

# CLIMATE CHANGE TASK FORCE

Dec 2024

## Final Report

## D1b Council

## December 2024

### 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)

Jason Gasper (NMFS-Regional Office)

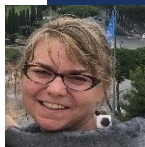
Mike LeVine (Ocean Conservancy)

Steve Martell (SeaState)

Brenden Raymond-Yakoubian (Sandhill Culture Craft)

Jeremy Sterling (AFSC Marine Mammal Lab)

Todd Loomis (Ocean Peace, Inc.)



# CCTF Overview & final report

- Brief recap of CCTF progress towards goals
- Report on Final CCTF meeting Nov 6-7, 2024
- Final report overview and key recommendations
- Next steps



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## 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**

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



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

### Objective 2



#### **SYNTHESIZE**

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



Climate Ready Synthesis

### Objective 3



#### **COMMUNICATE**

Summarize and communicate potential risks and adaptation actions.



Build a process:  
Final Report Recommendations



# GOALS (from original work plan)



“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.”

# Climate Change Task Force Steps



## CLIMATE CHANGE TASK FORCE 2020- now

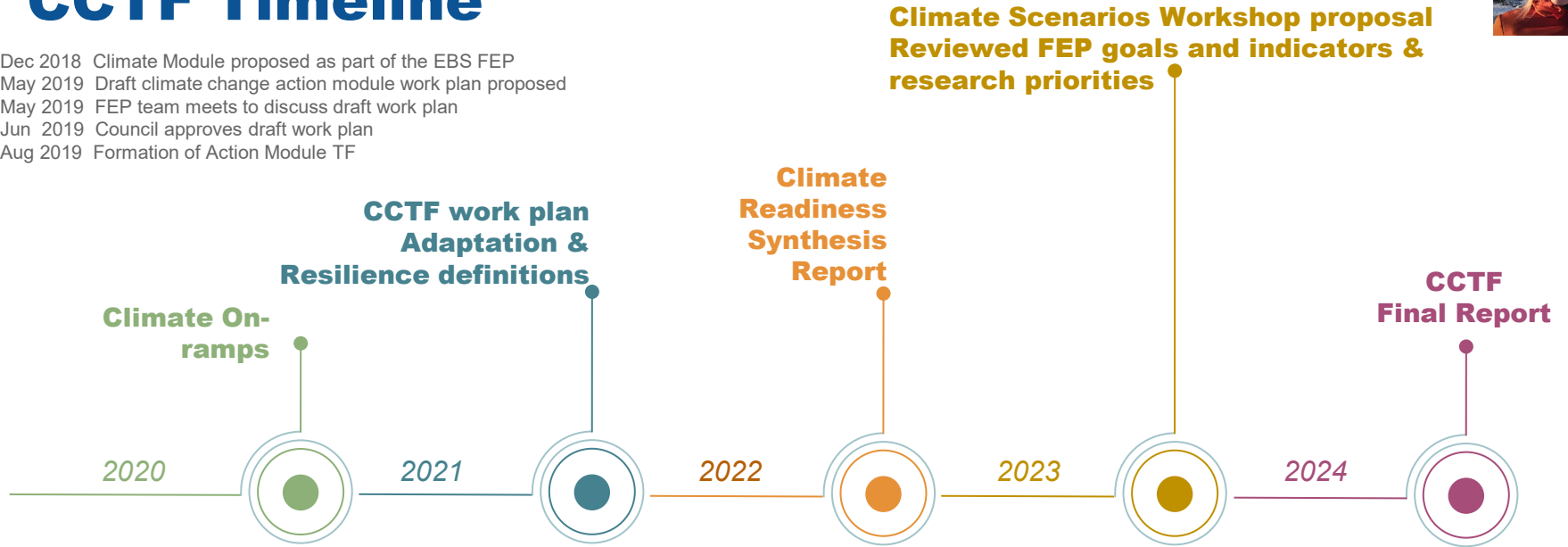
Final Report

- (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



# CCTF Timeline

- Dec 2018 Climate Module proposed as part of the EBS FEP
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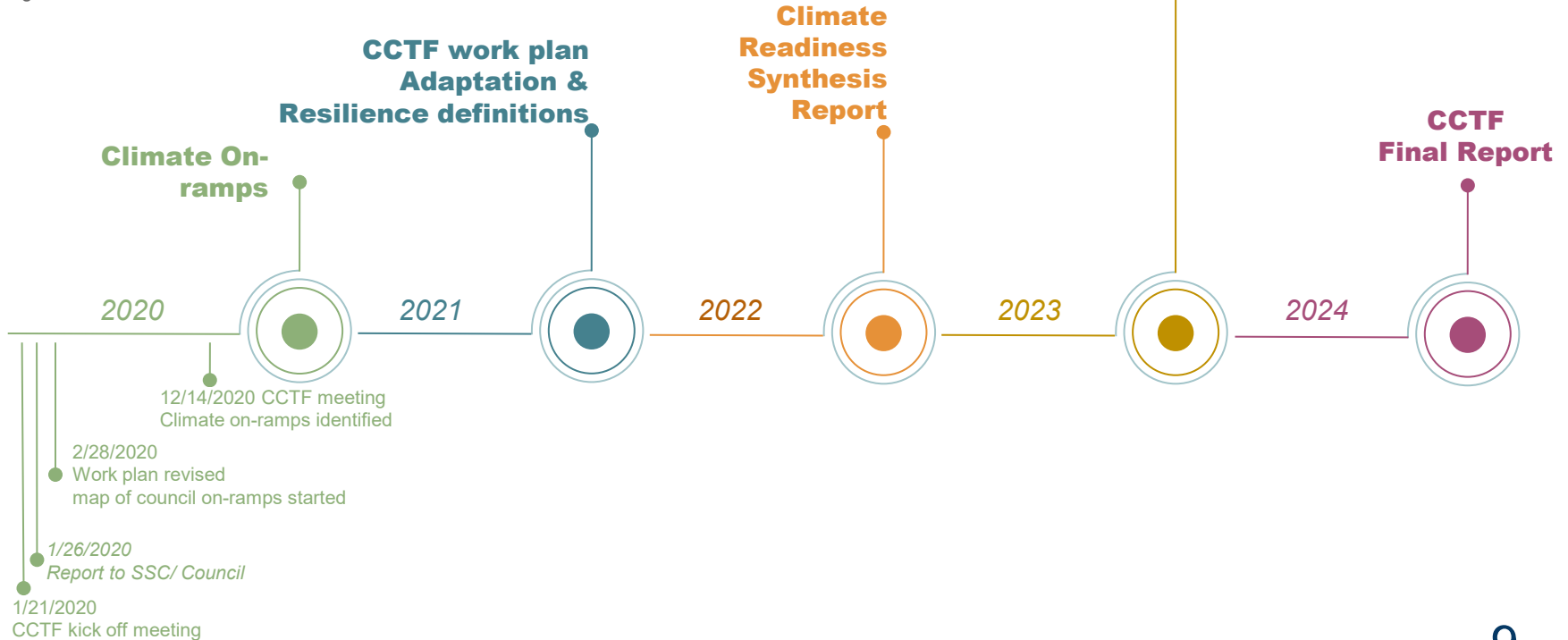






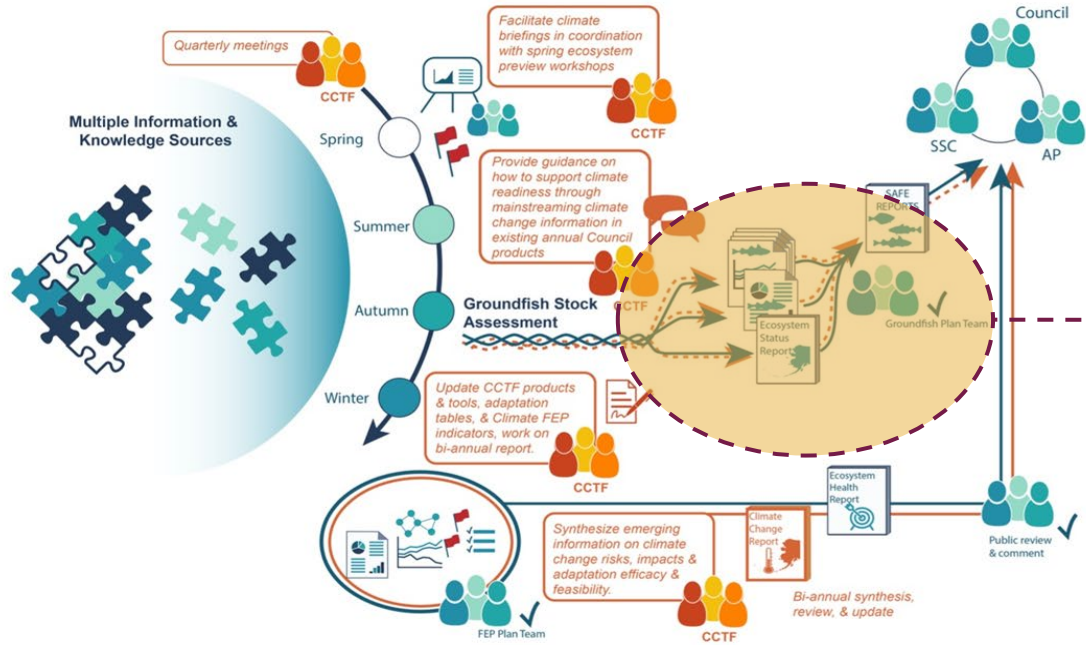
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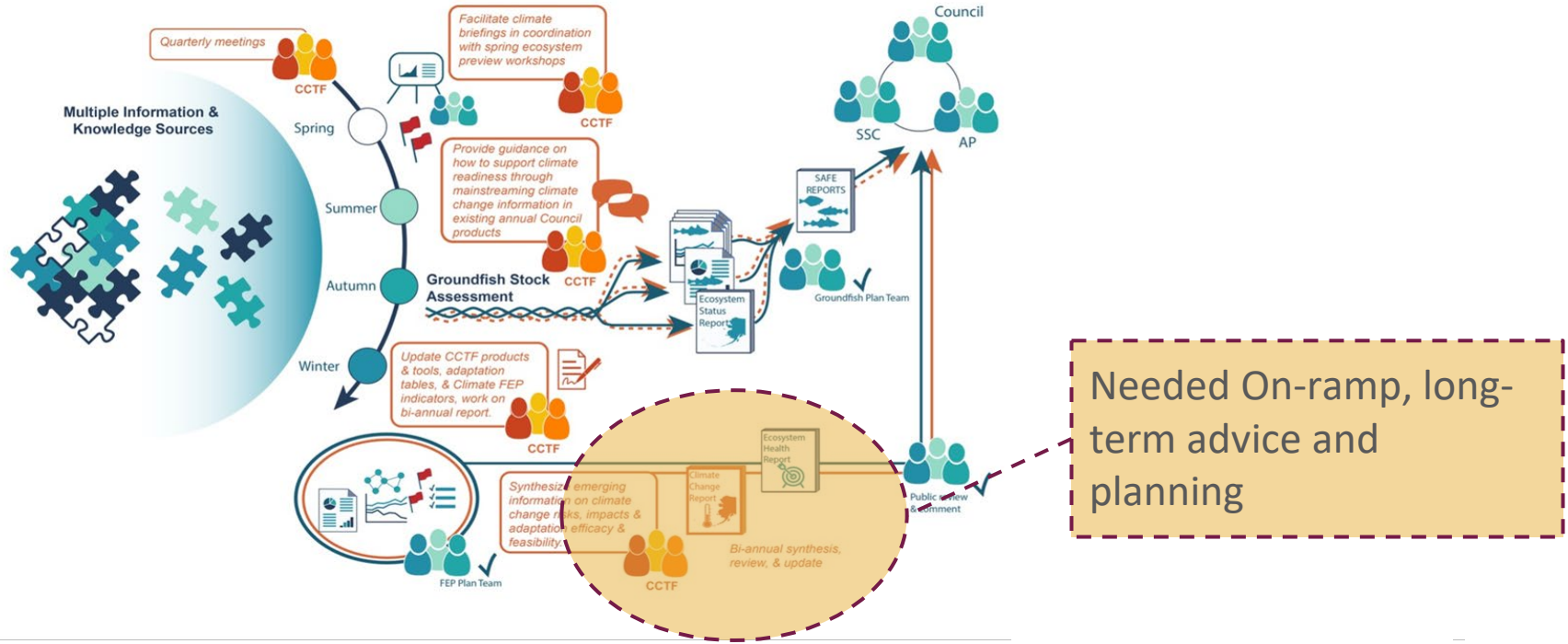
# 10 Climate-informed fisheries management: Proposed “on-ramps” and existing coordination



