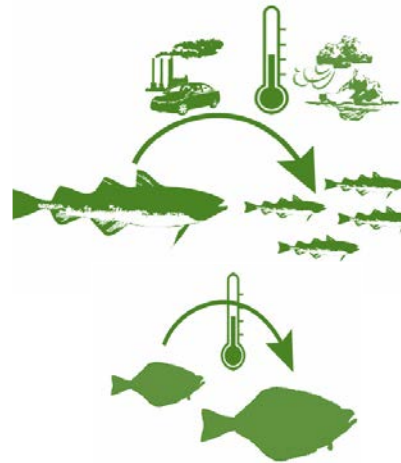


## Climate-linked real-time species maps



Hazen et al. 2019  
<https://advances.sciencemag.org/content/4/5/eaar3001>

## Climate-enhanced stock Assessment models



Holsman et al. 2020  
<https://www.nature.com/articles/s41467-020-18300-3>

## Climate smart long-term strategies



[www.blueeconomyconference.go.ke](http://www.blueeconomyconference.go.ke)

Santos et al. 2020.  
<https://www.nature.com/articles/s41893-020-0513-x>



# “Live” Glossary of Terms

[https://docs.google.com/document/d/1FUlpaXWzPhPS\\_MUXWd\\_hV6kGfBUWSaSXtkI5PVmWODI/edit#](https://docs.google.com/document/d/1FUlpaXWzPhPS_MUXWd_hV6kGfBUWSaSXtkI5PVmWODI/edit#)

## Climate Change Task Force Glossary of Terms 2021

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Acronyms	4
AP: Advisory panel	4
CCTF: Climate change task force (of the FEP)	4
CE - : “Climate Enhanced” -	4
Council : North Pacific Fisheries Management Council	4
ESR: Ecosystem Status Report	4
ESP: Ecosystem and Socioeconomic Profile	4
FEP: Fisheries Ecosystem Plan	4
GCM: General Circulation Model ( Global in scale)	4
IK: Indigenous Knowledge	4
IPCC: United Nations Intergovernmental Panel on Climate Change	4
LK: Local Knowledge	4
NMFS: National Marine Fisheries Service	4
NOAA: National Oceanic and Atmospheric Administration	4
RCP: Representative (carbon) Concentration Pathway	4
SSC: Scientific and Statistical Committee	4
TK: Traditional Knowledge	4

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# Additional Issues to address

## → Task Force and FEP Coordination

### ◆ How best can TFs and FEP team connected/coordinate?

- Monthly meeting between FEP, CCTF, and LKTKS co-chairs
- Coordination meetings every 6 mo?
- Include FEP Team on email updates of progress/etc as reported out to Council when FEP does not meet prior

## → What will the climate briefing look like?

- ◆ Review of current state of climate readiness (new)
- ◆ Synthesis of risk and adaptation efficacy/feasibility

## → Process by which new on ramps developed under CCTF process will be taken up moving forward from 2025 - i.e., who will be responsible for these tasks post 2025

## → Indicator development:

- ◆ Possible sub-group across TF and FEP for indicators?





