

CLIMATE CHANGE TASK FORCE

Climate Readiness Synthesis

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)

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.)



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



Objective 1



COLLATE

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

Objective 2



SYNTHESIZE

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

Objective 3



COMMUNICATE

Summarize and communicate potential risks and adaptation actions.

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



Objective 1



COLLATE

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

Objective 2



SYNTHESIZE

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

Objective 3



COMMUNICATE

Summarize and communicate potential risks and adaptation actions.

- **Objective 1. Collate:**

Evaluate the mechanisms and processes through which climate change information is currently included in the fishery management process, identify gaps, and help create opportunities to increase the inclusion of available information

- **Objective 2. Synthesize:**

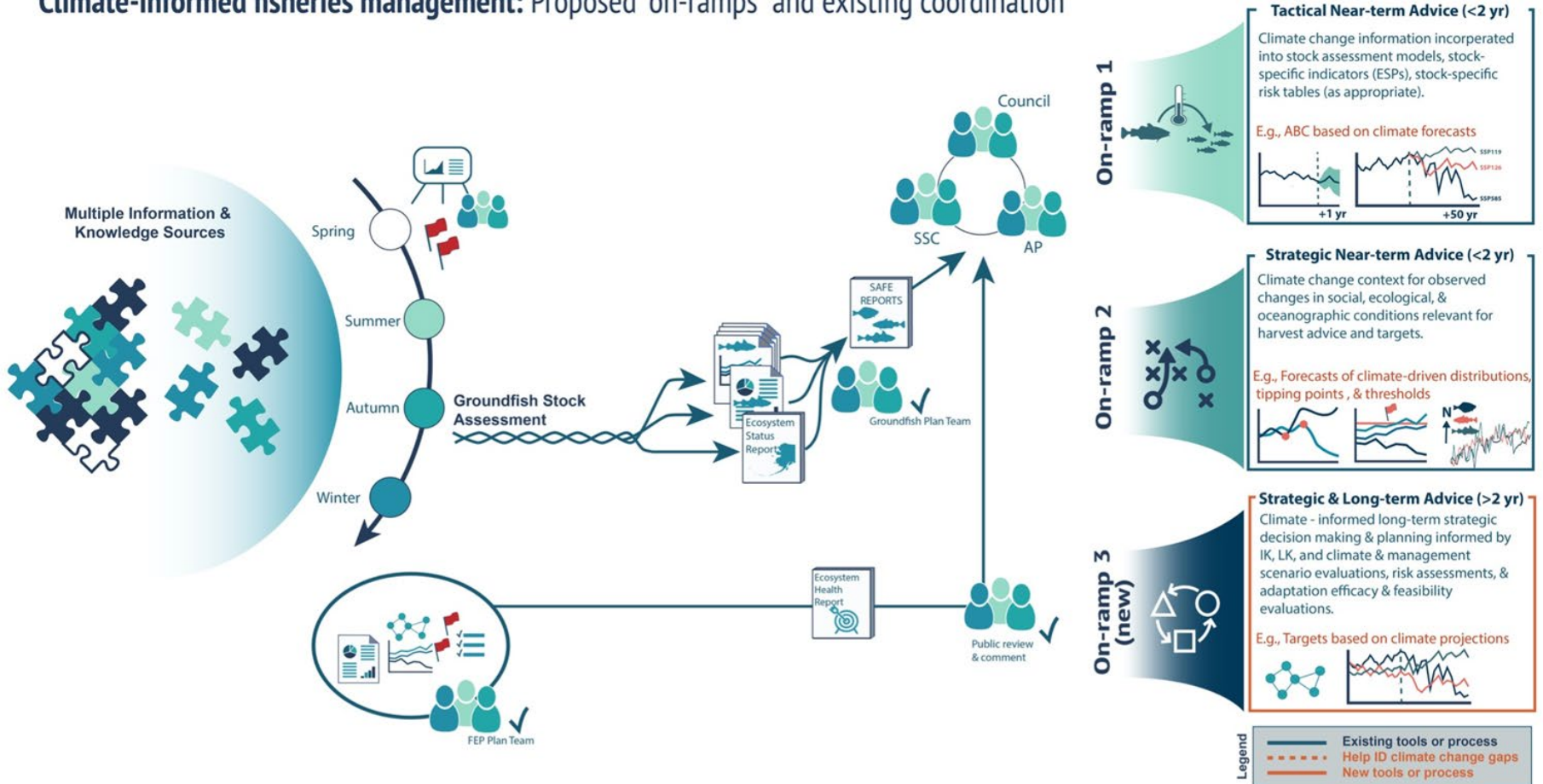
Synthesize information about long-term climate change impacts and scenarios and help create pathways for inclusion of that information in the fishery management process.