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

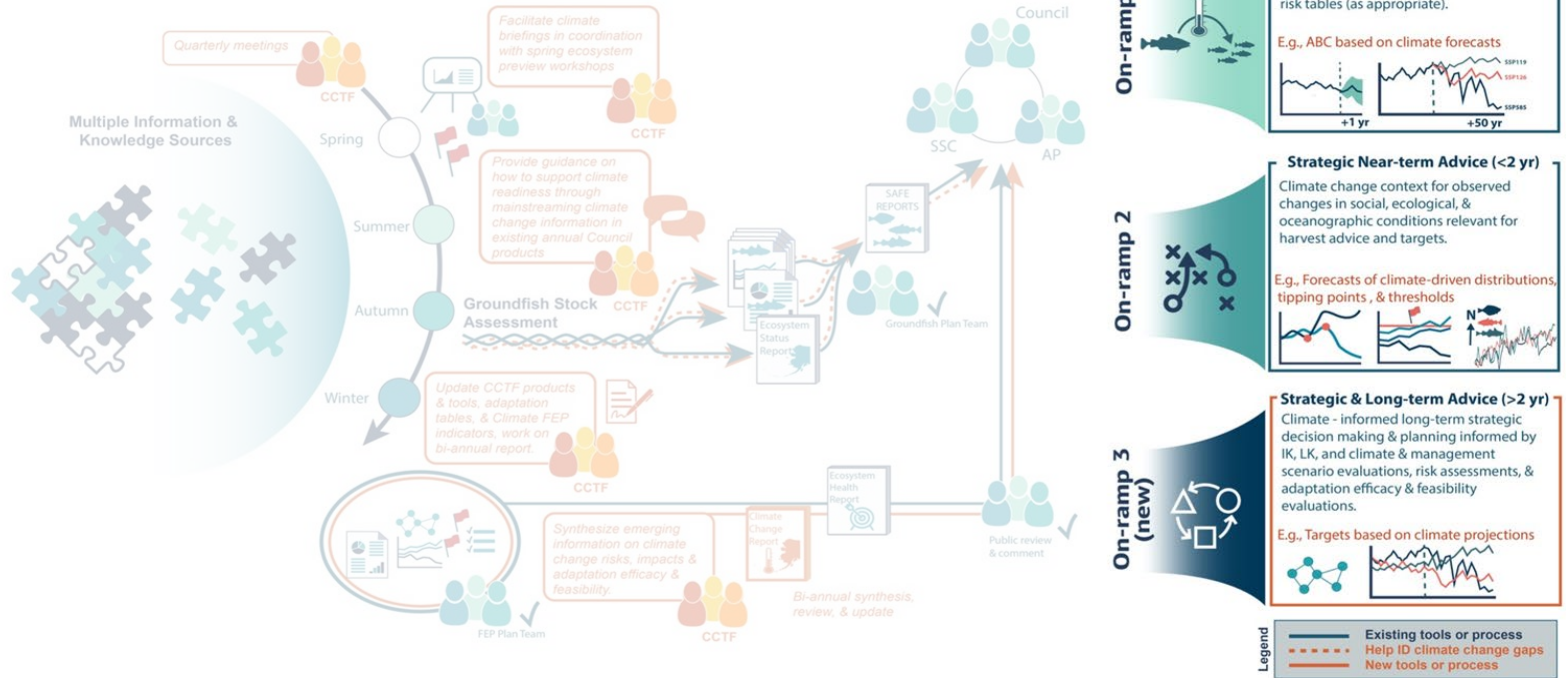


# 11 Climate-informed fisheries management: Proposed “on-ramps” and existing coordination



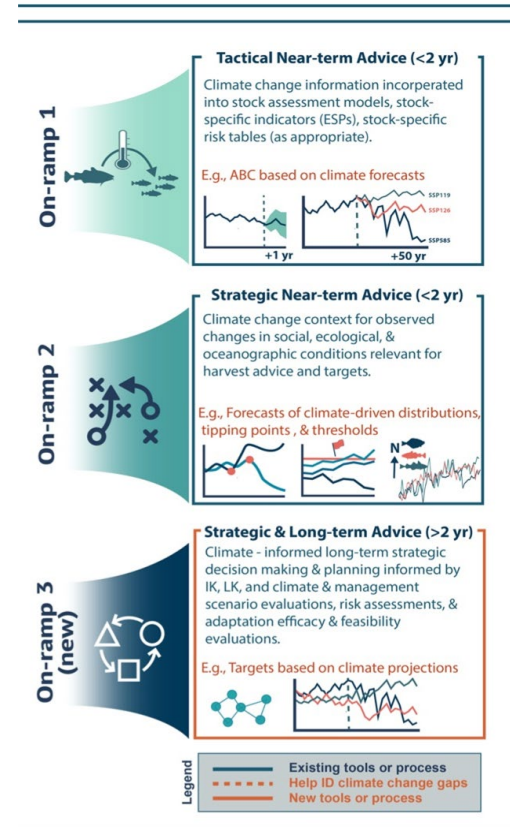
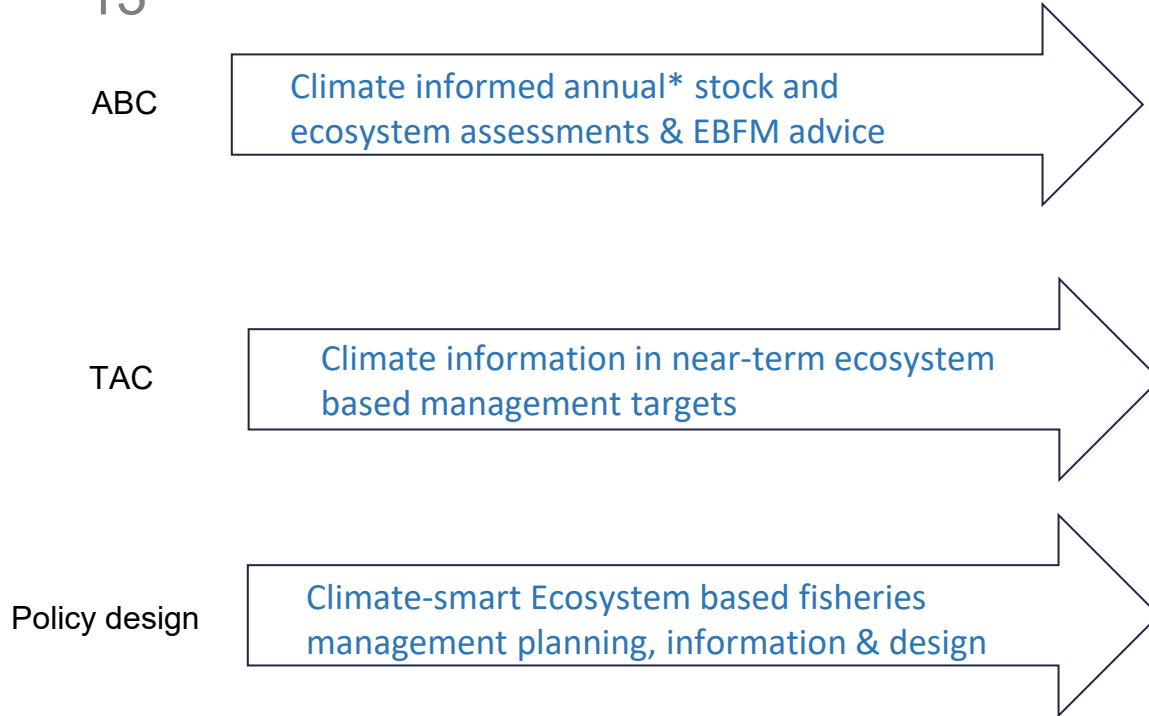


# 12 Climate-informed fisheries management: Proposed “on-ramps” and existing coordination





# Climate information on ramps for fisheries management

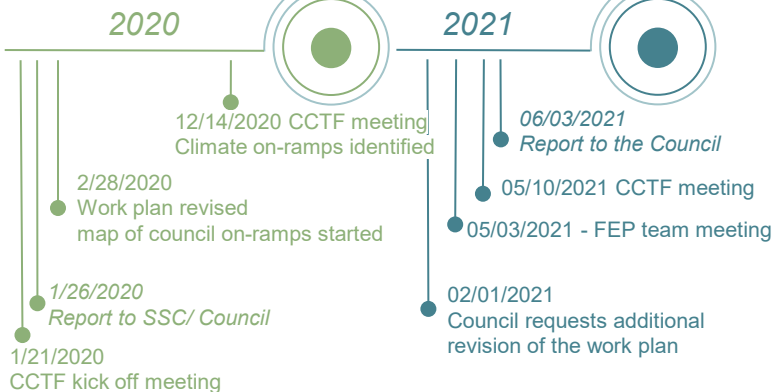


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## CCTF work plan Adaptation & Resilience definitions

