

# FEP Climate Change Module



# Climate Change Taskforce (CCTF) members:

Lauren Divine

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Aleut Community of Saint Paul Island

Natural Resources Consultants/Bering Sea Fisheries Research Foundation

AFSC-Seattle

SeaState

NMFS-Regional Office

Sandhill.Culture.Craft

Ocean Conservancy

AFSC Marine Mammal Lab

NPFMC



# Original agenda

- 2 ½ day in-person meeting planned in Seattle
- More emphasis on background information on current climate initiatives
  - Breakout groups
- More time allotted to draft specific progression plan moving forward



# Kickoff CCTF Meeting January 21<sup>st</sup>

## Abbreviated webex

- 9:10 - 9:20 : Introductions
  - Brief (1 min) statements by taskforce members on background/affiliation, interest in taskforce, and associated initiatives
- 9:20 - 9:30 : Overview of the FEP and origin of task forces [D. Evans]
- 9:30 - 9:45 : Overview of LK/TK module [S. Wise]
- 9:45 - 10:00 : Meeting details, survey results, climate change impacts and adaptation overview [K. Holsman] [presentation \(pdf version\)](#) [presentation \(ppt version\)](#)
- 10:00 - 10:20 : Overview of climate change module goals and objectives [K. Holsman & D. Stram]
- 10:20 - 10:35 : TK and LK, co-production of knowledge and Western AK Indigenous communities climate change impacts, adaptation, and research [Brenden Raymond Yakoubian]

10:45- 11:00 : AM break

11:00 - 12:00 : Module objectives & goals

- *i) evaluate management tools to develop incremental (normative) adaptation measures to preserve livelihoods, health and wellbeing across fisheries and dependent coast communities*
- *ii) enable transformative adaptation needed to ensure the productivity and sustain of the coupled social-ecological Bering Sea system*

12:00 - 13:00 : Lunch

13:00 - 14:30 : Module outcomes and products

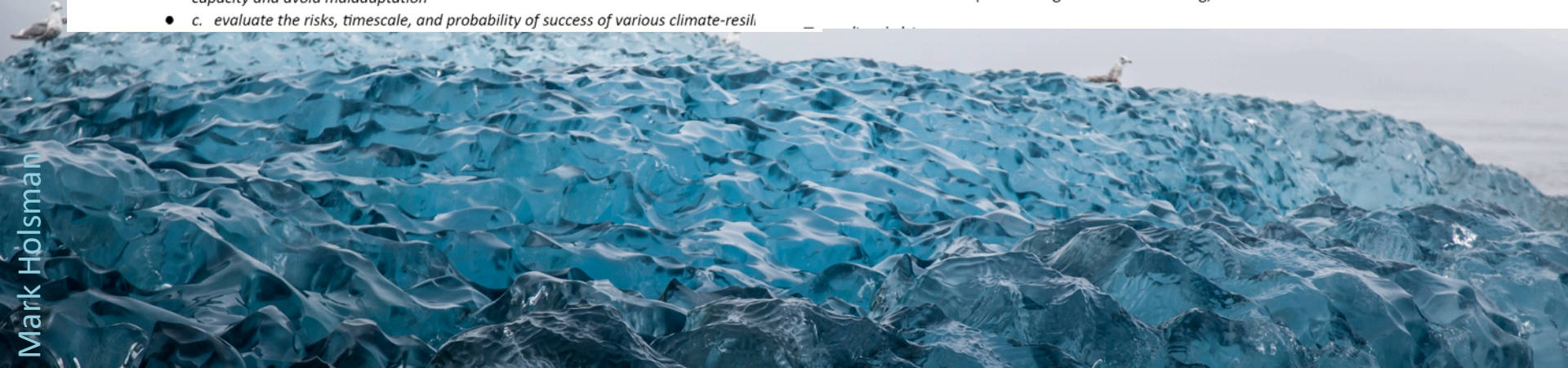
- *a. synthesize current knowledge regarding climate change effects on the EBS system*
- *b. identify potential climate-resilient management measures that can improve capacity and avoid maladaptation*
- *c. evaluate the risks, timescale, and probability of success of various climate-resilient management measures*