# BACKGROUND

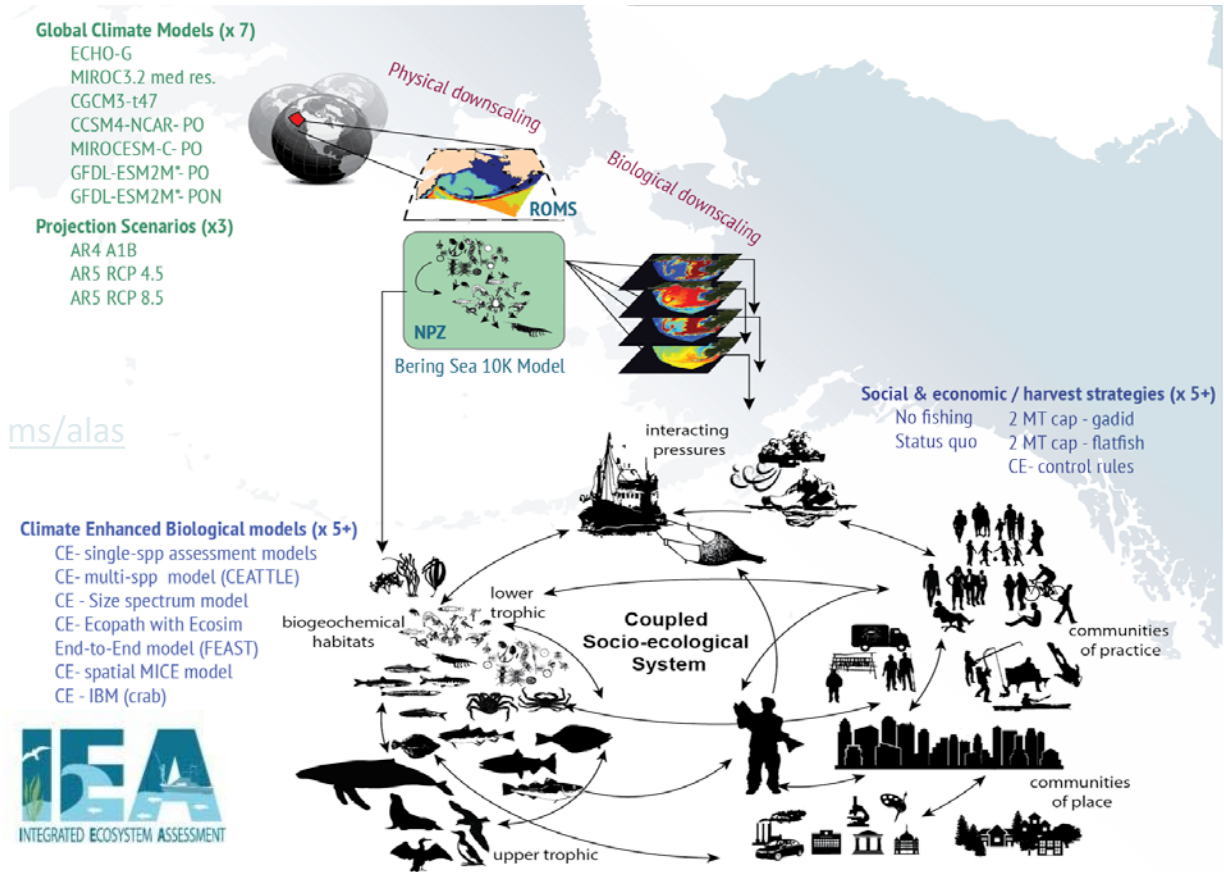




# The Alaska Climate Integrated Modeling Project

- Southeast Bering Sea
- Funding: NMFS S&T (FATE+SAAM+NPCREP), IEA, RTAP, Economic and Human Dimensions Program, AFSC, OAR)
- Operational suite of coupled socio-ecological models for climate fisheries hindcasts, forecasts, projections and Management Strategy Evaluation

[www.fisheries.noaa.gov/alaska/ecosystems/als/ka-climate-integrated-modeling-project](http://www.fisheries.noaa.gov/alaska/ecosystems/als/ka-climate-integrated-modeling-project)