### Climate On-ramps



Draft for BS FEP team review, May 2019

Cont  
Goal  
Intro  
Action  
Object  
Exam  
Short  
Metric  
Long  
How  
Plan  
How  
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<sup>3</sup> Sandhill  
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<sup>5</sup> Ocean C  
<sup>6</sup> Natural R  
<sup>7</sup> AFSC M  
<sup>8</sup> NMFS-R  
<sup>9</sup> SeaState



## Supporting climate-resilient fisheries through understanding climate change impacts and adaptation responses

May 2021

Climate Change Task Force work plan  
of the Bering Sea Fishery Ecosystem Plan

Diana Stram<sup>1</sup>, Kirstin Holsman<sup>2</sup>

Brenden Raymond-Yakoubian<sup>3</sup>, Lauren Divine<sup>4</sup>, Mike LeVine<sup>5</sup>, Scott Goodman<sup>6</sup>  
Jeremy Sterling<sup>7</sup>, Joe Krieger<sup>8</sup>, Steve Martell<sup>9</sup>, Todd Loomis<sup>10</sup>

<sup>1</sup> [diana.stram@noaa.gov](mailto:diana.stram@noaa.gov), North Pacific Fishery Management Council, Anchorage, AK, USA  
<sup>2</sup> [kirstin.holsman@noaa.gov](mailto:kirstin.holsman@noaa.gov), Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, Seattle, WA, USA  
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<sup>9</sup> SeaState, Seattle, WA, USA  
<sup>10</sup> Ocean Peace, Inc.



# Living (evolving) definition of Resilience & Adaptation



Supporting climate-resilient  
fisheries through understanding climate change  
impacts and adaptation responses

“adaptation to support climate resilient social-ecological systems includes **ecosystem-based management policies** that embrace uncertainty, adjust at a rate that is consistent with observed changes (e.g., allows communities and fisheries to **adapt in a proactive** rather than a solely reactive manner), **are inclusive of diverse knowledge sources** and information that may change and **evolve over time**”

## Resilience

Community resilience has numerous interconnected aspects, including the epistemic (e.g. access to information, rich involvement in scientific-management-policy activities, etc.), individual well-being (e.g. mental and physical health), economic vitality, and sociocultural prosperity (e.g. social cohesion, self-determination, integration of community with natural resources, thriving intergenerational relationships, community sustainability and vibrancy, food security, economic diversity, adaptability to change, etc.). The ecological/ biological resilience of marine resources likewise spans a wide array of considerations including biological and genetic diversity, healthy habitats and populations, adequate resources, sustained recruitment, and a balanced trophic structure. Resilience must be considered at the nexus of these two domains, i.e., coupled social-ecological systems. This includes, for example: sustained strong connections between harvest species and humans and communities that rely on them; management that is capable of being adaptive, flexible and stable in order to sustaining ecosystems and livelihoods; strengthened co-management, community engagement, and co-

agement, and policy to challenges of variability  
ion making that includes diverse knowledge  
just assessment of risks, impacts and tradeoffs.

ment to actual or expected climate change and its  
fisheries, adaptation to support climate resilient  
agement policies that embrace uncertainty, adjust  
allows communities and fisheries to adapt in a  
sive of diverse knowledge sources and  
consider both direct and indirect impacts and  
and the environment. The latter relies on  
change as well as the social, cultural, and  
ricately coupled social-ecological Bering Sea

ecosystem. Co-production of knowledge is essential for understanding changes as well as identifying, understanding, and promoting pathways of adaptation in both fisheries and fishing communities. Some social and ecological changes could help promote adaptation, but others might intensify negative impacts of climate-driven change.

Adaptation can include reactive responses as well as proactive, anticipatory planning and prevention. Adaptation is separate from, but can be synergistic with (i.e., have co-benefits for), “carbon mitigation” measures, which are actions at global or regional scales that aim to reduce or recapture atmospheric CO<sub>2</sub>. Climate adaptation planning is a multi-step and iterative process that includes evaluation of key risks and needs, assessment of available potential tools and approaches, understanding of institutional capacity and feasibility for adaptation planning and implementation (and evolving limits and constraints to adaptation), and interactive inclusive discussions regarding realized costs, tradeoffs, and benefits of adaptation measures (Meredith et al. 2019). This evolving definition will serve as the basis for ongoing climate-biological-social-economic evaluations of management actions that address climate-driven impacts, utilize novel opportunities, and identify and promote equitable adaptive pathways.

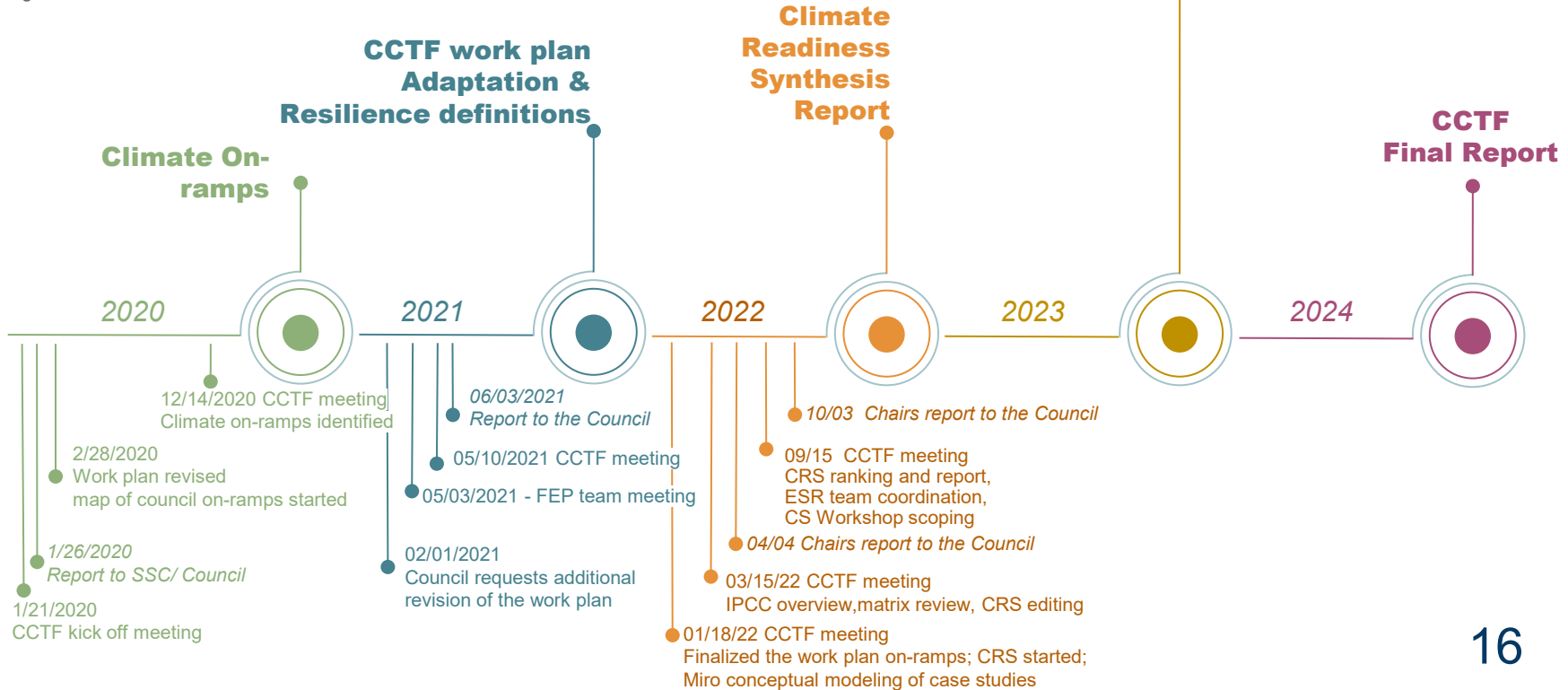
<sup>2</sup> [kirstin.holtsman@noaa.gov](mailto:kirstin.holtsman@noaa.gov), Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, Seattle, WA, USA  
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[Link to work plan](#)

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# CCTF Indicators workshop

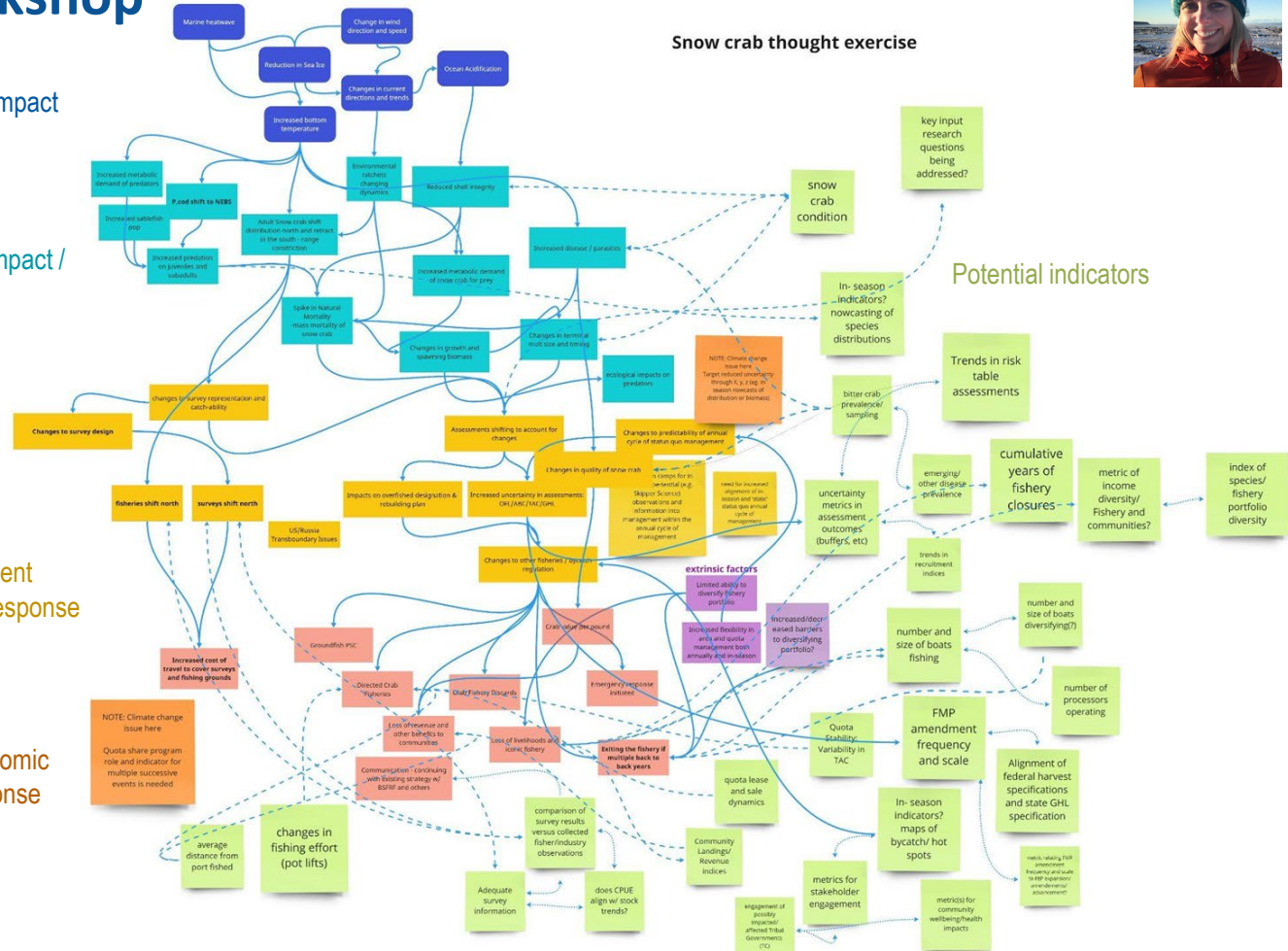
## (Jan 2022)



