

Development of a Climate resilient fisheries work plan

North Pacific Fishery Management Council



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Dutch Harbor, ASMI Industry and Partner Use

Background on the North Pacific Fishery Management Council

Who are we?

The North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS):

- Together manage U.S. Federal fisheries off Alaska (3-200 miles)
- Council makes recommendations to NMFS
- If NMFS approves, it implements regulations, and enforces them
- Management is coordinated, and in some cases jointly managed, with the State of Alaska



Who is on the Council?

15 total members

- 11 voting
 - 4 seats are designated (heads of: NMFS, ADF&G, Washington and Oregon Depts of Fish and Wildlife)
 - 7 appointed seats- generally fishing industry representatives (commercial fisheries various sectors, charter/recreational, sport)
 - 5 Alaska
 - 2 Washington
- 4 non-voting
 - USCG, Pacific States, Dept of State, U.S. Fish and Wildlife



Magnuson Stevens Act

Council and NMFS management of the groundfish fisheries is governed by the Magnuson-Stevens Act (U.S. Federal law)

- National Standards – Council and NMFS **must** consider all of them, including:
 - Prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery,
 - Minimize bycatch to extent practicable,
 - Provide for the sustained participation and minimize adverse impacts on fishing communities.



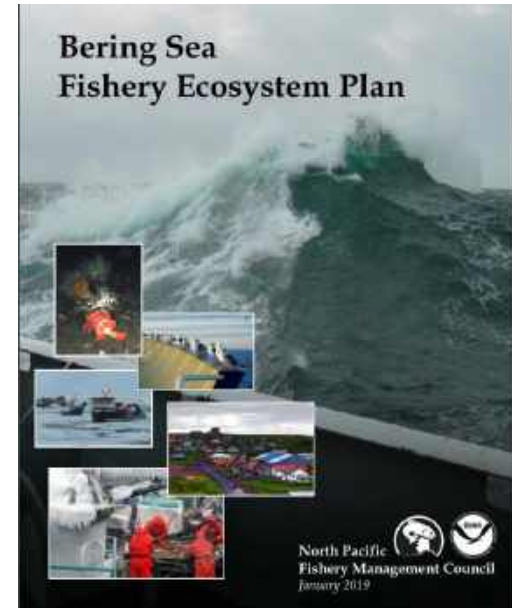
What is the Council's process?

- Proposal presented to Council from public, stakeholder group, or Council ← public input
- Council prioritizes workload
- Council initiates analysis of alternatives ← public input
- Analysis proceeds through:
 - Initial review/comment ← public input
 - Public review/comment ← public input
 - Final Council recommendation submitted to Secretary of Commerce for approval ← public input

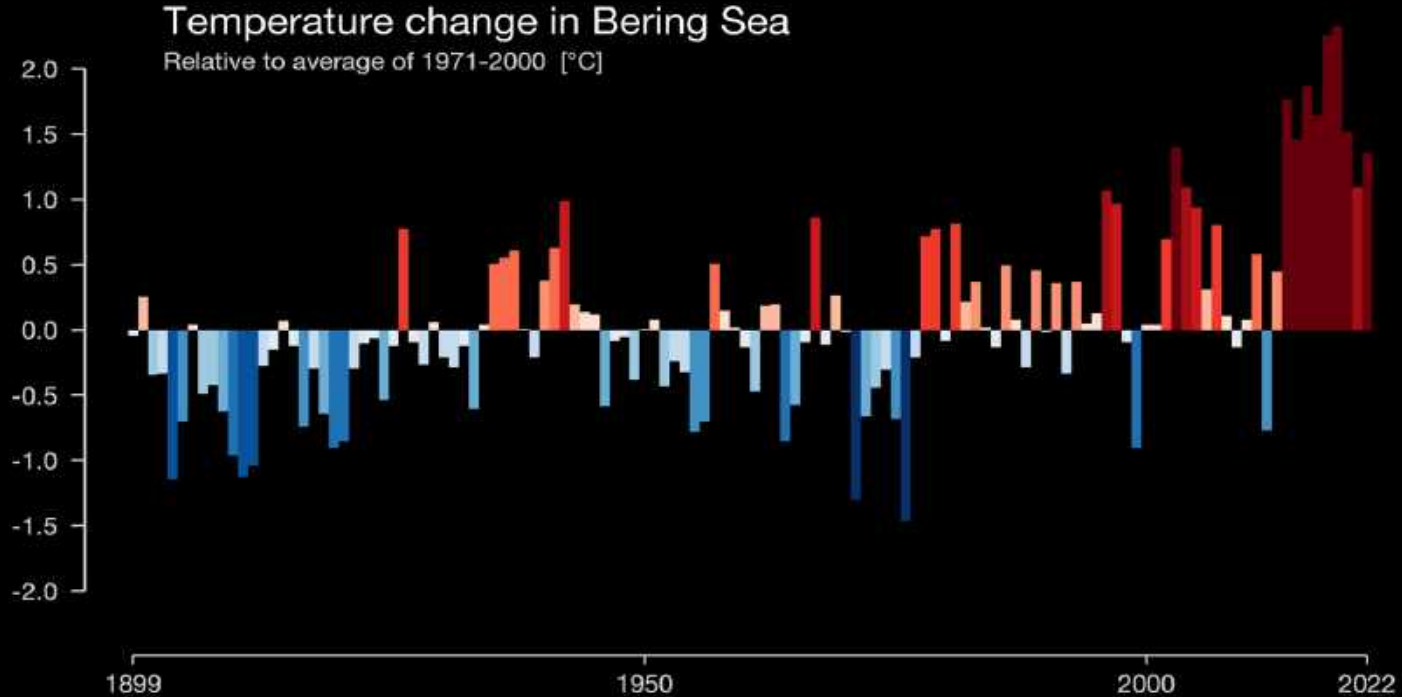


Council process for developing a Climate resilient work plan

- What actions did the Council initiate?
 - Bering Sea Fishery Ecosystem Plan
 - → Climate Change Task Force
- How did we get Council and stakeholder buy-in?
 - Lengthy process amidst multiple climate shocks, climate scenario planning, national SSC workshops



The North Pacific has experienced a variety of climate shocks and overall warming