14:55 - 15:45 : CCTF Planning and logistics

- Planning for next in-person and teleconference meetings
- Milestones & deliverables
- Elements and timing of work required to meet [Taskforce](#) objectives
- Development of a work plan
- Outreach and communication
- Coordination with LKTK module

15:45 - 16:30 :

- Feedback that we want from the Council:
  - Best method of communication of results to SSC, Ecosystem Committee, AP and Council
- Next steps following the Council meeting, review docs etc



ARTICLE

DOI: 10.1038/s41467-018-03732-9

OPEN

# Longer and more frequent marine heatwaves over the past century

Eric C.J. Oliver<sup>1,2,3</sup>, Markus G. Donat<sup>4,5</sup>, Michael T. Burrows<sup>6</sup>, Pippa J. Moore<sup>7</sup>, Dan A. Smale<sup>8,9</sup>, Lisa V. Alexander<sup>4,5</sup>, Jessica A. Benthuyzen<sup>10</sup>, Ming Feng<sup>11</sup>, Alex Sen Gupta<sup>4,5</sup>, Alistair J. Hobday<sup>12</sup>, Neil J. Holbrook<sup>2,13</sup>, Sarah E. Perkins-Kirkpatrick<sup>4,5</sup>, Hillary A. Scannell<sup>14,15</sup>, Sandra C. Straub<sup>9</sup> & Thomas Wernberg<sup>9</sup>

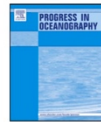
Progress in Oceanography 141 (2016) 227–238

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Progress in Oceanography

journal homepage: www.elsevier.com/locate/pocean



## A hierarchical approach to defining marine heatwaves



Alistair J. Hobday<sup>a,\*</sup>, Lisa V. Alexander<sup>b,c</sup>, Sarah E. Perkins<sup>b,c</sup>, Dan A. Smale<sup>d,e</sup>, Sandra C. Straub<sup>c</sup>, Eric C.J. Oliver<sup>b,i</sup>, Jessica A. Benthuyzen<sup>e</sup>, Michael T. Burrows<sup>h</sup>, Markus G. Donat<sup>b,c</sup>, Ming Feng<sup>i</sup>, Neil J. Holbrook<sup>b,j</sup>, Pippa J. Moore<sup>j</sup>, Hillary A. Scannell<sup>k,l</sup>, Alex Sen Gupta<sup>b,c</sup>, Thomas Wernberg<sup>e</sup>

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<sup>d</sup>Marine Biological Association of the United Kingdom, The Laboratory, Citadel Hill, Plymouth PL1 2PB, UK