- **Objective 3. Communicate:**

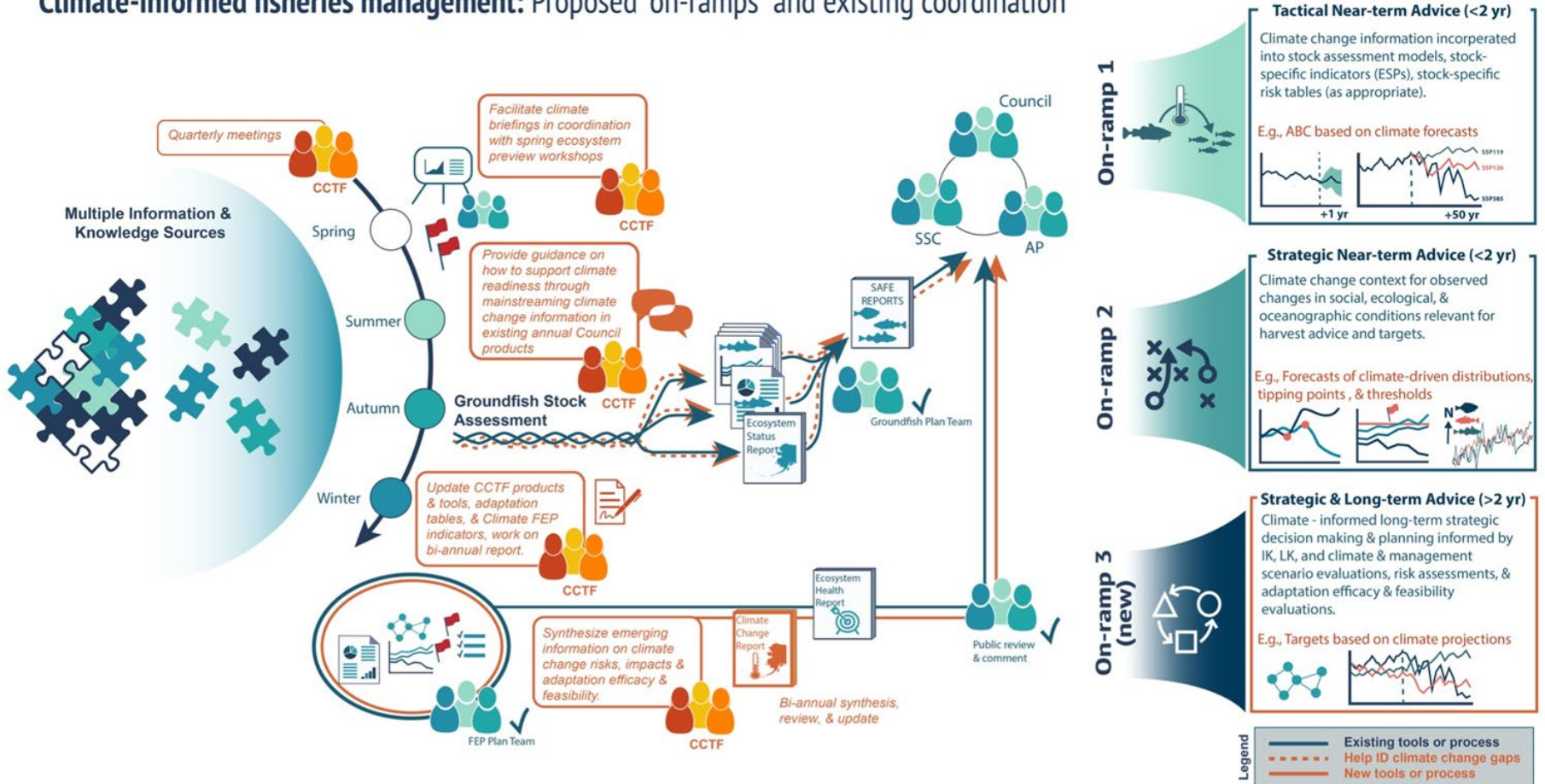
Identify potential management tools and actions for consideration by the Council that could help increase resilience and adaptation to climate change impacts