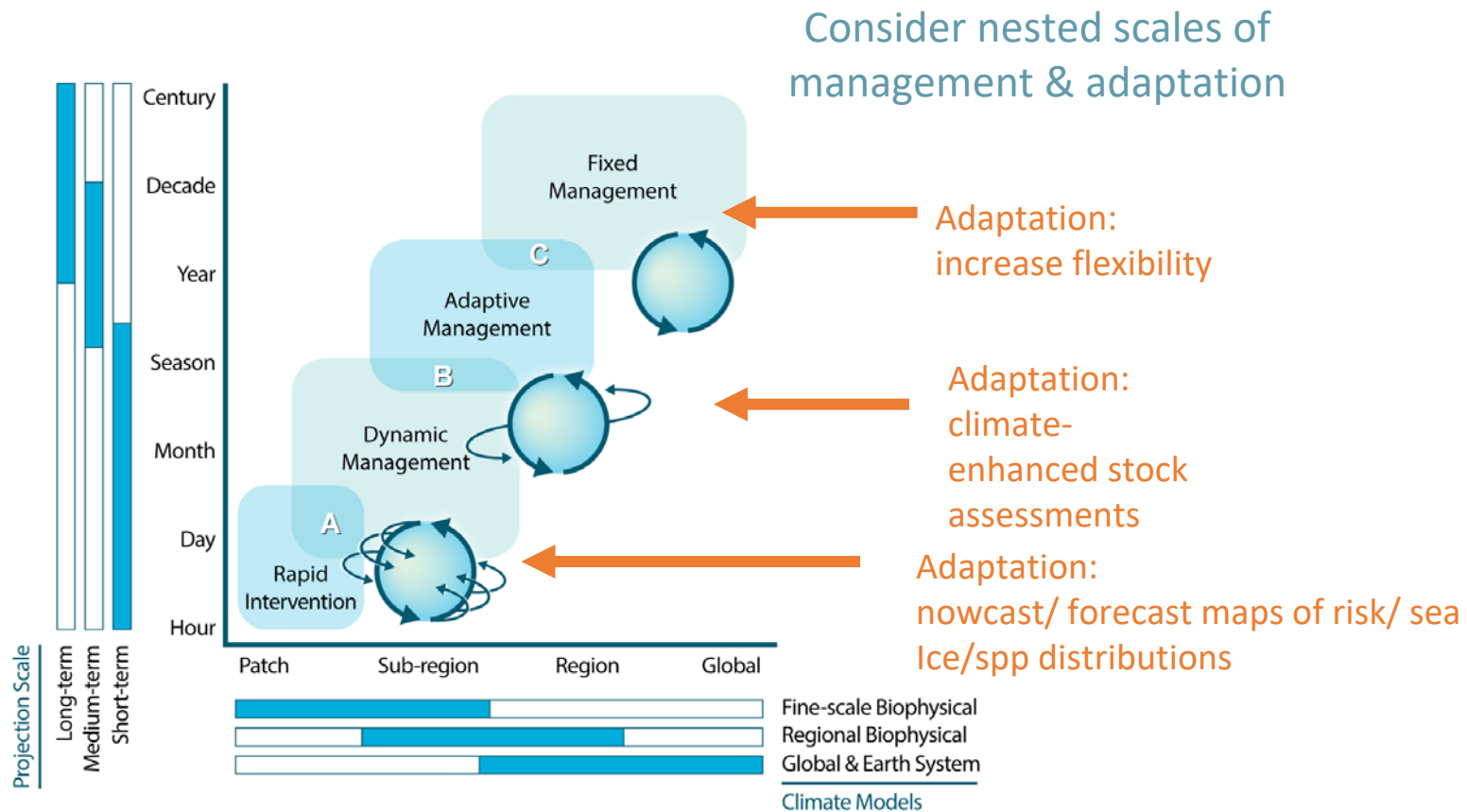


**NOAA FISHERIES**



Hollowed et al. 2020. *Frontiers in Mar. Sci.* doi: 10.3389/fmars.2019.00775

# Management can reduce risks & support adaptation



Holsman et al.(2019). Towards climate resiliency in fisheries management. ICES Journal of Marine Science. <https://doi.org/10.1093/icesjms/fsz031>