### Snow crab thought exercise

Climate impact

Ecological impact / response

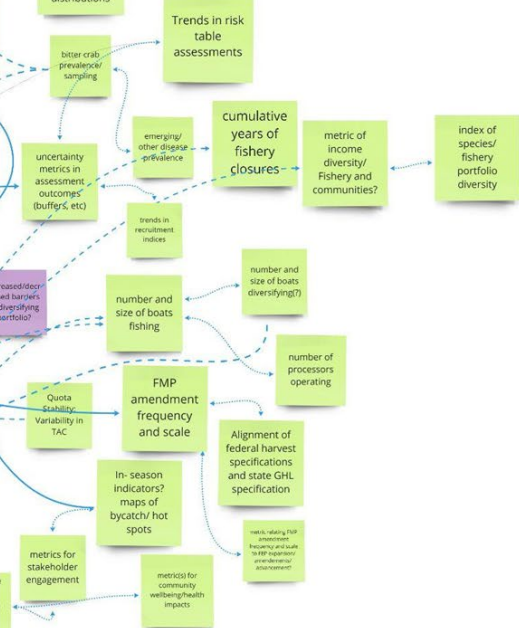


True impacts and responses are interconnected  
... as are adaptive solutions

Harvest & management impact / response

Social & economic impact / response

Potential indicators







# Management Process



Climate Readiness Synthesis  
2022

**Climate Readiness Synthesis**  
Prepared by the NPFMC Climate Change Task Force 2022

Diana Stram<sup>1</sup>, Kirstin Holsman<sup>2</sup>

Brenden Raymond-Yakoubian<sup>1</sup>, Lauren Divine<sup>4</sup>, Mike LeVine<sup>3</sup>, Scott Goodman<sup>5</sup>, Jeremy Sterling<sup>6</sup>, Jason Gasper<sup>7</sup>, Steve Martell<sup>8</sup>, Todd Loomis<sup>9</sup>

The Climate Change Taskforce (CCTF) has compiled this climate readiness synthesis as a starting point for the North Pacific Fishery Management Council (Council) in ascertaining how “climate ready” the current management system is overall and to assist in augmenting existing management for improved climate resilience. This synthesis aims to understand the current<sup>11</sup> state of “climate readiness”, meaning whether management tools, assessments, and information on-ramps are designed to address and consider long-term climate change and the unprecedented conditions and unique challenges that it presents (in contrast to addressing natural *climate variability*). Importantly, this synthesis does not evaluate management effectiveness.

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<sup>11</sup> This CRS is current through 2022.

2022 CCTF Climate Readiness Synthesis 1



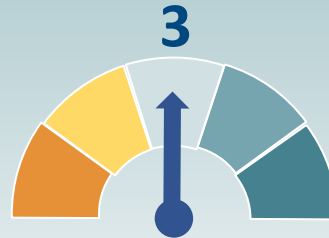


## Management Process



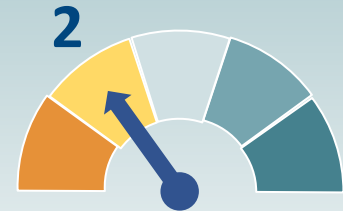
- Implicit climate variability information associated with some management measures
- Conceptually climate information informs management measure but is not directly implemented

## 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

# Climate Readiness Synthesis 2022




Climate Readiness Synthesis  
2022

**Climate Readiness Synthesis**  
Prepared by the NPFMC Climate Change Task Force 2022  
Diana Stram<sup>1</sup>, Kirstin Holsman<sup>2</sup>

Brenden Raymond-Yakoubian<sup>1</sup>, Lauren Divine<sup>4</sup>, Mike LeVine<sup>5</sup>, Scott Goodman<sup>3</sup>, Jeremy Sterling<sup>7</sup>, Jason Gasper<sup>8</sup>, Steve Martell<sup>9</sup>, Todd Loomis<sup>10</sup>

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2022 CCTF Climate Readiness Synthesis 1

KEY: Systematically increase climate information in EBM process & reports

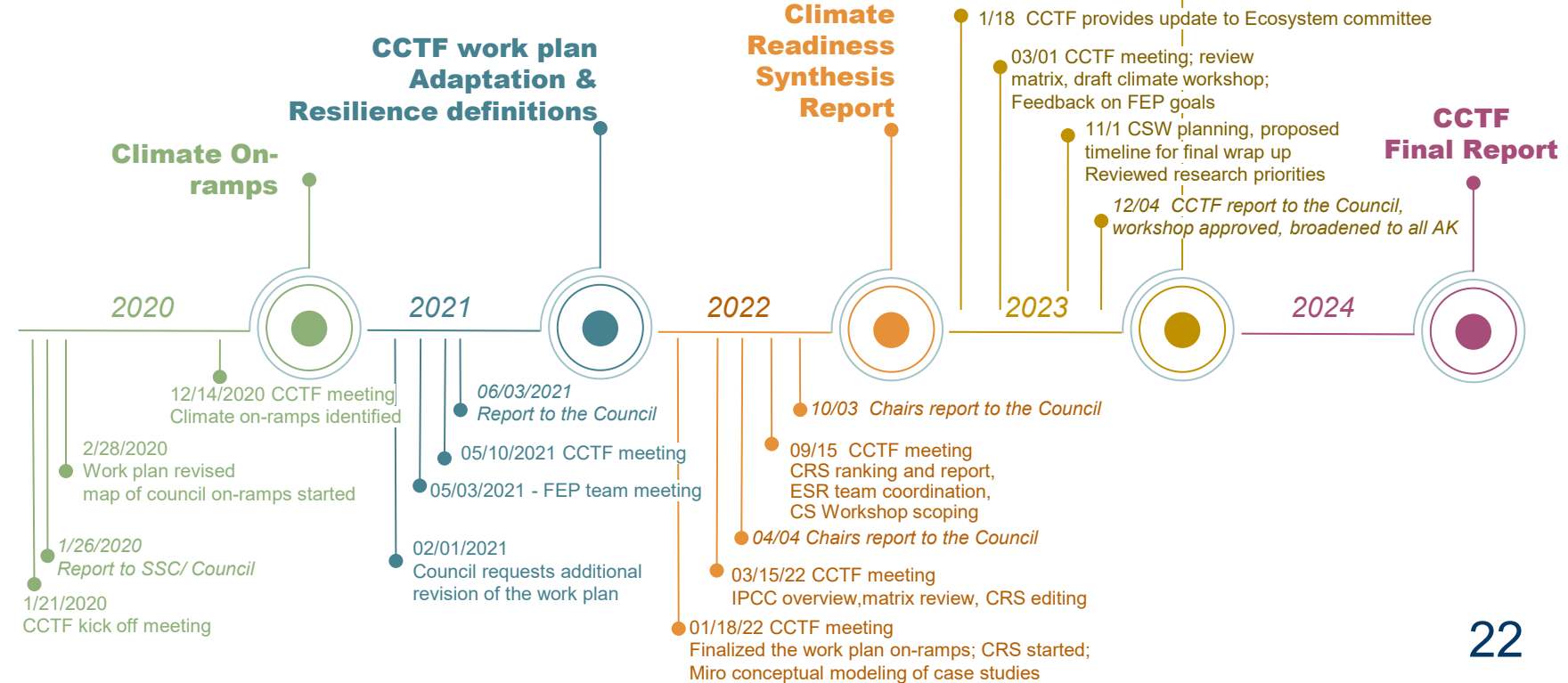
KEY: Build a process to iteratively re-consider potential strengths, weaknesses, & opportunities for improvement across management tools

KEY: Expand (or create) processes, collaborations, & partnerships that facilitate inclusion of understanding from multiple knowledge systems in climate planning

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breakout groups, repeated over multiple days, aimed at synthesizing and summarizing the critical needs, resources, and process. By the end of the workshop, the participants will have developed a robust and inclusive decision making process and provide recommendations for tools the Council may consider in the future. Additional details on the scope of the workshop and draft scenario development from the CCTF during the meeting are included below.

## CCTF 2024 Climate Change Scenarios Workshop

### When

Mid-May 2024 (3 days); Anchorage Alaska (tentatively)

### Who

NPFMC Climate Change Task Force, Council members, members of the public, community members, fishery participants, managers, and climate and fisheries researchers

### Goal

The overarching objective of this workshop is to synthesize and summarize the critical needs, resources, and process to develop and maintain a robust and inclusive decision-making process to respond to climate change effects in the North Pacific. The workshop will be focused on regional management process and would invite attendees and participants to:

- Think broadly about potential solutions and tools within the existing process (incremental) but also beyond existing approaches (transformational); and
- Identify the bigger picture changes that could be effective to address large climate impacts and changes.

The workshop format will include: (a) a combination of interactive breakout sessions with scenario planning exercises designed to explore a suite of potential and plausible 'what if's' in order to identify key needs, tools, information sources, opportunities and risks; (b) facilitated discussion sessions designed to support meaningful information exchange between attendees; and (c) structured format that enables cross-pollination of expertise, experiences, and perspectives in solution explorations.

