CLIMATE CHANGE TASK FORCE
WORKPLAN OVERVIEW
D3

CCTF Members:
Co-chair: Diana Stram (NPMFC): diana.stram@noaa.gov
Co-chair: Kirstin Holsman (NMFS- AFSC) : 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.)
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.
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
• **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

1. **Groundfish Stock Assessment**
   - Spring
   - Summer
   - Autumn
   - Winter

2. **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

3. **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

4. **Strategic & Long-term Advice (>2yr)**
   - Climate-informed long-term strategic decision making & planning informed by JK, LK, and climate & management scenario evaluations, risk assessments, & adaptation efficacy & feasibility evaluations.
   - E.g., Targets based on climate projections

Legend:
- Existing tools or processes
- Help ID climate change gaps
- New tools or processes
Climate-informed fisheries management: Proposed “on-ramps” and existing coordination

Multiple Information & Knowledge Sources

Quarterly meetings

Spring

CCTF

Groundfish Stock Assessment

Provide guidance on how to support climate readiness through mainstreaming climate change information in existing annual Council products

Summer

CCTF

Autumn

Winter

CCTF

Update CCTF products & tools, adaptation tables, & Climate FEP indicators, work on bi-annual report.

CCTF

Sythesize emerging information on climate change risks, impacts & adaptation efficacy & feasibility.

CCTF

Bi-annual synthesis, review, & update

CCTF

Council

AP

SSC

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 1

On-ramp 2

On-ramp 3 (new)

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

Legend

Existing tools or process
Help ID climate change gaps
New tools or process

Strategic & Long-term Advice (>2 yr)
Climate-informed long-term strategic decision making & planning informed by JK, LK, and climate & management scenario evaluations, risk assessments, & adaptation efficacy & feasibility evaluations.

E.g., Targets based on climate projections
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

![Graph showing climate change impact on fish stocks](image-url)
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
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

Multiple Information & Knowledge Sources

- **Quarterly meetings**
  - CCTF

- **Spring**
  - Groundfish Stock Assessment
  - CCTF
  - Provide guidance on how to support climate readiness through mainstreaming climate change information in existing annual Council products

- **Summer**
  - Update CCTF products & tools, adaptation tables & Climate FEP indicators, work on bi-annual report

- **Autumn**
  - Synthesize emerging information on climate change risks, impacts & adaptation efficacy & feasibility

- **Winter**
  - CCTF
  - Bi-annual synthesis, review, & update
  - FEP Plan Team

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, & climate & management scenario evaluations, risk assessments, & adaptation efficacy & feasibility evaluations
  - E.g., Targets based on climate projections

Legend:
- Existing tools or process
- Help ID climate change gaps
- New tools or process

Council
- SAE REPORTS
- AP
- SSC
- Public review & comment

CCTF

Ecosystem Health Report

Groundfish Plan Team
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.
- Performance, validation, and operationalized delivery of weekly forecasts (up to 9 months from press 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.
- 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 (e.g., Predicting changes in habitat for groundfishes under future climate scenarios using spatial distribution modeling).

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.

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, polar chapters of IPCC assessments, and other peer-reviewed synthesis reports of climate impacts on Bering sea social and ecological systems.

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.
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/s41467-020-0513-x

Climate smart long-term strategies

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

www.blueeconomyconference.go.ke
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  
Climate-enhanced stock Assessment models  
Climate smart long-term strategies

Plan is to map these sort of actions into a dynamic ‘live’ table (Table 1) to characterize the portfolio of tools available for the Bering Sea
Organized into short-term (1-3 yrs), medium term (5-10 yrs) and long term (> 10 yrs) potential actions
### Climate Change Task Force Glossary of Terms

2021

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