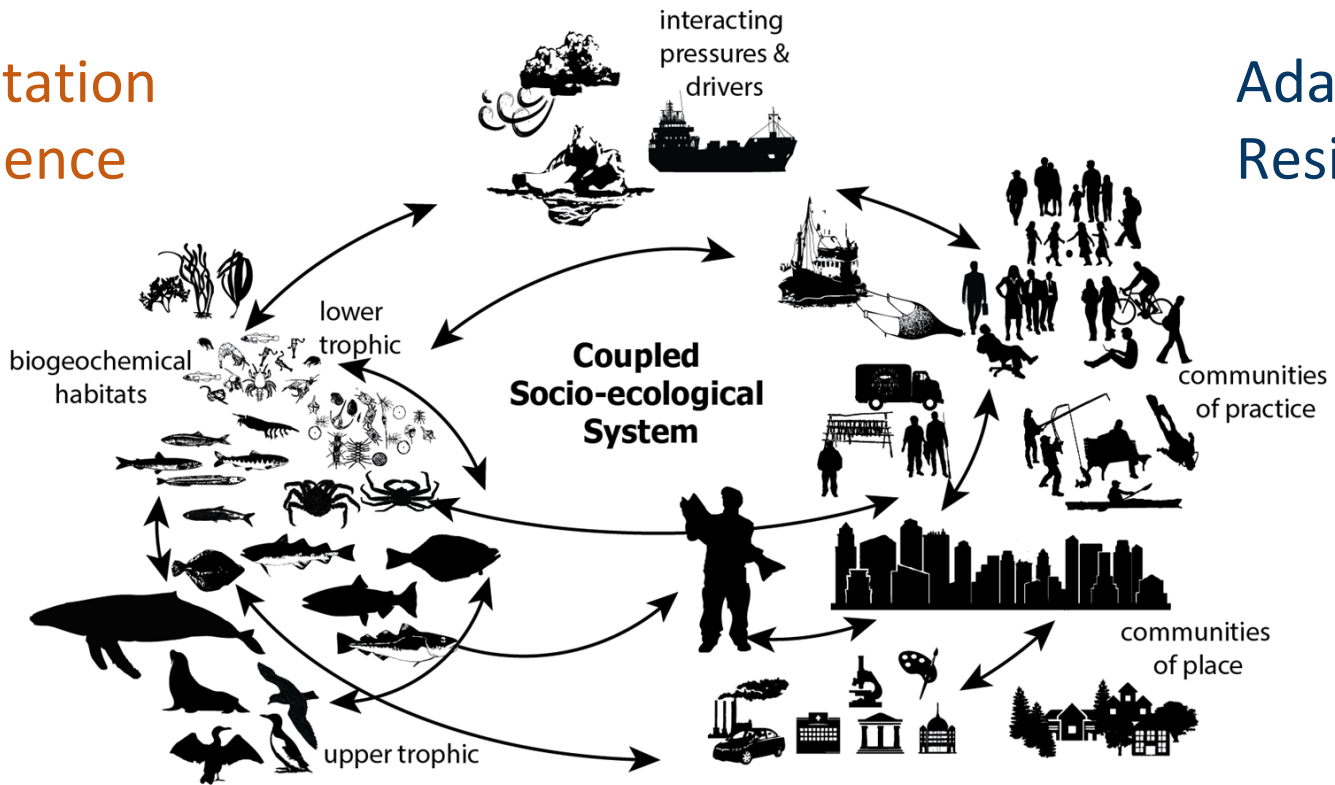
# Glossary of Terms: Social-ecological system