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

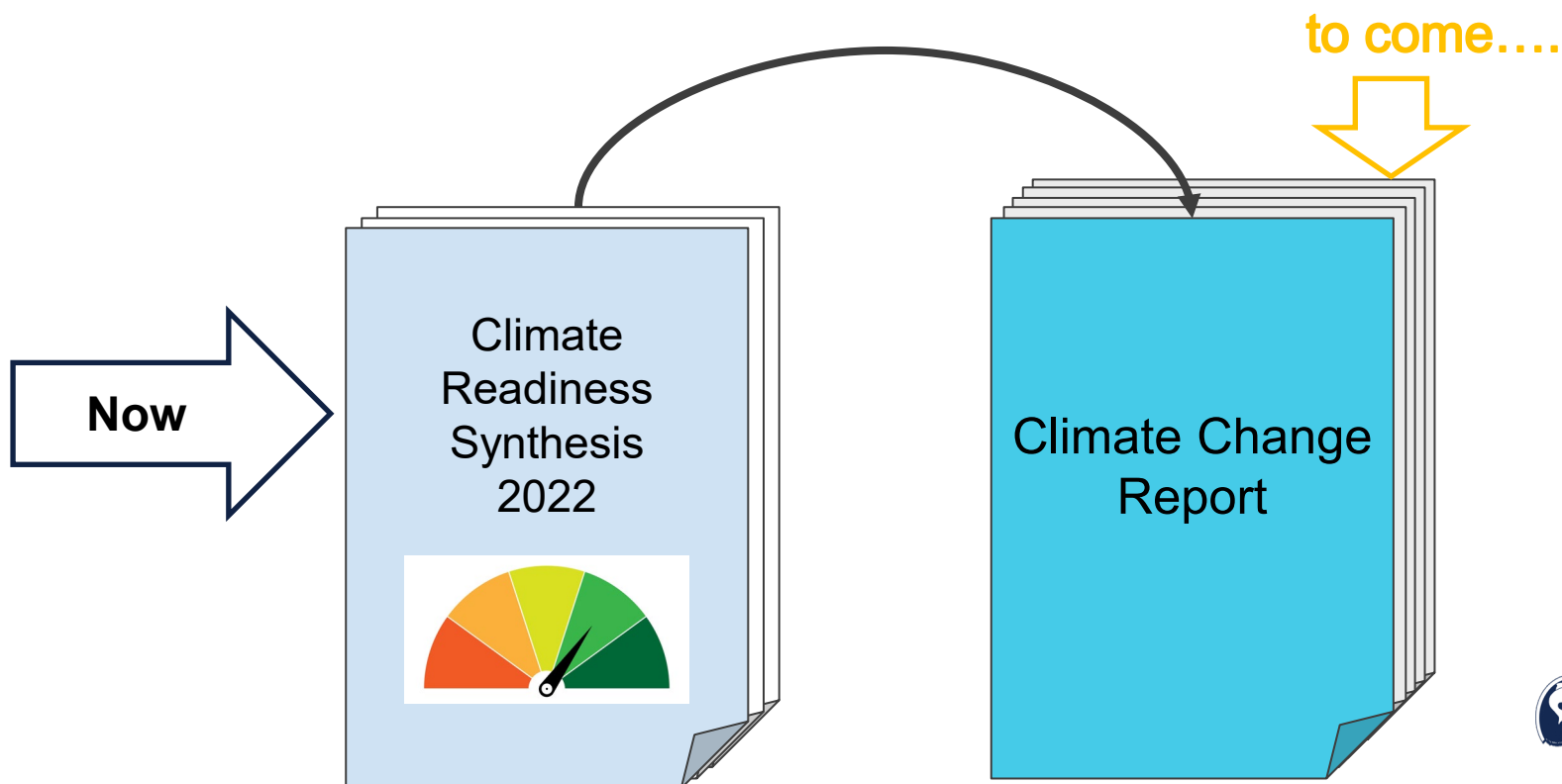


Climate-informed fisheries management: Proposed “on-ramps” and existing coordination