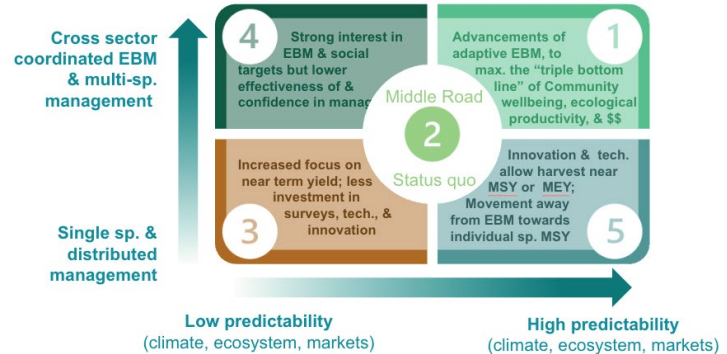
### Scenario planning & case studies

We will use a suite of illustrative future "what if" scenarios and case studies to help inform climate change planning and response. The focus of future scenarios would be for planning rather than predicting, i.e., they will provide the scope for potential future changes that may occur next year, ten years from now, or 20+ years from now. Discussions around these changes and potential future scenarios will help identify near term actions, step-by-step approaches, and long-term investments in information, tools, and management innovations needed to increase resilience to climate change for different fisheries and marine dependent communities of place and practice.

- Case studies will help anchor discussions for what if scenarios and provide concrete examples of gaps and needs as well as successes in weathering climate driven changes to Alaskan marine ecosystems and resources.
- Use of personal experience or recent case studies will also help work through each scenario.

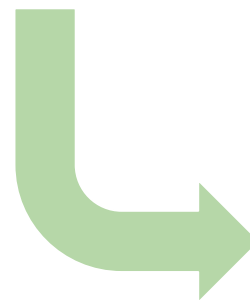


## Draft Climate Change planning Scenarios (CCTF Nov 2023)



*Note:*

- Scenario planning is used to help prepare for the possible futures and potential of
- Scenarios are intended to be plausible descriptions of possible future states useful prescriptive regarding desired future states.



**CLIMATE CHANGE**  
Let's talk about it.  
**VIRTUAL DISCUSSION SESSIONS**

The North Pacific Fishery Management Council is convening three interactive virtual discussions in preparation for the upcoming **Climate Scenarios Workshop**. The workshop will take place June 5-6, 2024 in Kodiak, AK as part of the June Council meeting. The purpose of the virtual sessions is to begin exploring the questions and concepts that will be discussed at the workshop, and help participants prepare to engage in discussion.

**SESSION 1:** Anticipated climate change impacts to the Bering Sea, Aleutian Islands, and Gulf of Alaska.  
APRIL 24 1:00-2:00 PM AKST

**SESSION 2:** What does "climate readiness" mean?  
APRIL 30 1:00-2:00 PM AKST

**SESSION 3:** Climate Scenario Planning 101, and an introduction to future scenarios that will be discussed at the NPFMC workshop.  
MAY 14 1:00-2:00 PM AKST

**NORTH PACIFIC FISHERY MANAGEMENT COUNCIL**  
For more information, including detailed topics and how to participate, check [www.npfmc.org](http://www.npfmc.org)

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# CLIMATE CHANGE

Let's talk about it.

Pre-Workshop

## VIRTUAL DISCUSSION SESSIONS

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**NORTH PACIFIC FISHERY MANAGEMENT COUNCIL**

For more information, including detailed topics and how to participate, check [www.npfmc.org](http://www.npfmc.org)

Current trajectory    Best of both worlds    EBM & rapid change    Siloed management & high challenges

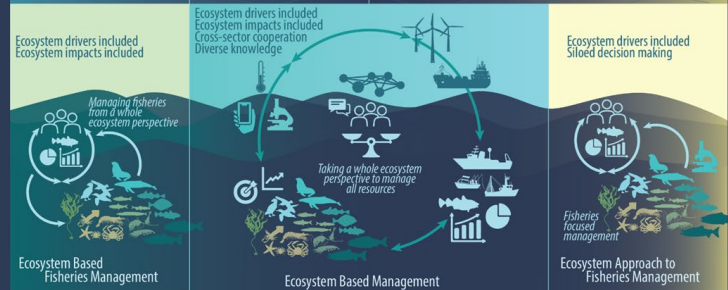
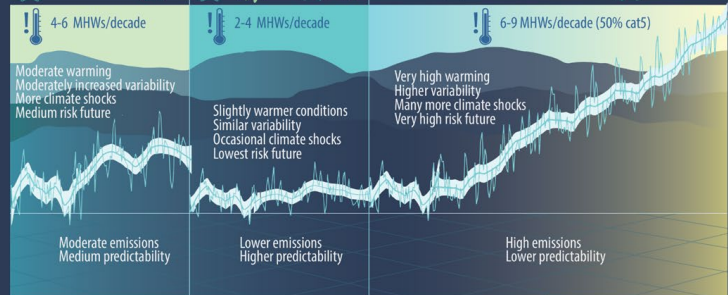
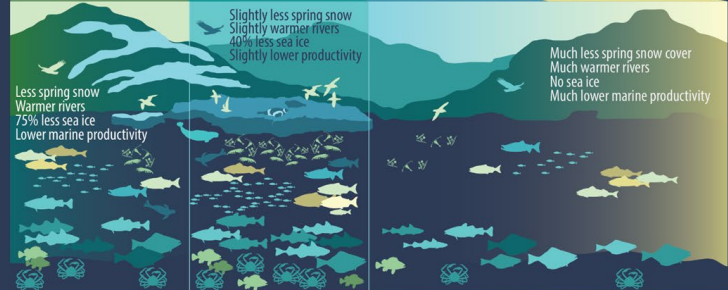
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changes relative to present day



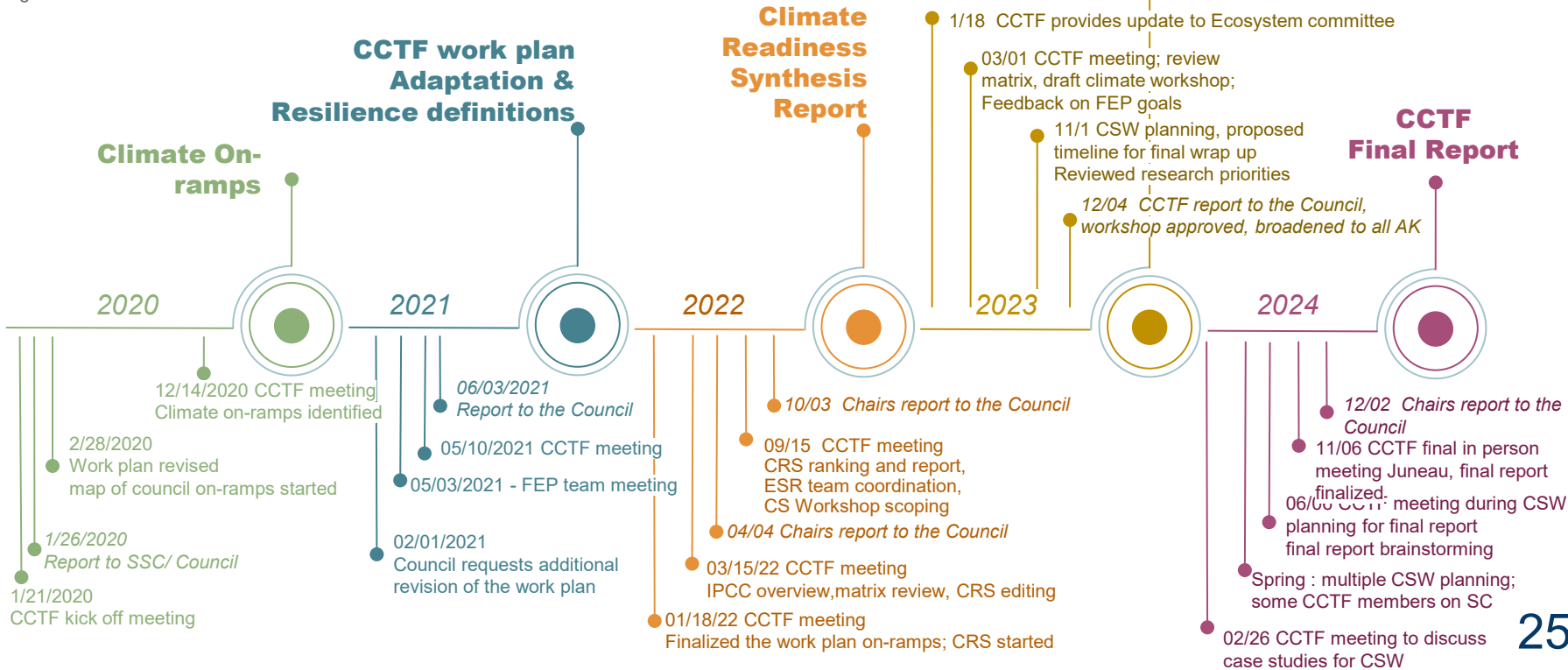
Future Climate Change Scenarios



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D1b CCTF Report  
DECEMBER 2024

## North Pacific Fishery Management Council Climate Change Task Force Final Report

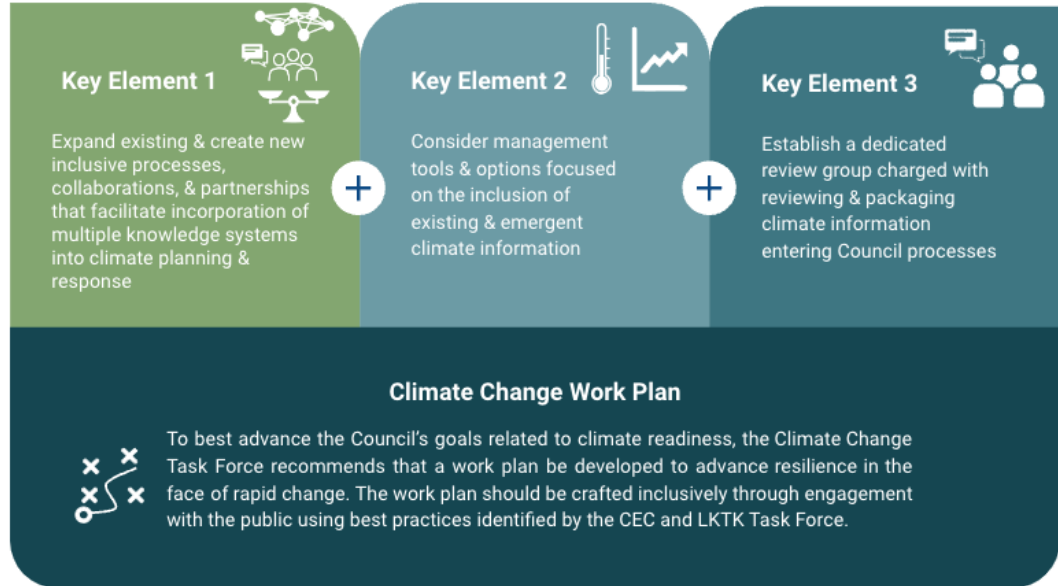
November 2024

### Disclaimer:

This report represents synthesis of ideas and discussions exchanged during CCTF meetings and in shared Task Force documents and reflects ideas offered therein but does not imply consensus of all member ideas nor is exhaustive of all existing and potential climate change challenges, opportunities, or future Council directions. Rather, this report is designed to be a resource to support NPFMC advancement of management policies, tools, and processes towards climate change adaptation and resilience in the Bering Sea, Alaska.