Recent Climate-Driven Extremes and Notable Events



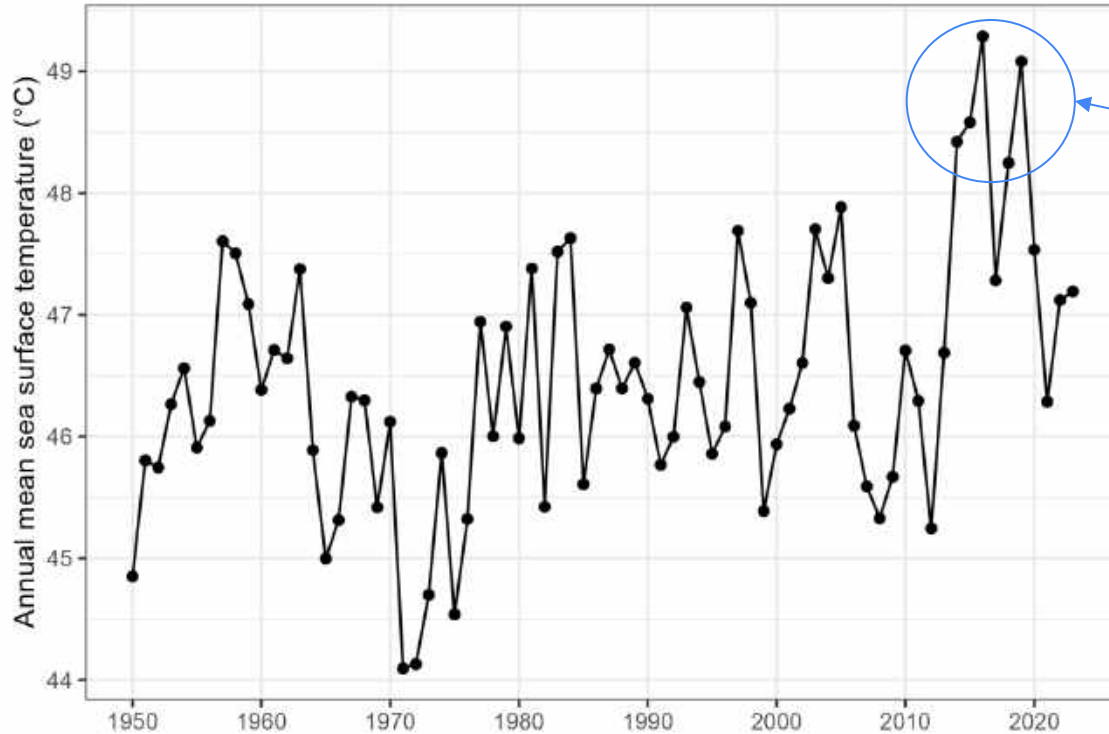
Gulf of Alaska Pacific cod



With contributions from
Erin Fedewa, Steve
Barbeaux, AFSC

Unprecedented warming, 2014-2019

Gulf of Alaska sea surface temperature



20-100 times more likely now than in the preindustrial climate



Ecological impacts of 2014-2016 warming

- Fewer large lipid-rich copepods
- Low forage fish abundance
- Lower forage fish quality



Massive seabird die-offs and reproductive failure

Increase in large whale strandings

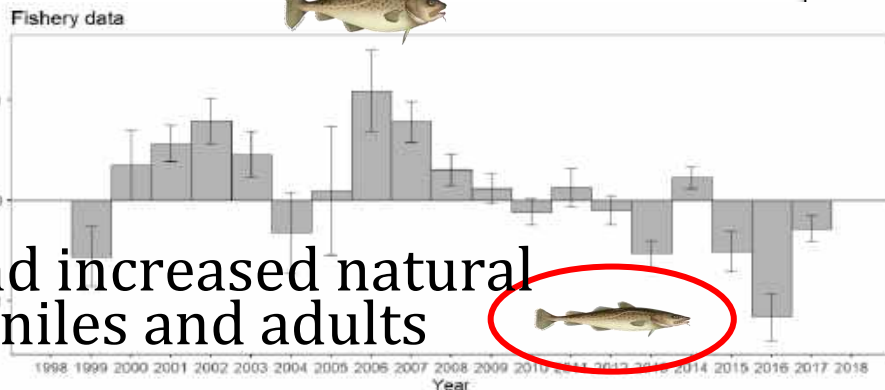
Frontiers in Marine Science 2020

Marine Heatwave Stress Test of Ecosystem-Based Fisheries Management in the Gulf of Alaska Pacific Cod Fishery

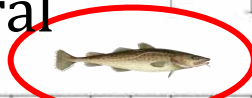
Steven J. Barboza*, Kristin Watson and Elizabeth Zacher
Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, NOAA, Seattle, WA, United States

In 2014–2016 an unprecedented warming event in the North Pacific Ocean triggered changes in ecosystem of the Gulf of Alaska (GOA) impacting fisheries management. The marine heatwave was noteworthy in its geographical extent, depth range, and persistence, with evidence of shifts in species distribution and reduced productivity. In 2017 a groundfish survey indicated that GOA Pacific cod (*Gadus macrocephalus*) had experienced a 71% decline in abundance from the previous 2015 survey. The