Climate Dynamics

<https://doi.org/10.1007/s00382-019-04707-2>

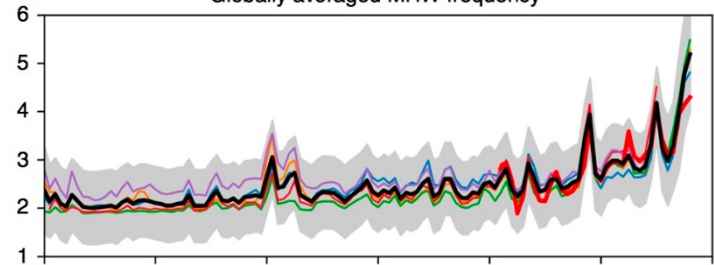


## Mean warming not variability drives marine heatwave trends

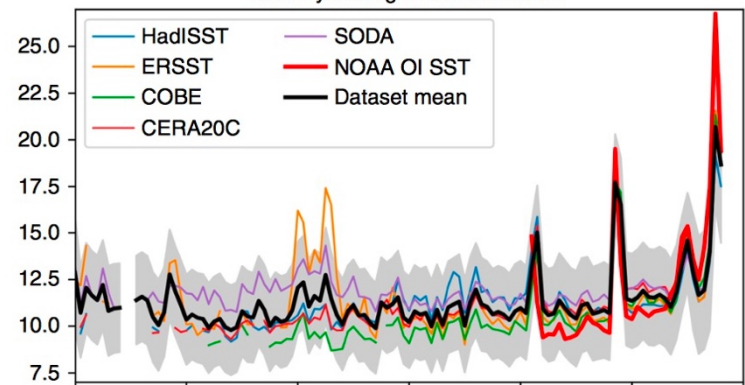
Eric C. J. Oliver<sup>1</sup>

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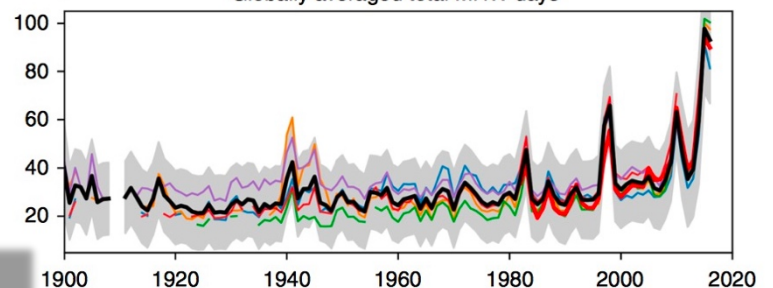
**b** Globally averaged MHW frequency