Climate Change Task Force Final Report, November 2024

1



# CCTF Overview & final report

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# ATTENDEES Final CCTF Meeting Nov 6 & 7, 2024

## 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), Jason Gasper (NMFS-Regional Office), Mike LeVine (Ocean Conservancy), Diana Stram co-Chair (NPFMC), Todd Loomis (Ocean Peace, Inc.)

## Taskforce members in attendance virtually:

Jeremy Sterling (AFSC Marine Mammal Lab), Brenden Raymond-Yakoubian (Sandhill.Culture.Craft), Steve Martell (SeaState),

**Members of the public and other state and agency staff:** Angela Abolhassani, Stephanie Madsen, Julie Kavanaugh, Heather Mann, Mellisa Johnson, Nick Jacuk, Steve Marx, Diana Evans, Danielle Mercurief, Katie Latanich, Sarah Wise, Megan Williams



# CCTF Agenda

## Nov 6 & 7, 2024



1. **Reflect on Climate Scenarios Workshop**
  1. Review on CSW workshop proceedings → synthesize themes and topics towards CCTF recommendations
  2. Discussion of Council action as applicable (October 2024)
2. **Recap of workplan, process, progress and outcomes** [Stram and Holsman ppts]
  1. What was our original charge
  2. What did we initially propose to accomplish this (workplan)
  3. What did we accomplish (CRS, CSW, on-ramps)
  4. To the extent these (b. and c.) differ, why?
3. **CCTF recommendations moving forward**
  1. Review the Brainstorming document
  2. CCTF process and recs for further modules/TFs (module and process)
    1. Lessons learned
    2. Recommendations for future FEP modules
  3. CCTF feedback to Council in moving forward to develop an NPFMC climate workplan
    1. What needs to be considered based on outcomes of CCTF
    2. Running list of tools, process etc based on CCTF feedback and considerations from CSW [Climate workplan]
    3. Phases based on timing
4. **Final report drafting and review**
  1. CCTF Report (all members)
  2. Synthesis Paper (all members, opt in)

(Open for CCTF internal only  
input June - Sept 2024)

# CCTF Meeting Nov 6 & 7, 2024

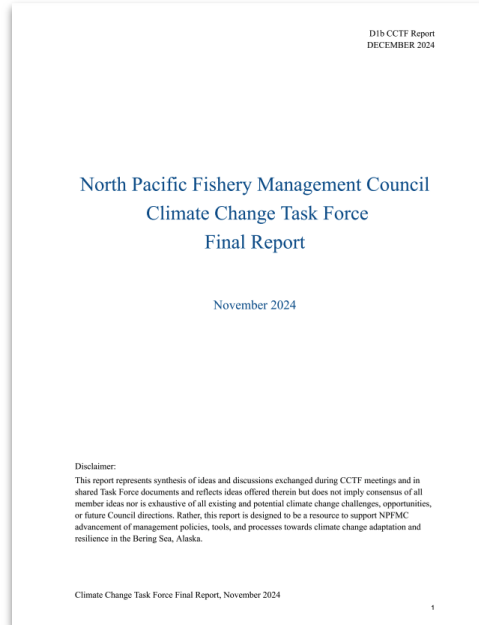
Shared Google Doc  
to brainstorm key  
messages for final  
report

During the Nov CCTF meeting:  
Key Recommendations  
Lessons learned

Draft Report Co-  
Written during the  
meeting  
(google doc)

Nov 8 - 16, 2024  
Offline edits/ revisions  
using google docs and  
comment/track changes

Finalized for posting  
Nov 16, 2024



# CCTF Overview & final report

- Brief recap of CCTF progress towards goals
- Report on Final CCTF meeting Nov 6-7, 2024
- Final report overview and key recommendations
- Next steps



# CCTF Final Report



D1b CCTF Report  
DECEMBER 2024

## North Pacific Fishery Management Council Climate Change Task Force Final Report

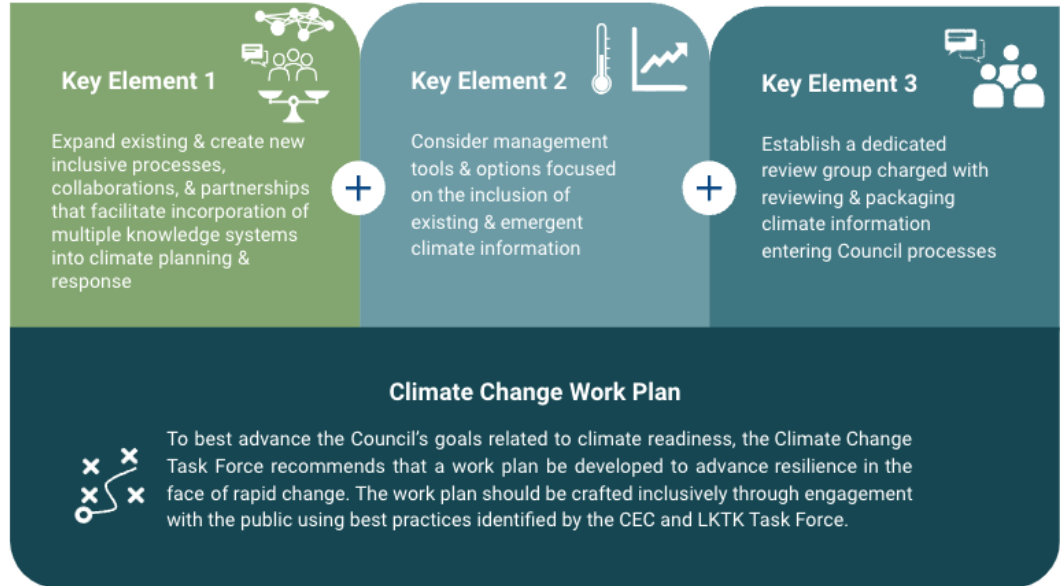
November 2024

### Disclaimer:

This report represents synthesis of ideas and discussions exchanged during CCTF meetings and in shared Task Force documents and reflects ideas offered therein but does not imply consensus of all member ideas nor is exhaustive of all existing and potential climate change challenges, opportunities, or future Council directions. Rather, this report is designed to be a resource to support NPFMC advancement of management policies, tools, and processes towards climate change adaptation and resilience in the Bering Sea, Alaska.

Climate Change Task Force Final Report, November 2024

1

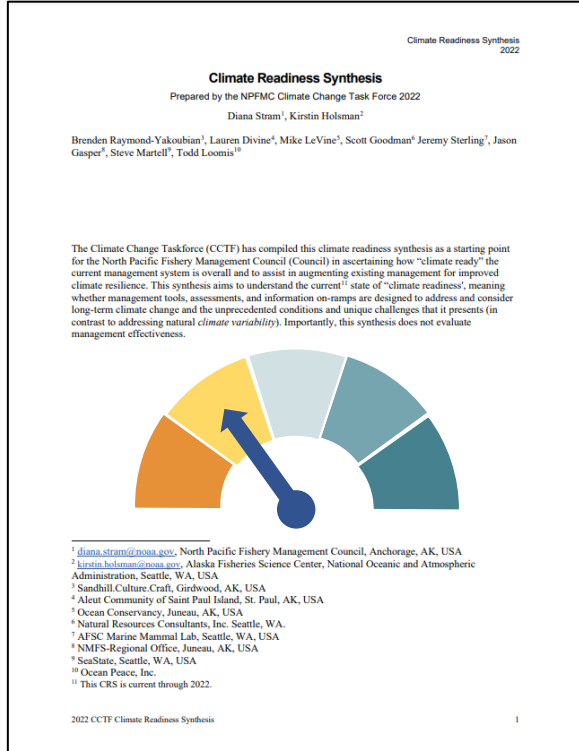






# CCTF Final report built on previous work

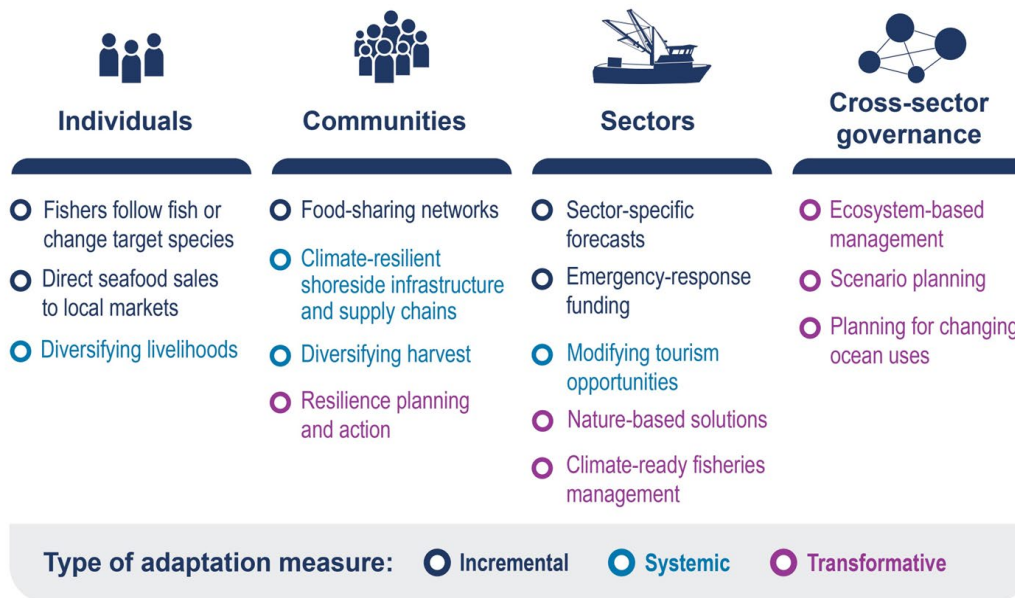
## Management Process





## “Adaptation can occur at many organizational scales— from individuals to governance systems.” Chp 10

### Ocean-Related Climate Adaptation Strategies



**CCTF Final  
report built on  
previous work**



## 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.



# High Priority Key Elements

## Key Element 1



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

advancing measures that promote inclusive decision-making  
( Key 1.2)

reducing barriers to diverse participation  
(Key 1.3)

providing regular opportunities for public-facing brainstorming and two-way information sharing  
(Key 1.1)

supporting equitable participation in Council processes through mentorship  
(Key 1.4)