Full ACCESS
 Summary



Poor condition and increased natural mortality for juveniles and adults

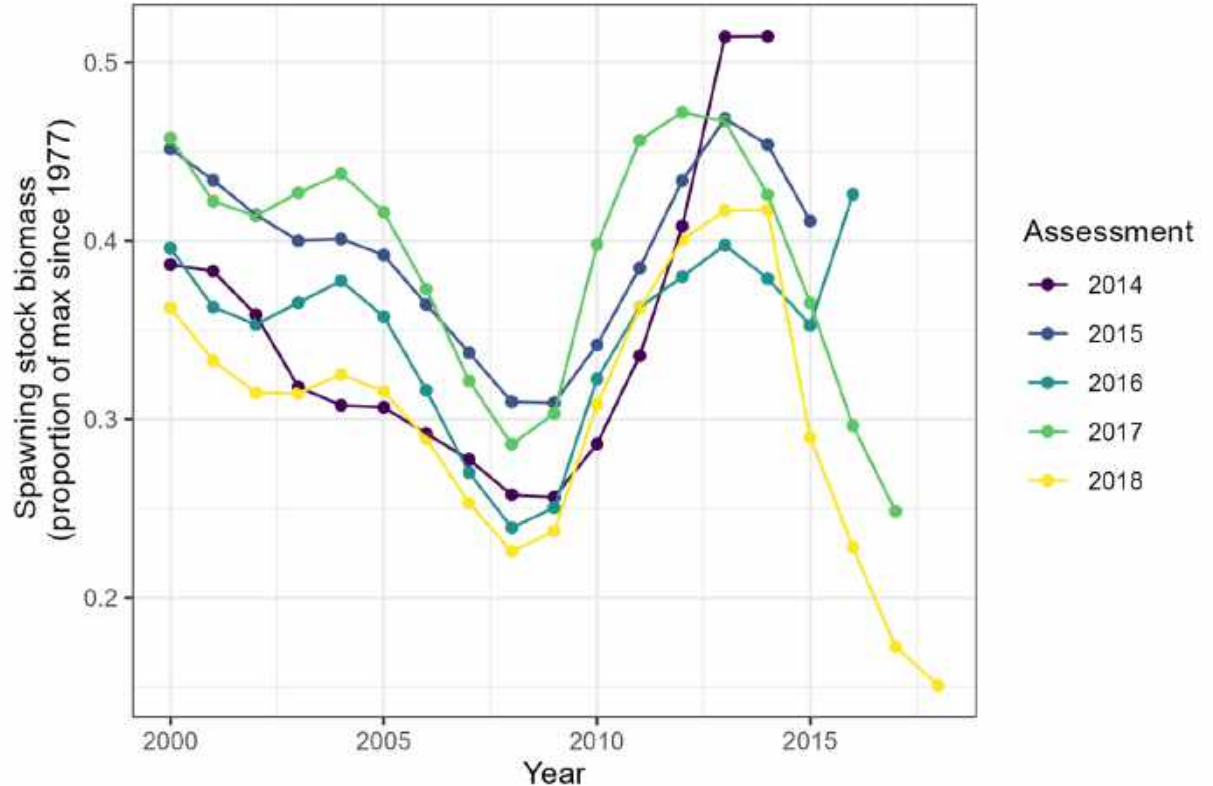


Not enough information was available at the time!

- Bottom trawl survey only every other year
- Bottom trawl survey has high observation error for Pacific cod (lots of noise in the data)
- Even though the collapse started in 2015, it wasn't detected until the 2017 assessment



Spawning stock biomass estimates,
2014 - 2018 assessments



Bering Sea Snow Crab



Climate Change Impacts



Alaska Snow Crab

Deep-Sea Research II 181–182 (2020) 164079

Contents lists available at ScienceDirect

Deep-Sea Research Part II

journal homepage: <http://www.elsevier.com/locate/dsrii>



Recent shifts in northern Bering Sea snow crab (*Chionoecetes opilio*) size structure and the potential role of climate-mediated range contraction

Erin J. Fedewa^{a,*}, Tyler M. Jackson^a, Jon I. Richar^a, Jennifer L. Gardner^a, Michael A. Litrow^a



CBS EVENING NEWS

Alaska snow crab season canceled as officials investigate disappearance of an estimated 1 billion crabs

CBS EVENING NEWS

By Jonathan Vigliotti
Updated on: October 13, 2022 / 11:14 PM EDT / CBS News



Plummeting Bering Sea crab populations

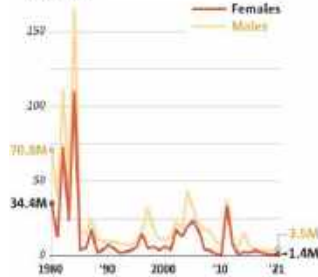
Snow crab and king crab have long been mainstays of commercial harvests.



Red king crab
Paralithodes camtscheticus
Long-term decline in mature red king crab populations (for Bristol Bay District)

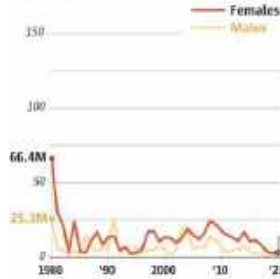
IMMATURE RED KING CRAB

275 million



MATURE RED KING CRAB

275 million



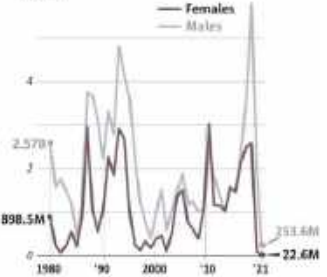
Source: Surveys conducted by NOAA Fisheries



Snow crab
Chionoecetes opilio
Sharp drops in snow crab populations (all districts)

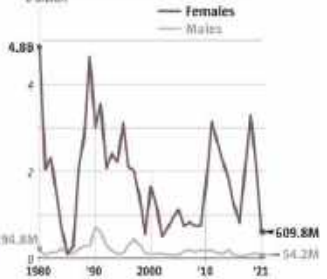
IMMATURE SNOW CRAB

6 billion



MATURE SNOW CRAB

6 billion



MARK HOWLEN / THE SEATTLE TIMES

What happened? The current state of knowledge

The collapse of eastern Bering Sea snow crab

Sub-Arctic no more: Short- and long-term global-scale prospects for snow crab (*Chionoecetes opilio*) under global warming

Human-induced borealization leads to the collapse of Bering Sea snow crab

Poor energetic condition of eastern Bering Sea snow crab during a population collapse and marine heatwave

Multiple studies have linked the snow crab population collapse to a 2018 - 2019 Bering Sea marine heatwave

Increased metabolic demands, decreased spatial extent, and declines in body condition suggest starvation may have played a role

Snow crab are an ice-associated species, and snow crab productivity will likely decline alongside the loss of Arctic conditions in the Bering Sea



Multiple crab fishery closures have magnified the immediate and long-term economic impacts on fishermen and crab-dependent communities

Estimated Ex-vessel revenue LOSSES

Season	Bering Sea Snow Crab	Bristol Bay Red King Crab	TOTAL
2021/22	\$94M	\$51M	\$145M
2022/23	\$133M	\$51M	\$184M
2023/24	\$133M	\$35M	\$168M
SUM	\$360M	\$137M	\$497M LOSSES