**d** Globally averaged MHW duration

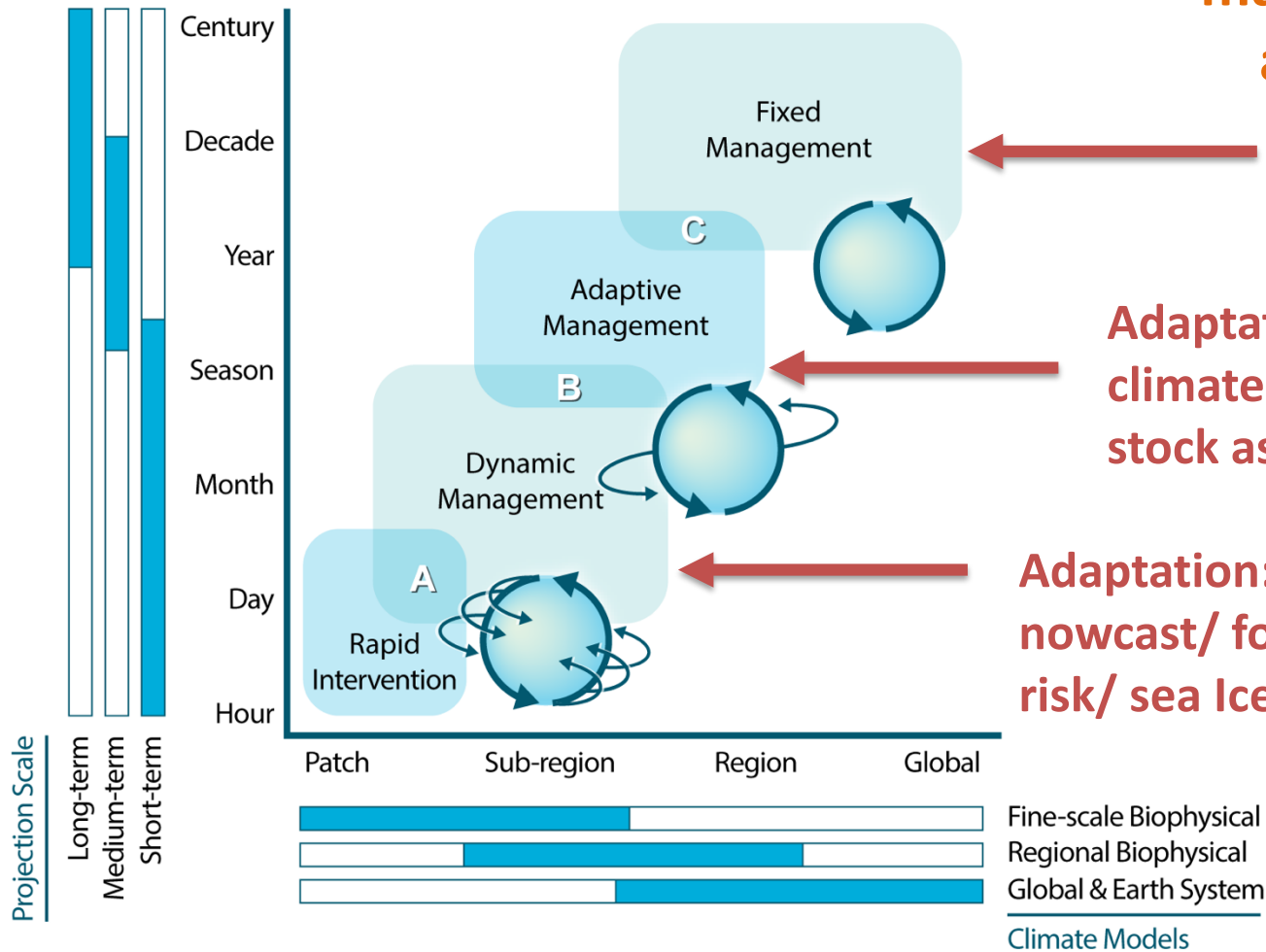


**f** Globally averaged total MHW days



*“We find that **mean SST change was the dominant driver of increasing MHW** exposure over nearly two thirds of the ocean, and of changes in MHW intensity over approximately one third of the ocean. “*

# Consider nested scales of management & adaptation



Holsman, K. K., Hazen, E. L., Haynie, A., Gourguet, S., Hollowed, A., Bograd, S. J., ... Aydin, K. (2019). Towards climate resiliency in fisheries management. *ICES Journal of Marine Science*. <https://doi.org/10.1093/icesjms/fsz031>

# Discussion: Outcome & goals

- How best to monitor and measure success towards CC Module goals?
- Should the BSFEP Team monitor? Or should the CCTF monitor?
- Can we develop metrics and outreach to evaluate goals and outcomes?
  - “e.g. asking key stakeholder groups who are engaged at the Council (e.g. 'Do you feel management measures are sufficiently adaptive in addressing climate effects on fisheries?')”
  - doing keyword analysis of Council meetings
  - Working with some of the Council bodies - e.g. Ecosystem Committee and CEC
- Can we try to link to the ecosystem goals of the council?



# Discussion: Adaptation

- What do we mean by adaptation/maladaptation ?
- What helps EBS communities and commercial fisheries adapt?
  - New fisheries and FMPs for novel species in the EBS?
  - Flexibility and diversity in subsistence and target fisheries?
- **Perhaps we need to be specific with regards the potential risks** and outline the ideal process for evaluating risks and tradeoffs?
- The challenge that remains is to
  - **identify management measures** that provide scope for fisheries adaptation to future climate conditions and
  - **to establish a process** that ensures that diverse perspectives are considered when assessing risks, impacts and tradeoffs.





# Changes to workplan: Adaptation

Working definition of 'adaptation' to be developed by CCTF

module will seek to provide the Council pathways to identify and implement management measures that provide for fisheries adaptation to future climate conditions and to ensure that diverse perspectives are considered when assessing risks, impacts and tradeoffs.



# Module goal (page 1 workplan):

**” facilitate equitable climate change adaptation pathways, transparent communication, and broad engagement to support short- and long-term resilience for the coupled social-ecological system of the Bering Sea ”**

- i) evaluate management tools to develop incremental (normative) adaptation measures to preserve livelihoods, economies, health and wellbeing across fisheries and dependent coastal communities,
- ii) enable transformative adaptation needed to ensure the productivity and sustainability of the coupled social-ecological Bering Sea system, and
- iii) encourage transparent, effective, and dynamic communication and engagement of communities, fishers, managers and other stakeholders and the Council.