# High Priority Key Elements

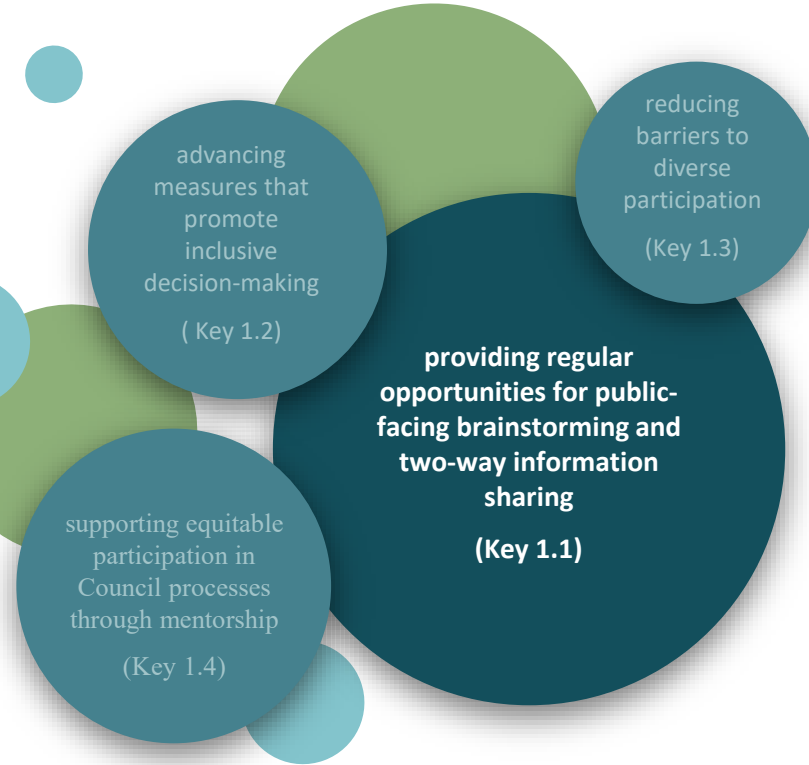
## Key Element 1



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

“Providing a space for **informal information exchange** is one of the easiest and most efficient ways to gather and include climate change-related information that can help inform Council responses to both rapid shocks and long-term climate shifts. The Council facilitated informal exchanges like this in the **breakout sessions** at the June 2024 Climate Scenarios Workshop (CSW), and future exchange could take various forms, including: **annual round table discussions** on various climate topics, dedicated evening sessions at Council meetings; breakout groups during workshops, **semi-structured Climate Testimonials**, and other forms.”

## KEY 1.1



“These informal exchanges should be guided by a code of conduct to promote respectful discussion, the sharing of multiple perspectives, and the fostering of safe spaces for the exchange of ideas.”



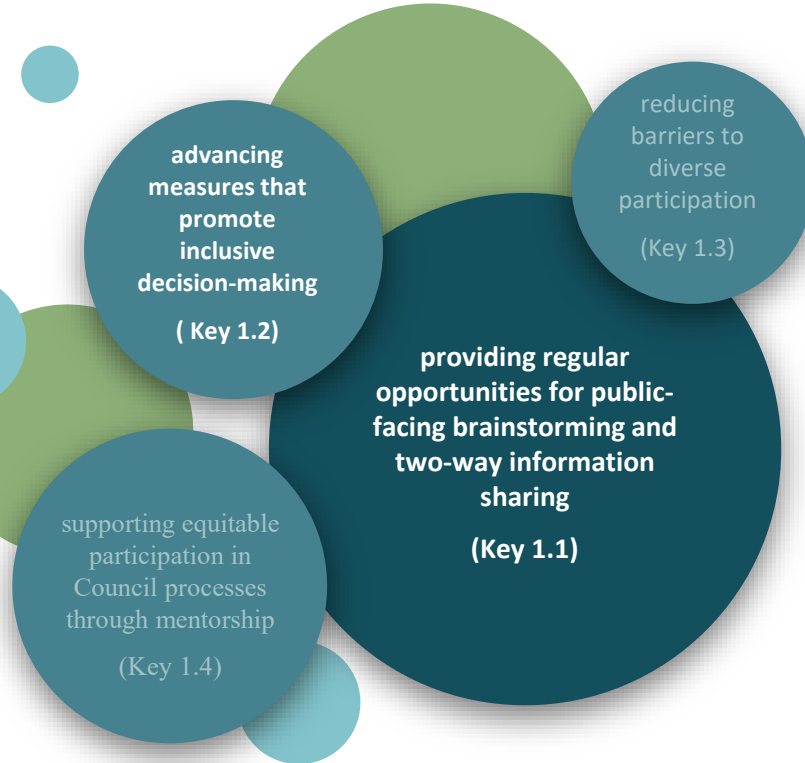
# High Priority Key Elements

## Key Element 1



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

“The Council can formalize on-ramps that **incorporate information and perspectives** from diverse knowledge sources into decision-making processes. As part of doing so, the Council can provide support and resources for **collaborative and cooperative processes** that are inclusive of diverse stakeholders and Tribes, such as **promoting co-production of knowledge**, promoting and integrating results of timely and meaningful **Tribal Consultation**, supporting and exploring collaborative and cooperative management and policy structures and processes, **promoting co-stewardship**, and promoting co-presentation on Council issues by Tribal entities.”



KEY 1.2



# High Priority Key Elements

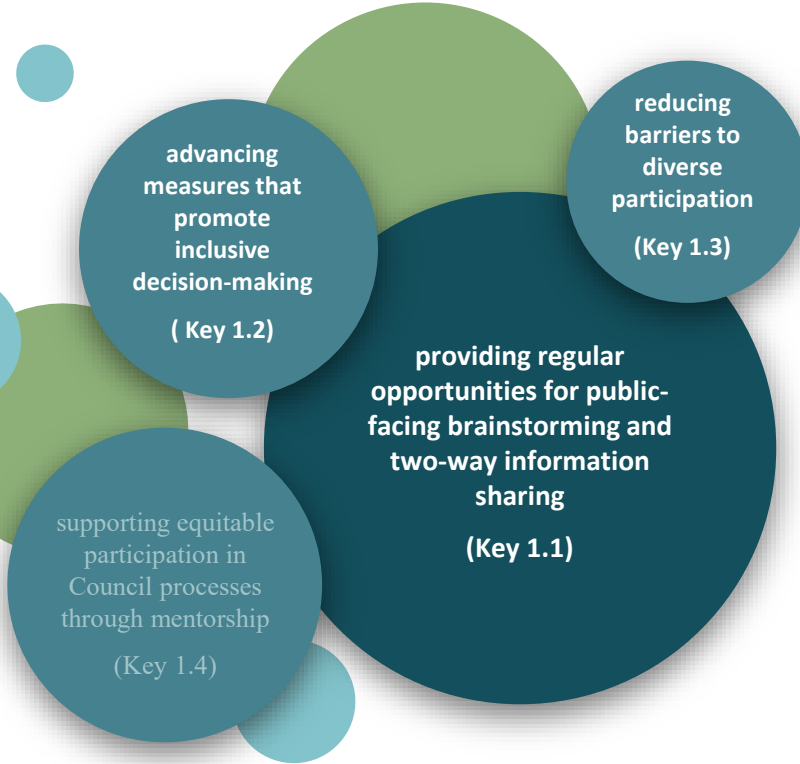
## Key Element 1



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

“Additional perspectives and information can be better integrated into management through **increased information exchange**, which is facilitated by **appropriate utilization of diverse sources of available information**. The Council can facilitate this exchange as appropriate and by using **FAIR** (Findable, Accessible, Interoperable, Reusable; e.g., Pirini et al. 2022) principles, **CARE** (Collective benefit, Authority to control, Responsibility, Ethics) principles, the **LKTKS Task Force Protocol**, and other existing protocols which pertain to information use and sharing. The Council can also **continue to improve access to documents ahead of Council meetings** to help promote equitable participation.”

KEY 1.3





## High Priority Key Elements

### Key Element 1



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

“To build capacity for Council involvement and contributions, the Council can **provide support and resources for mentorship programs** (e.g., Marine Resource Education Program [MREP], UAF Tamamta Program).”

### KEY 1.4

supporting equitable participation in Council processes through mentorship  
(Key 1.4)

advancing measures that promote inclusive decision-making  
(Key 1.2)

providing regular opportunities for public-facing brainstorming and two-way information sharing  
(Key 1.1)

reducing barriers to diverse participation  
(Key 1.3)



## Key Element 2



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

**The CCTF recommends a work plan** that initiates both implementation of near-term priorities and start processes to explore the longer-term priorities

## High Priority Key Elements

incorporating climate-driven interactions and cascading impacts through ecosystem indicators and models

(Key 2.2)

Incorporate climate forecast-linked management advice

(Key 2.1)

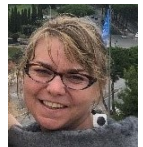
(longer-term)  
reviewing the tier systems and considering climate-informed biomass targets and limits, as well as climate-robust or forecast-informed Harvest Control Rules

(Key 2.5)

developing dynamic management tools using early warnings, ocean and ecosystem nowcasts (daily; weekly), and forecasts (<2 yr) to increase in-season adaptation tools for management

(see Key 2.4)

*10 Key elements identified, 4 prioritized*



# High Priority Key Elements

## Key Element 2



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

**Incorporate forecasts of climate and ecosystem conditions (+1-2 yrs)** in the harvest projections and specifications processes.

**Include climate forecast information and vulnerability assessments** in management advice to inform Risk Tables and discussions around ABC or TAC.

**Consider climate-forecast linked spatial management measures** (e.g., via climate specific species distribution models) to inform apportionments.