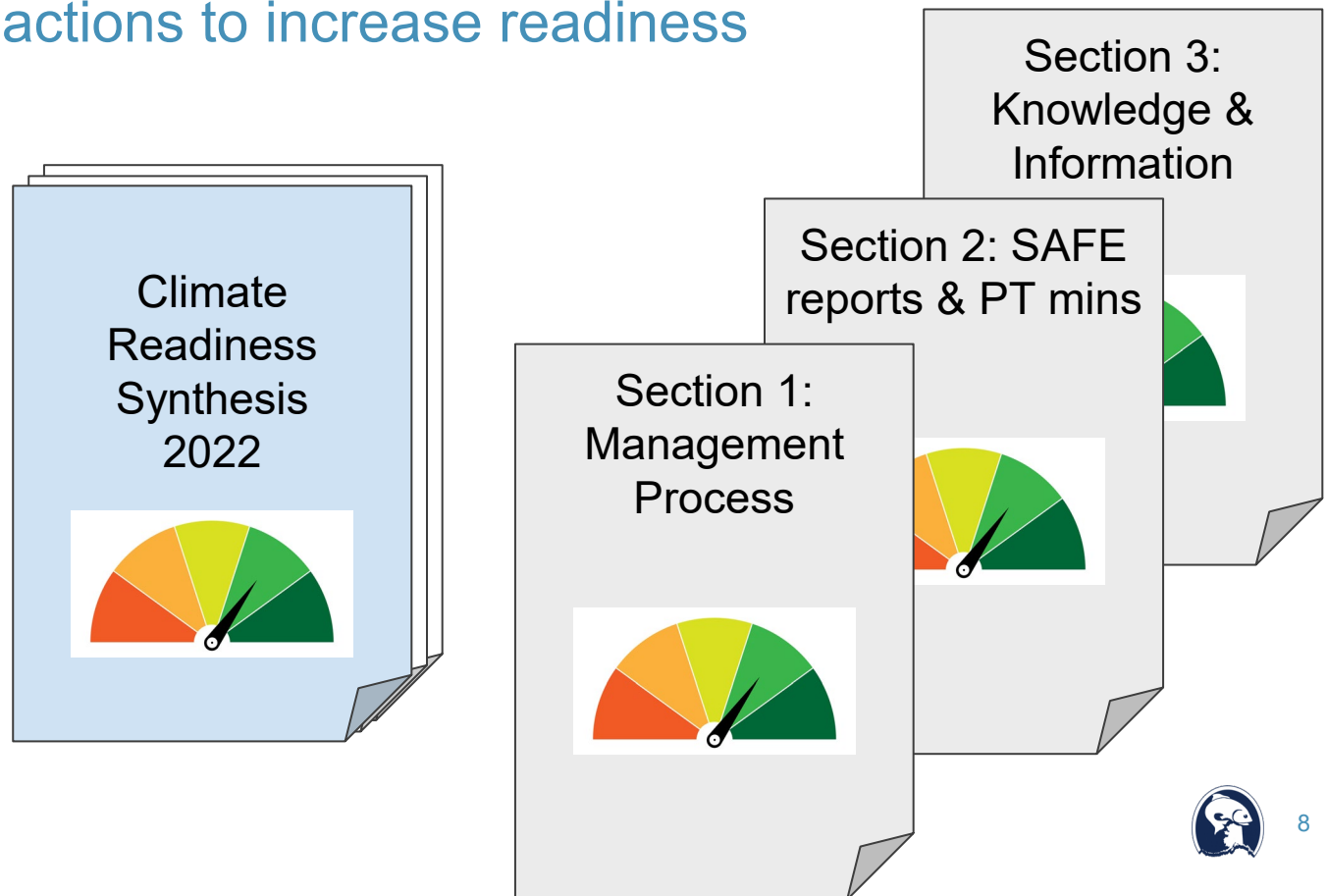
Climate Readiness Synthesis (2022)

Assessment of climate change readiness
& near-term actions to increase readiness



Climate Readiness Synthesis (2022)

Assessment of climate change readiness
& near term actions to increase readiness



Climate Readiness Synthesis

Section	Ranking	Description	Section Specific Details
Section 1: Management System	2	Implicit climate <u>variability</u> information associated with some management measures	Conceptually climate information informs management measure but is not directly implemented
Section 2: SAFE Reports	3	Somewhat ready	Climate and ecological information are included in the assessment, but climate change information is implicit (not explicitly discussed) in the assessment model, text, or advice.
Section 3: Knowledge Base Integration	2	Ranking depends on which knowledge base is being referred to. Overall, there are limited pathways for such information into management and decision-making.	Management measures include some/limited information from various knowledge bases and not others, though few are formally/explicitly informing, guiding, and directing actions and decisions. 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.