# Objectives / tasks:

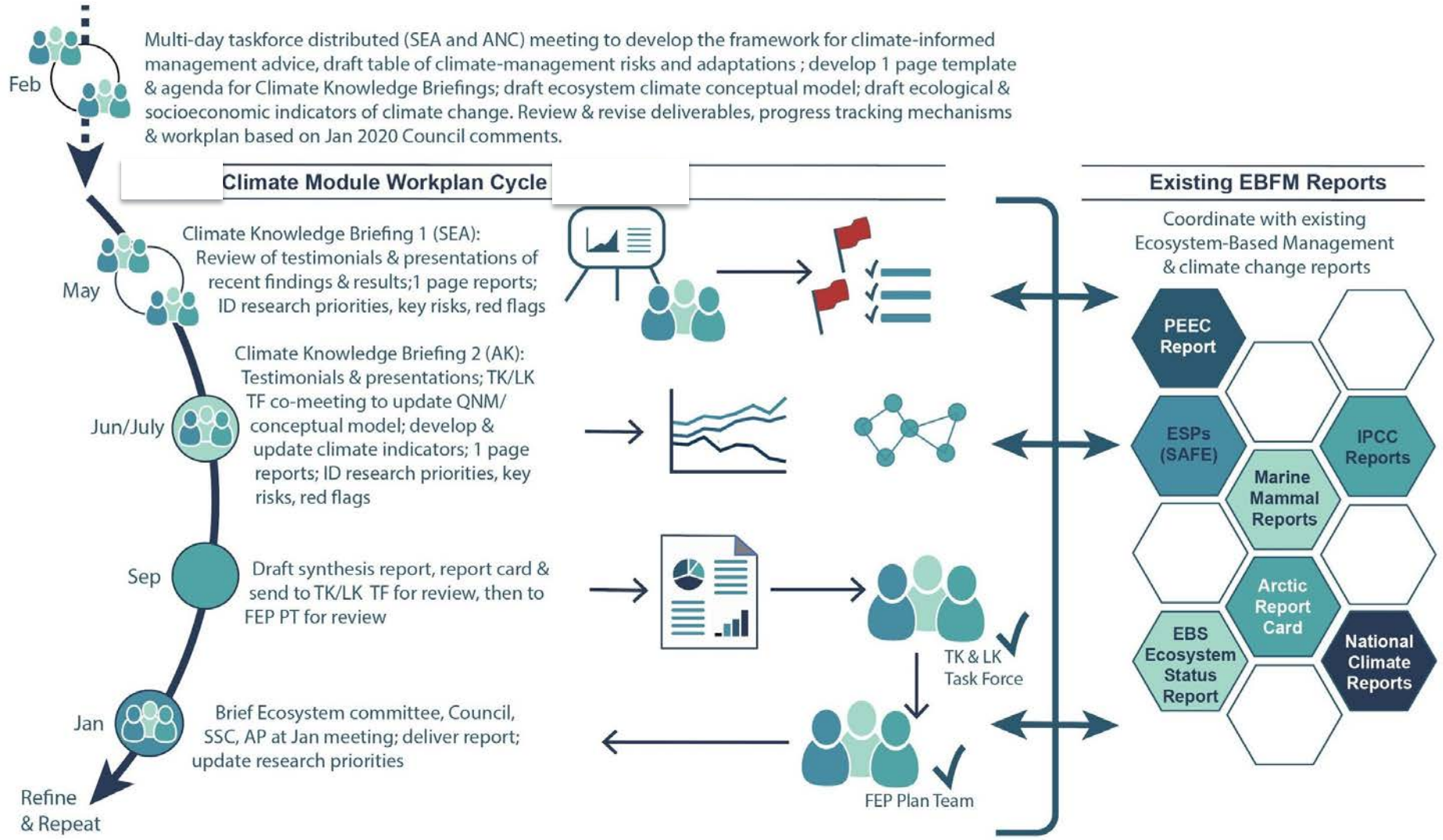
” To achieve this, the climate change module will be used to...”

- ✓ used to synthesize current knowledge regarding climate change effects on the Bering Sea ecosystem,
- ✓ identify potential climate-resilient management measures that can improve adaptive capacity and avoid maladaptation
- ✓ evaluate the risks, timescales, and probability of success of potential climate-resilient management policies under future scenarios of change;
- ✓ provide short-, medium-, and long-term recommendations for actions that could be considered and initiated by the Council to help advance the goals and minimize the risks identified.