## KEY 2.1

incorporating climate-driven interactions and cascading impacts through ecosystem indicators and models

(Key 2.2)

Incorporate climate forecast-linked management advice

(Key 2.1)

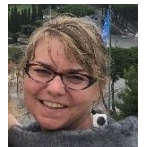
(longer-term)

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(Key 2.5)

developing dynamic management tools using early warnings, ocean and ecosystem nowcasts (daily; weekly), and forecasts (<2 yr) to increase in-season adaptation tools for management

(see Key 2.4)



## Key Element 2



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

Develop and **use ecological indicators** and multi-species, multi-fleet, or ecosystem models that **quantify uncertainty, interactions, and risk** across multiple fisheries or species. As part of this effort risk table discussions can be aligned around **climate buffers/risks.**

## KEY 2.2

## High Priority Key Elements

incorporating climate-driven interactions and cascading impacts through ecosystem indicators and models

(Key 2.2)

Incorporate climate forecast-linked management advice

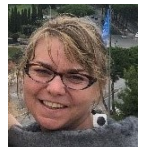
(Key 2.1)

(longer-term)  
reviewing the tier systems and considering climate-informed biomass targets and limits, as well as climate-robust or forecast-informed Harvest Control Rules

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developing dynamic management tools using early warnings, ocean and ecosystem nowcasts (daily; weekly), and forecasts (<2 yr) to increase in-season adaptation tools for management

(see Key 2.4)



# High Priority Key Elements

## Key Element 2



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

**Dynamic management tools aligned with federal regulations** and management could be used to trigger pre-season and/or within season adjustments, revaluations, or “red flag” responses.

Using nowcasts (daily; weekly) and forecasts (<2 years) to **inform spatial in-season and annual management actions**

Increase in-season flexibility and responsiveness in harvest measures through **incorporation of real-time observations** from a broader suite of observations and information (e.g., Skipper Science citizen science data, LKTK information).

incorporating climate-driven interactions and cascading impacts through ecosystem indicators and models

(Key 2.2)

Incorporate climate forecast-linked management advice

(Key 2.1)

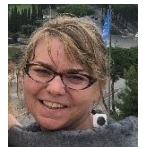
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(Key 2.5)

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(see Key 2.4)

## KEY 2.4



# High Priority Key Elements

## Key Element 2



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

As it undertakes this review, the Council should consider developing criteria for improvements in performance **tier, HCRs and biomass targets that incorporate more than just stock sustainability** (e.g., Ecosystem MSY, volatility over time, risk of collapse, fishery consolidation, biodiversity), and **HCRs and biological targets that might increase improvement under future climate shocks** (e.g., B50). These could use a suite of observations, ecosystem and climate hindcasts, forecasts and longer term predictions. This work also aligns with the Council IRA proposal item 3.

incorporating climate-driven interactions and cascading impacts through ecosystem indicators and models

(Key 2.2)

Incorporate climate forecast-linked management advice

(Key 2.1)

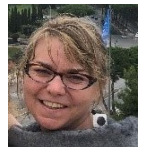
(longer-term)  
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(Key 2.5)

developing dynamic management tools using early warnings, ocean and ecosystem nowcasts (daily; weekly), and forecasts (<2 yr) to increase in-season adaptation tools for management

(see Key 2.4)

**KEY 2.5**



# High Priority Key Elements

## Key Element 3



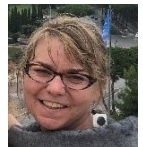
Establish a dedicated review group charged with reviewing & packaging climate information entering Council processes

synthesizing and promoting climate smart management approaches  
(Key 3.6)

regularly identifying and coordinating review of external evaluations relevant to climate-informed advice  
(Key 3.4)

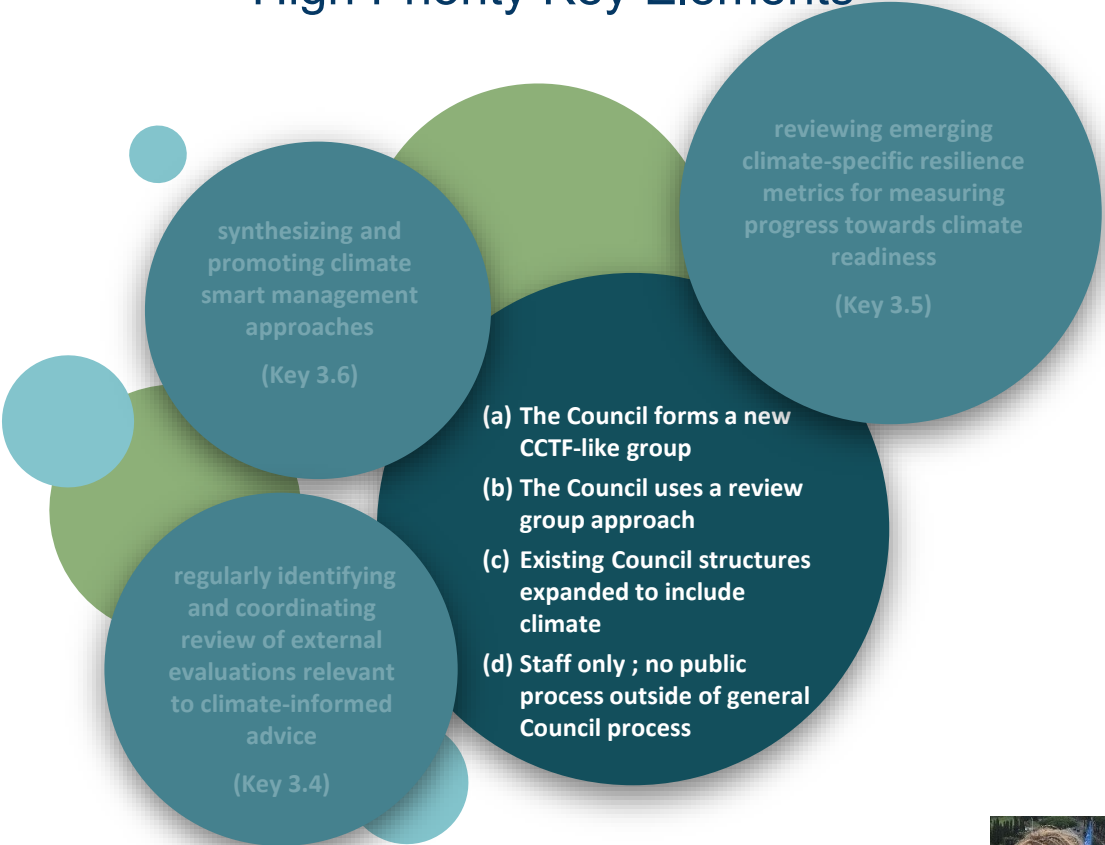
reviewing emerging climate-specific resilience metrics for measuring progress towards climate readiness  
(Key 3.5)

- (a) The Council forms a new CCTF-like group
- (b) The Council uses a review group approach
- (c) Existing Council structures expanded to include climate
- (d) Staff only ; no public process outside of general Council process



# High Priority Key Elements

- (a) The Council forms a new CCTF-like group** with a directive to provide advice through existing pathways (AP, SSC, Plan Teams, Committees and other existing working bodies, GPT and CPT, Council);
- (b) The Council uses a review group approach** to compose a small team of Council body representatives (no more than 2 representatives from each: AP, SSC, Council, Staff) that would convene, as appropriate, tactical sub- teams of experts and public roundtable discussions, to guide analysis and reporting on recommendations of management measures to the Council;
- (c) Existing Council structures expanded** to include climate; similar to (b) but reassignment of the following tasks to existing Council bodies and committees; or
- (d) Staff only** to create work plan and filter climate advice to Council and no public process outside of general Council process (this option not favored by CCTF as this is less inclusive and transparent and is less feasible for implementation due to limited staff capacity).



# High Priority Key Elements

## Key Element 3



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

“The review group could recommend **initiating and identifying subteams to conduct analyses or evaluations** to be approved by the Council and coordinate synthesis of outcomes for Council bodies . The review group could additionally **consider how these needs align with the Council's research priorities** and low-hanging fruit identified in CRS (and future updates). Example analyses could include: Management Scenario Evaluations (**MSEs**) that test the **skill** of climate-informed assessments or evaluate the role of **uncertainty**, climate informed tools, and alternative management measures; comparative review of alternative **approaches for adding flexibility** to existing management measures; evaluations of specific actions relating to risk and uncertainty, particularly **more clearly defining risk** as it relates to fisheries and ecosystem wellbeing.”

synthesizing and promoting climate smart management approaches  
(Key 3.6)

reviewing emerging climate-specific resilience metrics for measuring progress towards climate readiness  
(Key 3.5)

regularly identifying and coordinating review of external evaluations relevant to climate-informed advice  
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## KEY 3.4





# High Priority Key Elements

## Key Element 3



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

“**Re-evaluate risks and climate readiness** (e.g., repeat the Climate Readiness Synthesis, CRS) on a regular basis and periodically reconsider metrics used to **monitor climate readiness**. Provide periodic review and evaluation of the Council actions and **performance of actions** previously taken over time and under various conditions.”

synthesizing and promoting climate smart management approaches  
(Key 3.6)

regularly identifying and coordinating review of external evaluations relevant to climate-informed advice  
(Key 3.4)

- (a) The Council forms a new CCTF-like group
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reviewing emerging climate-specific resilience metrics for measuring progress towards climate readiness  
(Key 3.5)

### KEY 3.5



# High Priority Key Elements

## Key Element 3



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

“Identify **robust and equitable climate resilience-oriented strategies and tools** (including identification of roadblocks to development and implementation of strategies and tools) and provide **synthesis and assessment of various climate-related processes and initiatives** as they relate to Council activities.”

synthesizing and promoting climate smart management approaches  
(Key 3.6)

regularly identifying and coordinating review of external evaluations relevant to climate-informed advice  
(Key 3.4)

- (a) The Council forms a new CCTF-like group
- (b) The Council uses a review group approach
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reviewing emerging climate-specific resilience metrics for measuring progress towards climate readiness  
(Key 3.5)



## 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

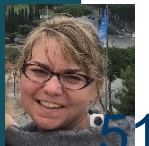


Establish a dedicated review group charged with reviewing & packaging climate information entering Council processes

## Climate Change Work Plan



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# CCTF Overview & final report

- Brief recap of CCTF progress towards goals
- Report on Final CCTF meeting Nov 6-7, 2024
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- Next steps



**Any questions?**



## D1 Climate Planning Discussion: Action memo

**Council guidance on two issues will allow staff to continue making progress toward climate adaptation priorities and IRA funding deliverables**

1. Council feedback on staff ideas for materials to support discussion of Programmatic Evaluation alternatives
2. Whether and how the Council and staff wishes staff to proceed with developing a climate work plan