Human and ecological systems are linked through feedback mechanisms

Adaptation  
Resilience

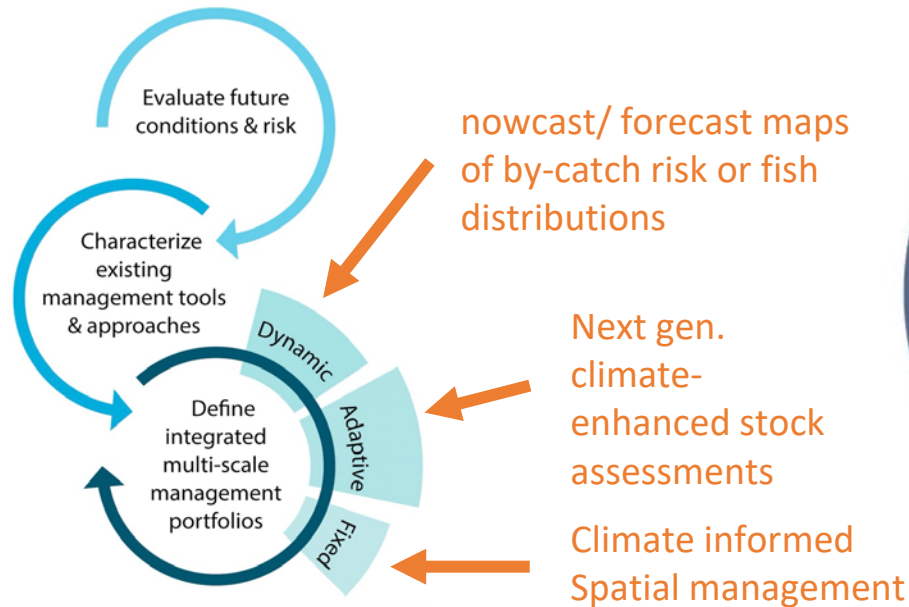


Adaptation  
Resilience



# Background: Management can reduce impacts & support adaptation

✓ Build climate-informed process



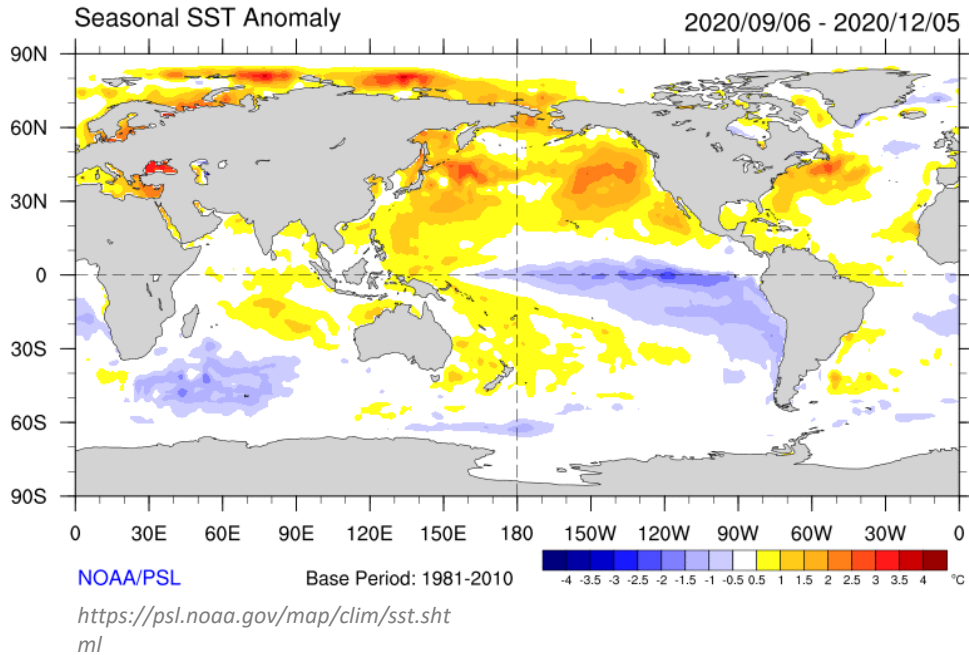
Holsman et al.(2019). Towards climate resiliency in fisheries management. *ICES Journal of Marine Science*.  
<https://doi.org/10.1093/icesjms/fsz031>

Karp et al. 2019. Accounting for Shifting Distributions and Changing Productivity in the Development of Scientific Advice for Fishery Management. *ICES JMS* doi: 10.1093/icesjms/fsz048

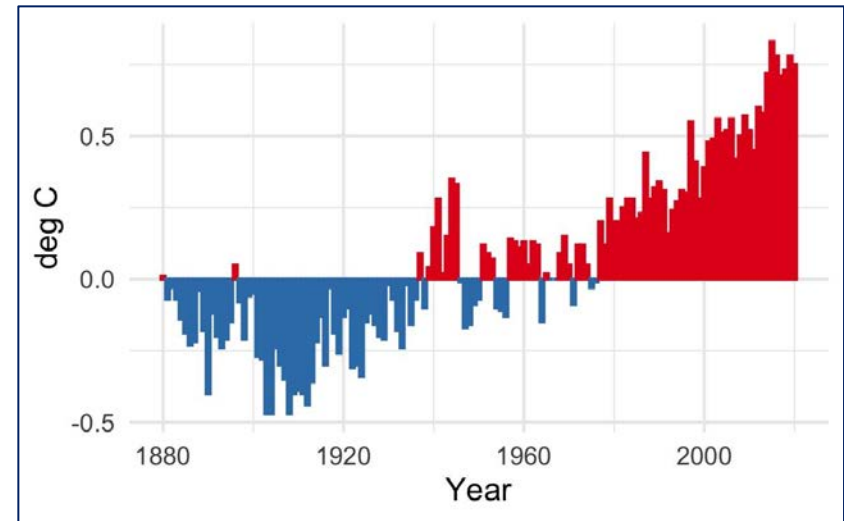




# Background: Climate change is altering the Bering Sea ecosystem



Anomaly from 1901- 2000 climatology  
1 degree, weekly resolution; September



NOAA National Centers for Environmental information, Climate at a Glance: Global Time Series, published November 2020, retrieved on December 9, 2020 from <https://www.ncdc.noaa.gov/cag/>