**Policy relevant not policy prescriptive**

*(climate-resilient management would go through the existing Council process)*

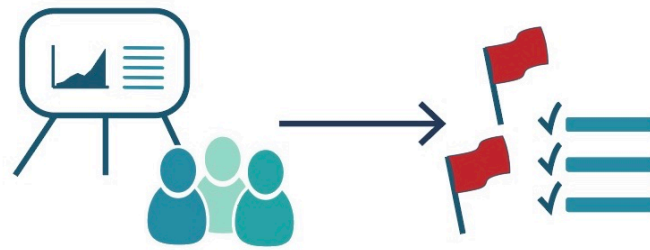




May



Climate knowledge briefing:  
Review of testimonials & presentations  
of recent findings & results; 1 page  
reports; ID research priorities, key  
risks, red flags.



## 1 Page reports from each contributor

- Characterize contribution (testimonial, research, observation)
- ID management connection/relevance
- Define scope in time and species:
  - CORE spp and BROAD (non-focal spp)
  - Short, medium, long term

## ID red flags and emergent issues:

- Flag these for the report next step

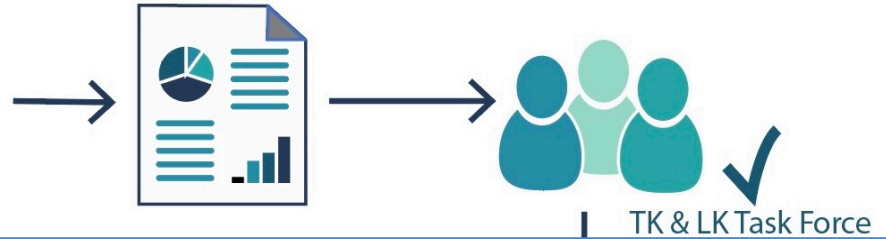
## ID Research needs and priorities

- Identify indirect impacts of climate driven changes

Sep



Draft synthesis report, report card & send to TK/LK TF for review, then to FEP PT for review



## Report card

- Summary of climate related trends/ indicators

## Synthesis

- Emergent issues
- Future risks
- Novel/emerging tools

## Contributions (based on form)

## Table of Example Management/adaptation actions:

- short, medium, long term
- Tactical vs strategic
- ID who should be included in risk assessment process
- Rapid response vs incremental adjustment

## Research needs and priorities

# Deliverables and tracking progress

- A framework for exploring a range of EBS management actions across a range of climate scenarios(e.g., periodic review of existing and alternative management strategies/policies).
- Synthesis report of climate change impacts and adaptive strategies of interest and within the purview of the Council; authored by the climate module taskforce, contributing authors, and collaborators.
- Communication and engagement plan (in collaboration with LK TK Subsistence Taskforce)
- Periodic update of recommendations of Council's climate-specific research priorities (with Council cycle)



# Annual proposal

- Review climate change hot-topics/ red flags/ considerations for the coming year (e.g. via the ESR or other recommended document)
- Table of potential short-, medium-, long-term adaptive measures and new climate tools
- Table of climate risks/ unknowns, data and information needs
- Conceptual model of climate-social-ecological linkages (including direct and indirect connections)
- Recommendations for potential management action(s) to be considered in the Council process





# Milestones

**Feb 26-28, 2020 (tent) ~3 day meeting ANC/SEA dual locations/web coordinated taskforce** meeting to develop framework, begin to draft list of short-medium and long-term projects and scenarios to explore; draft table of climate-management risks and adaptations by species or focal components; develop one-page template and tasking for climate knowledge briefing reports; agenda for proposed Climate Knowledge Briefing 1 meeting in May and Climate Knowledge Briefing 2 workshop with LK TK taskforce; draft ecosystem climate conceptual model; draft ecological and socioeconomic indicators of climate change. Review and revise deliverables and progress tracking mechanisms. Revise workplan based on Jan 2020 Council comments.

**Climate Briefing Workshops 1 and 2**





# Request for feedback

- What is the best method for delivery of Climate Synthesis report? Part of ESR, along with ESR but separate?
- Endorse the CCTF direction; are we on the right track?
- “Research priorities” and “Management recommendations” language and intent?