- Lost jobs in the harvesting and processing sector
- Lost revenue for communities and support businesses
- Lack of timely disaster response disproportionately harming independent harvesters, small businesses, and remote communities

Process for developing a Climate work plan

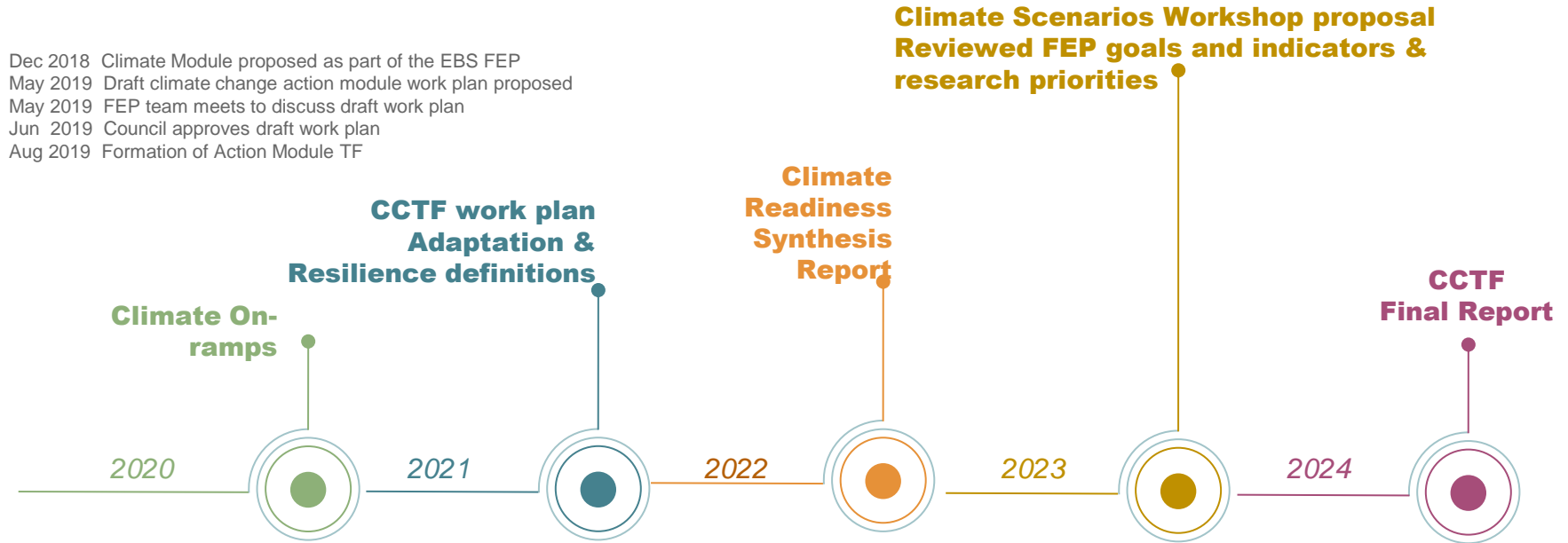
Council's articulated goal in initiating Climate Change module of FEP and Climate Change Task Force(CCTF):

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.



Process for developing a Climate resilience work plan

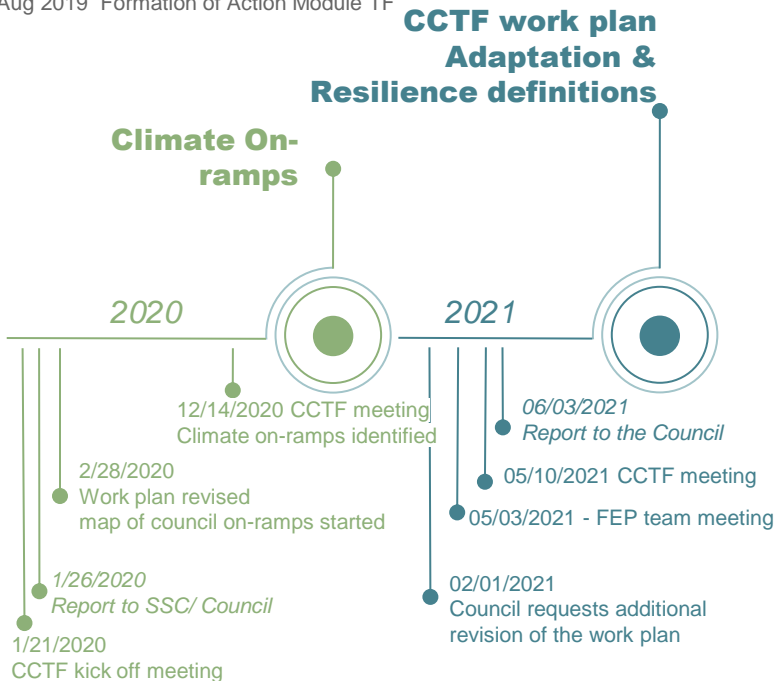
Dec 2018 Climate Module proposed as part of the EBS FEP
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Jun 2019 Council approves draft work plan
Aug 2019 Formation of Action Module TF



- Council initiates Climate Change Task Force 2019
 - 5 year focus
- CCTF recommendations formed the basis of the Council's Climate work plan December 2024
 - Council previously received reports on Climate Scenarios Workshop (no recommendations) and our SSC's recommendations stemming from SSC National workshop Fall 2024

CCTF Timeline

- Dec 2018 Climate Module proposed as part of the EBS FEP
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GOALS written by CCTF approved by Council

“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:

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,

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.”

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.

Regular updates & discussions regarding climate assessments (e.g., IPCC, NCA, etc.)