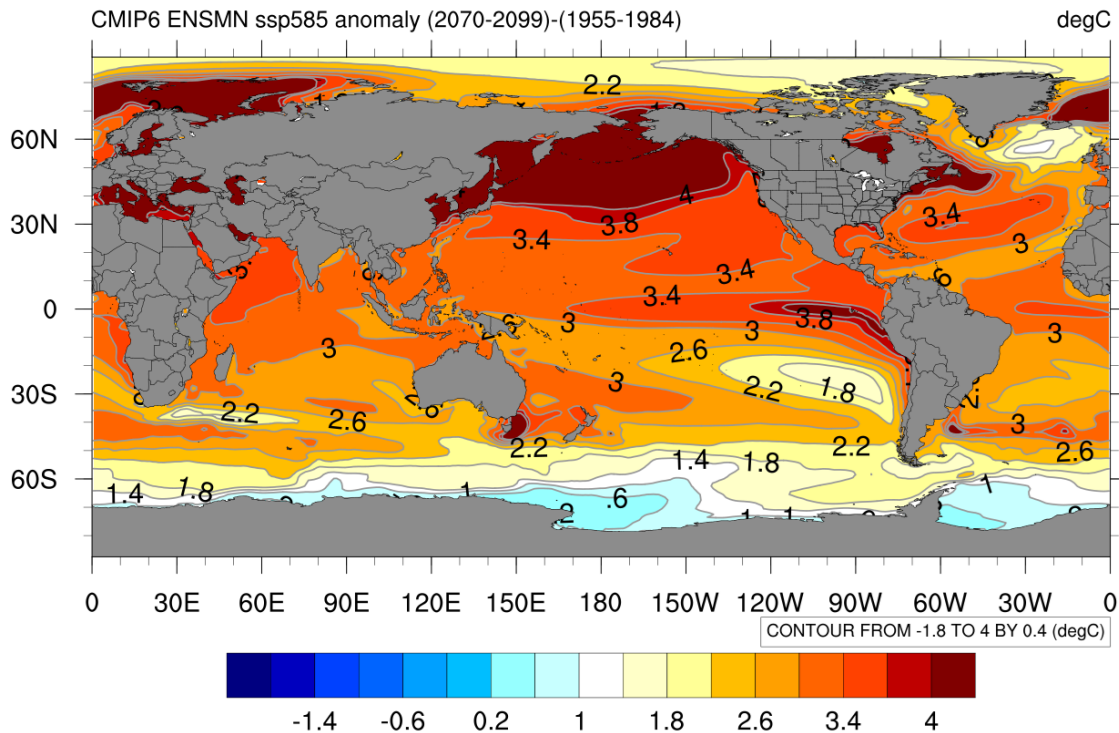




# Background: Future changes to the Bering sea are expected

## Changes in Sea Surface Temperature

CMIP6: SST Anomaly from 1955-1984 climatology



<https://psl.noaa.gov/ipcc/cmip6/>

# Technical workplan



# What: Task Force Goals:

The CCTF aims to **operationalize the delivery of climate change information to the Council** including climate change information, tools, and recommendations that can help the Council **further its ecosystem vision statement through equitable climate change adaptation pathways, transparent communication, utilization of diverse knowledge sources, and broad engagement. This module will support the Council's capacity to:**

- 1. More effectively incorporate climate change information** from diverse knowledge holders into the fishery management process through transparent, effective and dynamic communication and engagement with communities, fishers, managers, scientists and other Council stakeholders with the Council and Council staff; and,
- 1. Evaluate and implement management measures that can help** preserve livelihoods, economies, health and well-being across fisheries and dependent coastal communities; support near- and long-term adaptation to climate change; and ensure the continued productivity and sustainability of the coupled social-ecological Bering Sea system.



**Key: Action informing NOT policy prescriptive**





**Key: Seeks to use existing “on ramps” to deliver climate information to Council process**





**Key: Iterative process that will be refined over time with input and feedback**



**Key: Inclusive approach to provide Council process with “the best available” information on climate impacts and effective adaptation actions to reduce impacts.**