Management Overview ranking

Ranking	Description	Section specific details
1. Not Ready	No climate information included in management measures	Management measures are not designed to address climate change
2. On the way to climate ready	Some implicit climate <u>variability</u> information associated with management measures	Conceptually climate information informs management measure but is not directly implemented
3. Somewhat ready	Some implicit climate <u>change</u> information included in management	Some measures built into management to address climate change or changing environmental conditions
4. Nearly ready	Few modifications would result in climate readiness	Management measures have built in mechanisms to be responsive to changing environmental conditions and climate change
5. Climate ready	Process in place for regular (operational) climate change informed management	Management measures are designed to address climate change and climate extremes and provide informative feedback on performance

Management Overview ranking

Ranking	Description	Section specific details
1. Not Ready	No climate information included in management measures	Management measures are not designed to address climate change
2. On the way to climate ready	Some implicit climate <u>variability</u> information associated with management measures	Conceptually climate information informs management measure but is not directly implemented
3. Somewhat ready	Some implicit climate <u>change</u> information included in management	Some measures built into management to address climate change or changing environmental conditions
4. Nearly ready	Few modifications would result in climate readiness	Management measures have built in mechanisms to be responsive to changing environmental conditions and climate change
5. Climate ready	Process in place for regular (operational) climate change informed management	Management measures are designed to address climate change and climate extremes and provide informative feedback on performance

Management Overview ranking

Ranking	Description	Section specific details
1. Not Ready	No climate information included in management measures	Management measures are not designed to address climate change
2. On the way to climate ready	Some implicit climate <u>variability</u> information associated with management measures	Conceptually climate information informs management measure but is not directly implemented
3. Somewhat ready	Some implicit climate <u>change</u> information included in management	Some measures built into management to address climate change or changing environmental conditions
4. Nearly ready	Few modifications would result in climate readiness	Management measures have built in mechanisms to be responsive to changing environmental conditions and climate change
5. Climate ready	Process in place for regular (operational) climate change informed management	Management measures are designed to address climate change and climate extremes and provide informative feedback on performance

Table 1.2

Items are examples that are further described and ranked below.

Management Measures						
Special Area Management	Quota Programs	Seasonal and Sector Reallocations	Retention Restrictions	TAC Adjustments/ Exchanges	Data Integration	Industry-led Measures
<p>Protects critical habitat (e.g., skate nurseries, coral areas)</p> <p>Bycatch control/protection measures:</p> <p>Salmon/Herring savings areas - winter/ summer herring areas)</p> <p>CVOA limits and AFA CP restriction in B season.</p> <p>PHCZ, NBSRA, Walrus Islands, etc. RKCSA, Zones</p>	<p>IFQ/CDQ/A-80,AFA, P-cod</p> <p>LAPP groundfish allocations</p> <p>Halibut CDQ</p> <p>Reserve</p> <p>PSC limits designed into some programs</p>	<p>Many seasons are related to SSL protection measures, some are halibut avoidance (May 1 arrowtooth/ Kamchatka/ Gturbot), some established for biological or market factors, Sector reallocations (P-cod), AI pollock reallocation, Seasonal</p>	<p>Small boat fisheries in State waters (e.g., <58 ft state GHL), Trawl gear modifications (i.e., elevated sweeps), Pot gear escape mechanisms, Seabird deterrence,</p>	<p>TAC and allocations specified in regs (e.g., AI pollock, state-water cod), Reallocation rules, Flatfish exchange (Yellowfin, Flathead, Rock Sole), <u>Set asides</u>, Nonspecified reserves for non catch share species. Incidental Catch Allowances</p>	<p>Comprehensive landings and monitoring programs (e.g., observer and EM monitoring, eLandings, eFish), Data warehousing and data services (e.g., online reports, data feeds, fishery applications, fishery independent information), Industry data services (e.g., Sea State), EM data</p>	<p>Cooperative bycatch monitoring and notification</p>

Examples of current actions

Potential Climate Change Adaptive Attributes (Strengths)

Reduces fishing impacts to important habitat or stock component

Can be designed to meet specific species, management, and habitat needs

Can be defined to protect fishing opportunities for communities



Potential
Maladaptive
Attributes
(Weakness)

Static and cannot respond to shifts in stock out of the area or changes in fishery, Management measures may have been established decades ago and no longer use best available information, Stock abundance shifts into a special area may strand harvestable fish, Interaction among areas with differing goals may create conflicts with area-specific/management objectives (e.g., halibut versus crab PSC)