Climate Ready Synthesis

Build a process: Final Report Recommendations



Climate Change Task Force Steps



NORTH PACIFIC
FISHERY MANAGEMENT COUNCIL

CLIMATE CHANGE TASK FORCE 2020- now

- (1) Map existing management process & identify climate information on-ramps
- (2) Develop living definitions of resilience and adaptation
- (3) Use case studies to explore climate impacts, responses, and indicators
- (4) Review existing climate readiness
- (5) Provide framework for climate-informed decision making

Climate Change Task Force Steps

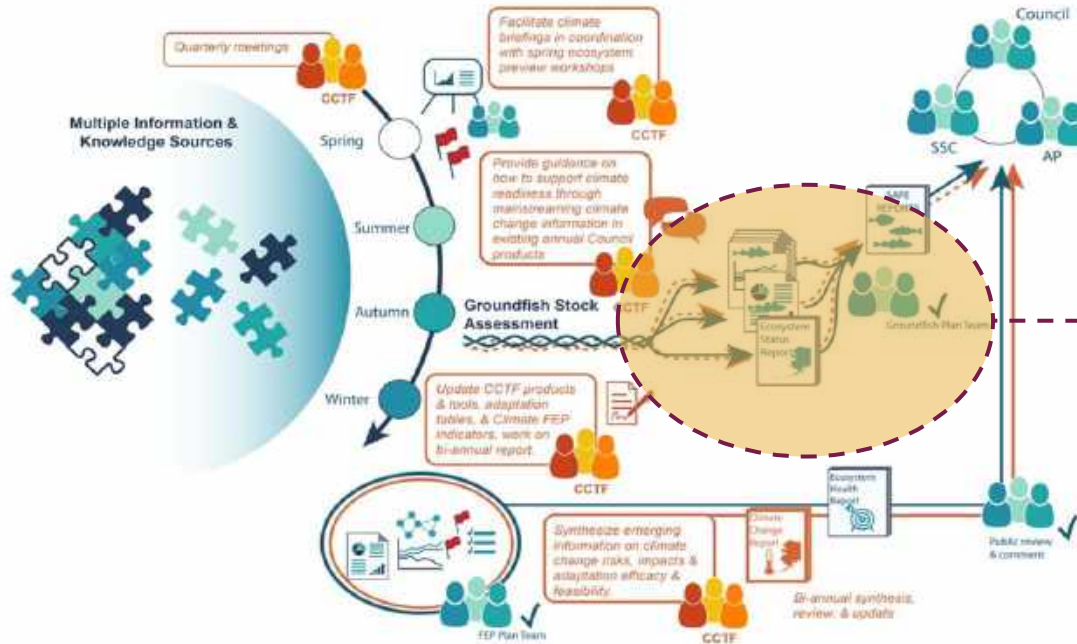


NORTH PACIFIC
FISHERY MANAGEMENT COUNCIL

**CLIMATE CHANGE
TASK FORCE**
2020- now

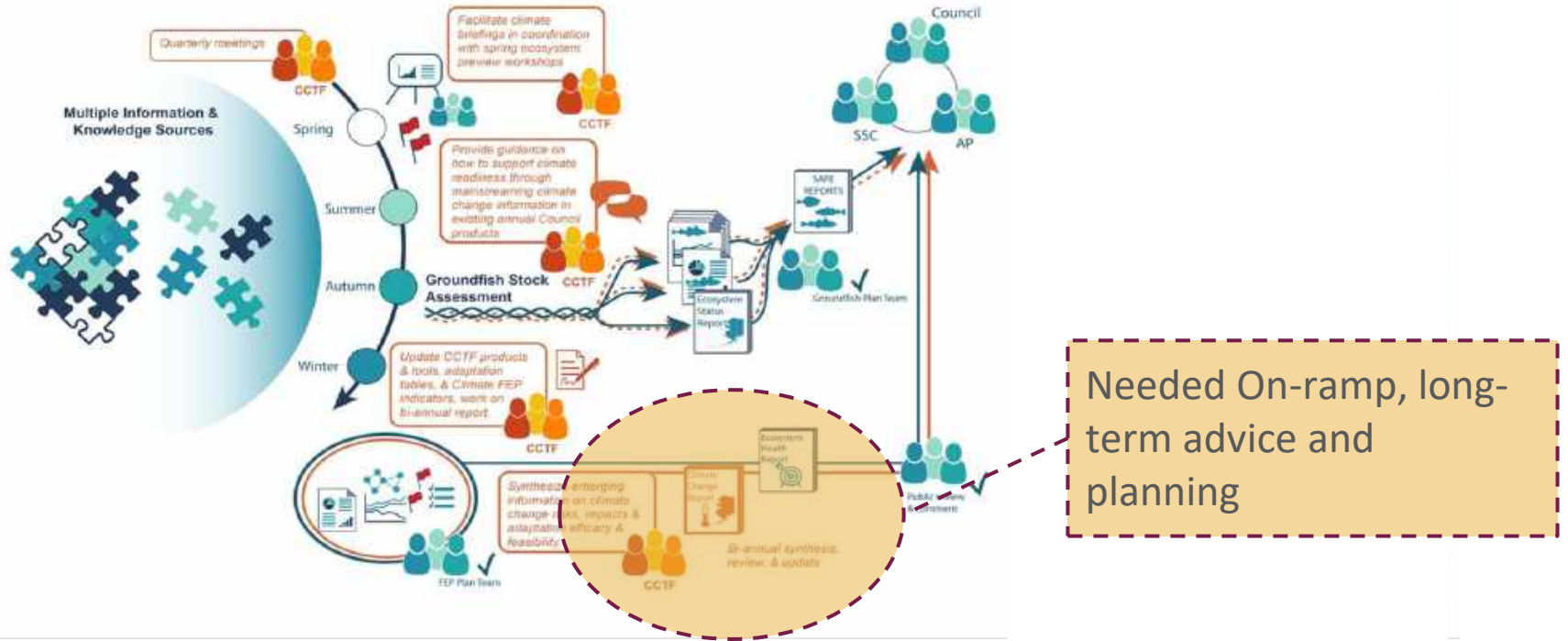
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Climate-informed fisheries management: Proposed “on-ramps” and existing coordination



Existing climate information on-ramps: Ecosystem reports, ESPs, and ecosystem sections of stock assessments

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



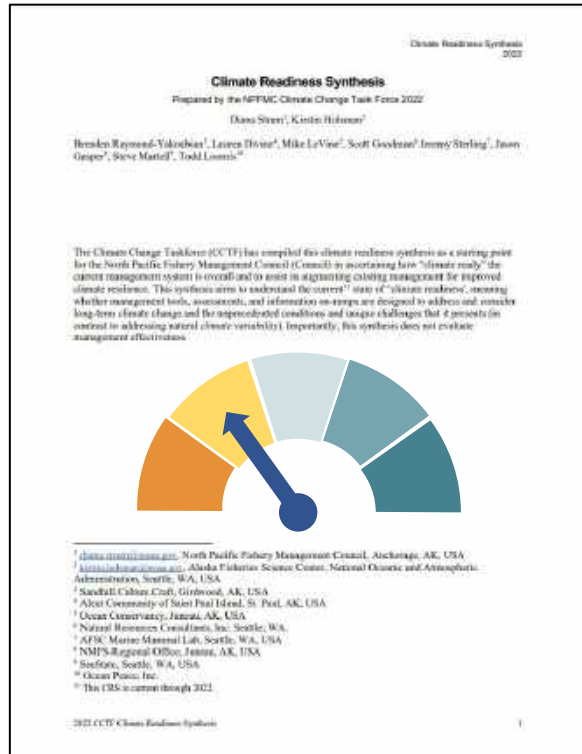
Climate Change Task Force Steps



NORTH PACIFIC
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Management Process



2022 NPFMC Climate Readiness Synthesis

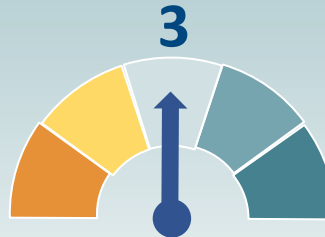
Management

Process 



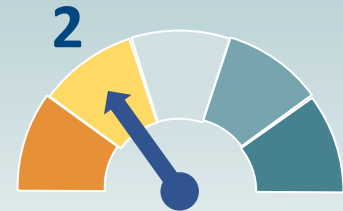
- Implicit climate variability information associated with some management measures
- Conceptually climate information informs management measure but is not directly implemented

Status reports



- Some implicit climate information included via EBFM processes & reports
- Climate and ecological information is increasingly included in a few assessments, but for most climate change information is absent or implicit in assessment models & text

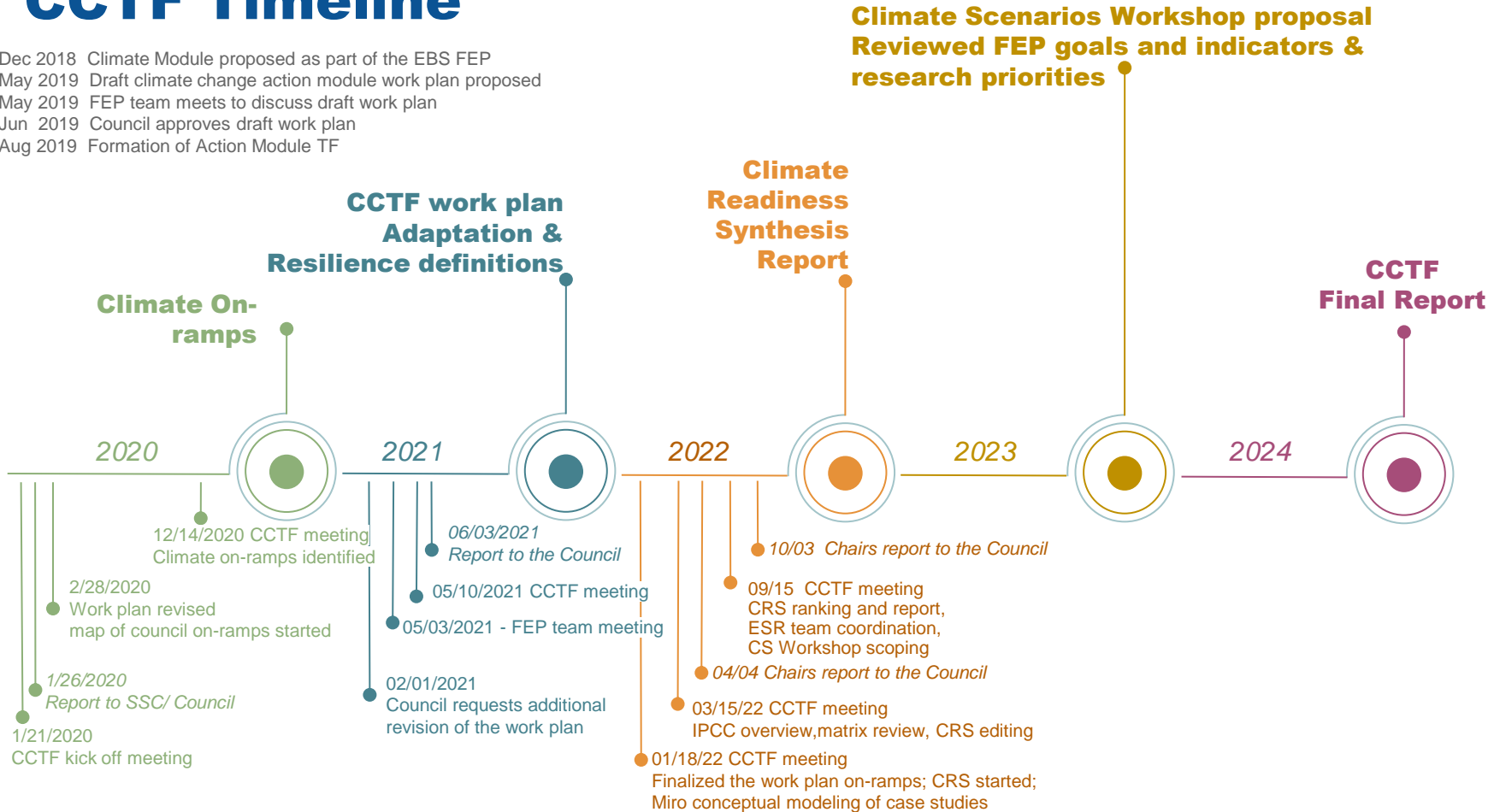
Knowledge & Information



- Management measures include some/limited information from various knowledge bases and not others
- Integration into the NPFMC & NMFS system of information from the knowledge base of Indigenous communities is extremely limited
- Integration into the system from industry, agency, and other knowledge bases is a bit higher in general

CCTF Timeline

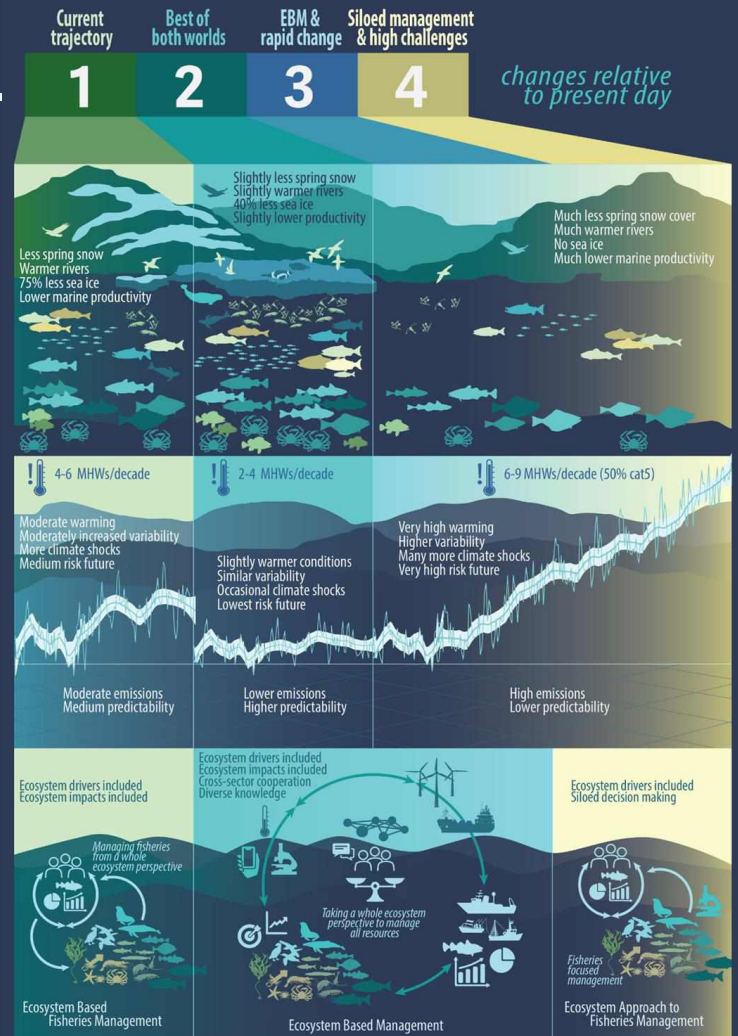
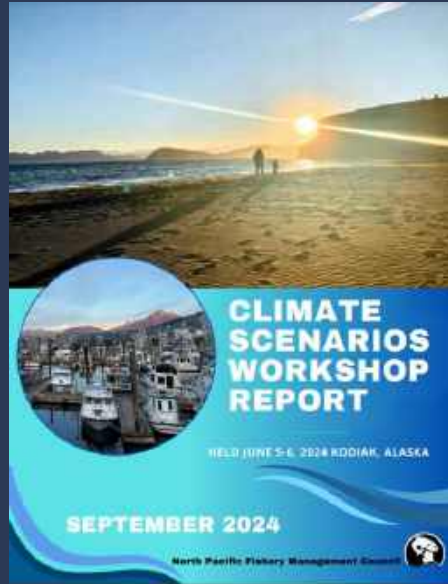
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Climate Scenario planning

Climate Scenario Workshop
Kodiak, AK June 2024

Report to Council:
October 2024



Future Climate Change Scenarios

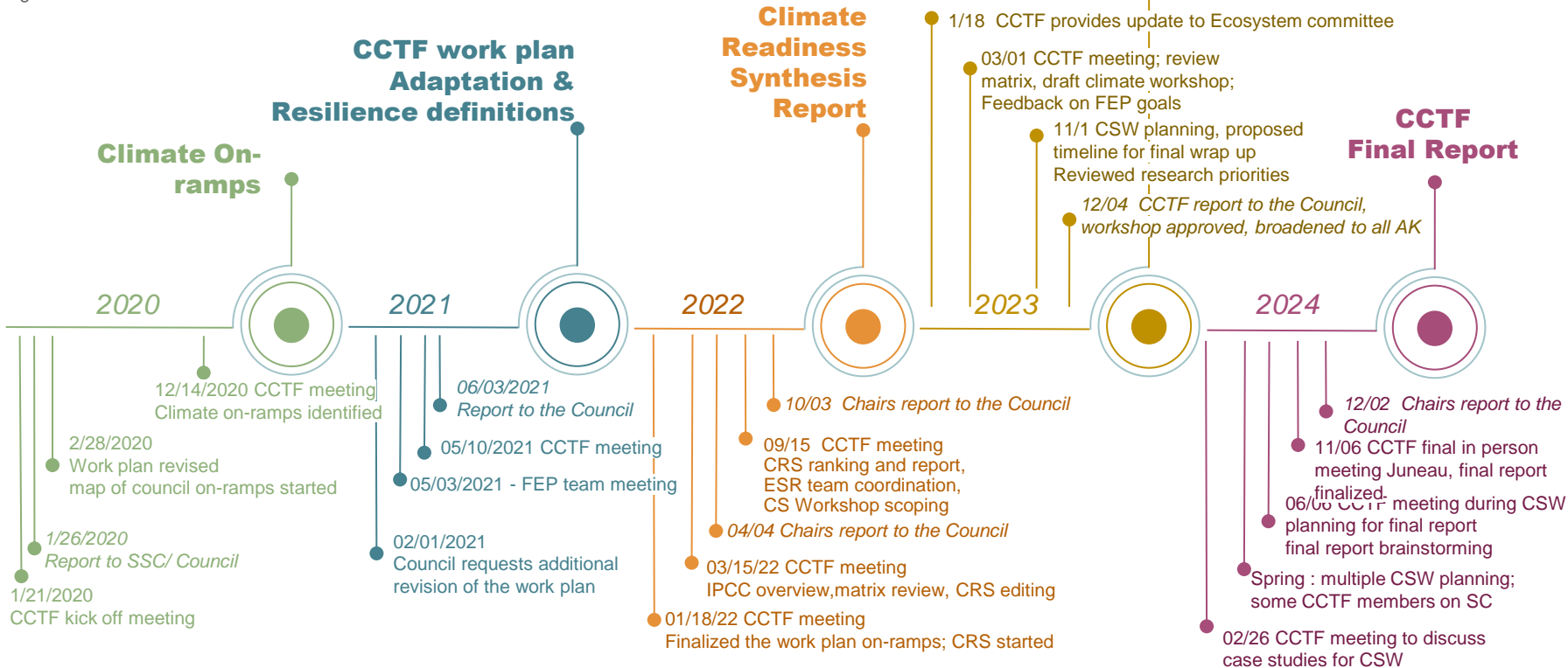
Discussion questions during the workshop:

(From your perspective)

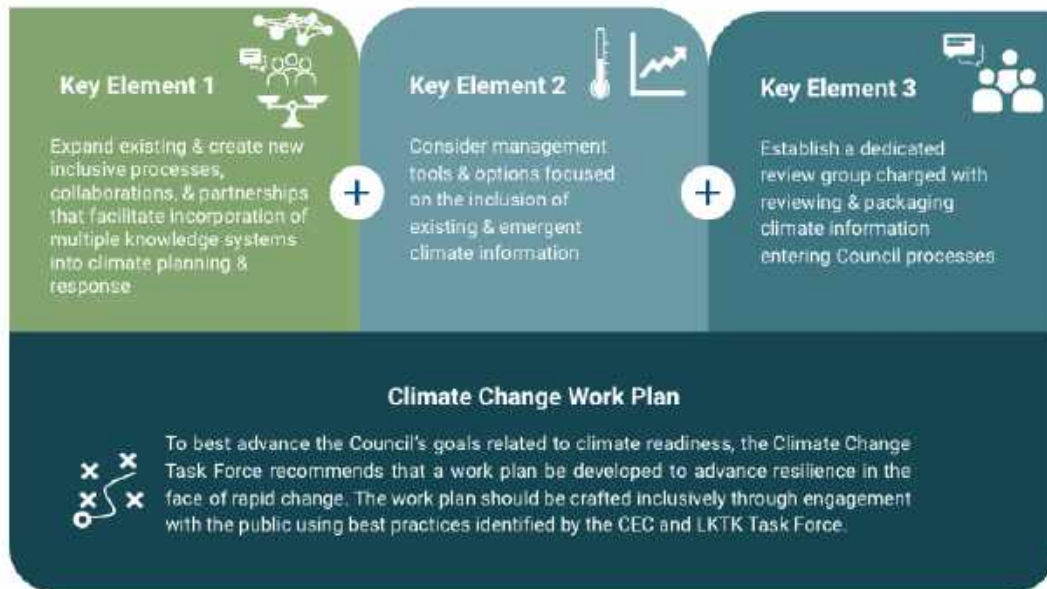
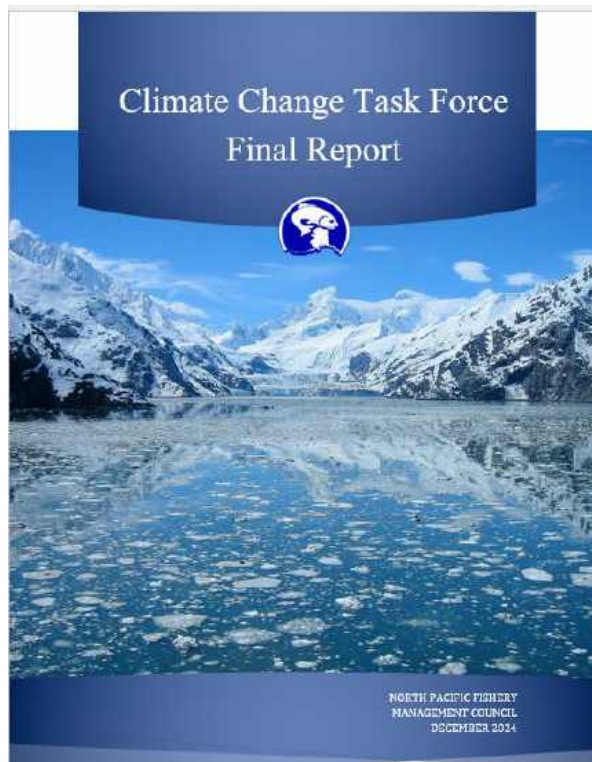
1. What does climate resilience look like in each scenario?
2. What are the challenges to climate resilience?
3. What management tools and approaches could help?
4. What scientific tools and information could help?
5. What other assets and opportunities could help support climate resilience? (E.g., diverse knowledge sources, collaborative approaches, community and industry-led initiatives).
6. How can the Council support a robust and inclusive process for climate readiness planning?

CCTF Timeline

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Final Report and CCTF recommendations December 2024



CCTF overarching recommendations

Key Element 1



Expand existing & create new inclusive processes, collaborations, & partnerships that facilitate incorporation of multiple knowledge systems into climate planning & response



Key Element 2



Consider management tools & options focused on the inclusion of existing & emergent climate information



Key Element 3



Establish a dedicated review group charged with reviewing & packaging climate information entering Council processes

Climate Change Work Plan



To best advance the Council's goals related to climate readiness, the Climate Change Task Force recommends that a work plan be developed to advance resilience in the face of rapid change. The work plan should be crafted inclusively through engagement with the public using best practices identified by the CEC and LKTK Task Force.

Key Element 1



Expand existing & create new inclusive processes, collaborations, & partnerships that facilitate incorporation of multiple knowledge systems into climate planning & response

Council action December 2024



Key Element 2



Consider management tools & options focused on the inclusion of existing & emergent climate information

Climate Resilience Work Plan

Council adopted a motion to develop a climate resilience work plan guided by principles in Key Elements 1 and 2. To be formatted by staff with timelines and intent to guide near-term actions for enhanced climate resilient management in BSAI and GOA. Adopted some of the recommended items in their work plan understanding that it will be a long-term effort, and additional items and actions may be considered in the future.



Climate Change Task Force
Final Report



NORTH PACIFIC FISHERY
MANAGEMENT COUNCIL
DECEMBER 2024

Thank You!