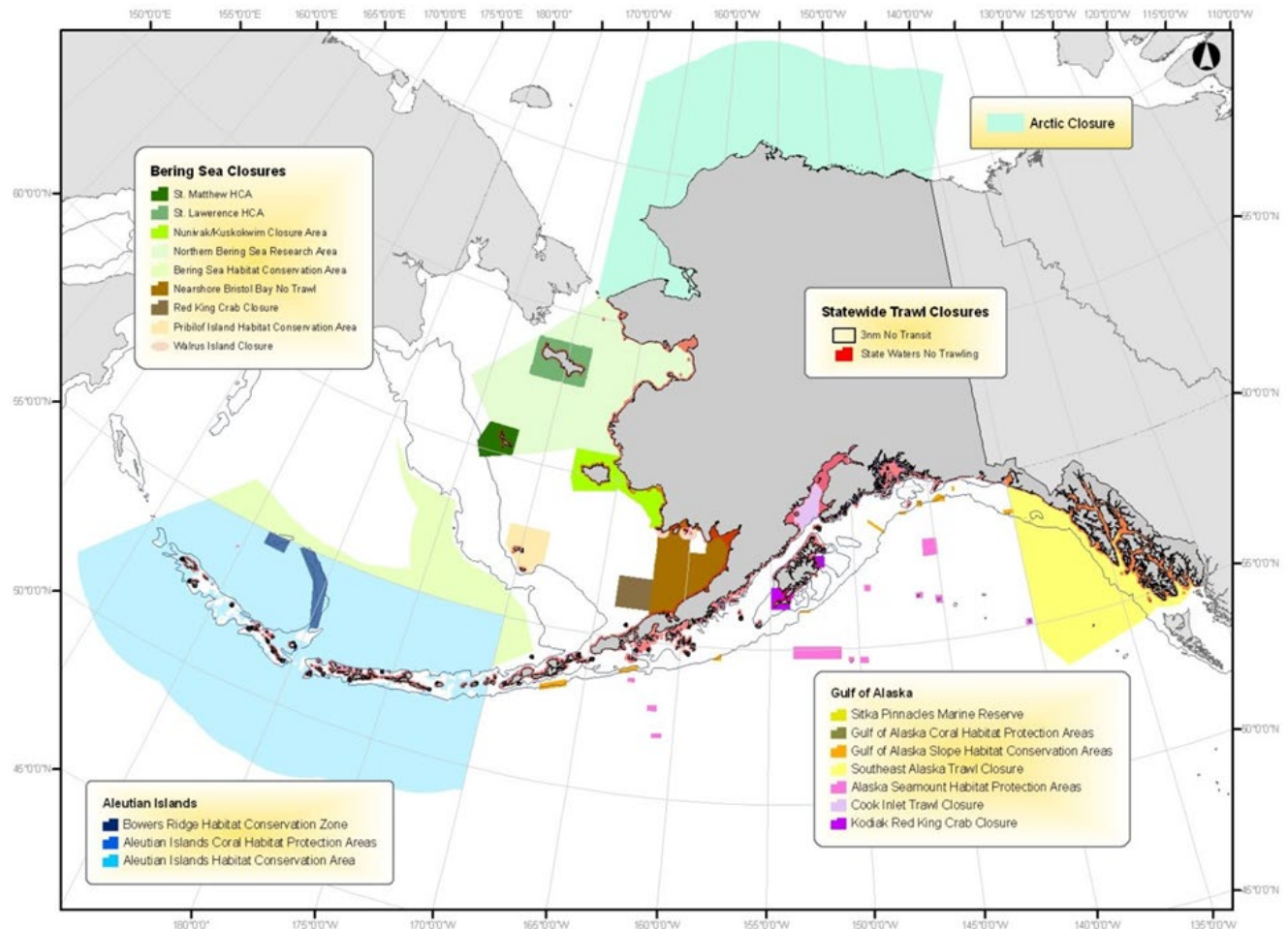
Opportunities
for
Improvements

Consider whether flexibility in certain Council- defined management actions would allow for more timely responses to change that would not be detrimental.



Case Studies (Management)

- Table 1.2 more examples
- Herring Savings Area
- Northern Bering Sea Research Area
- OY range
- Industry led measures



1.6.1 Near-term considerations

- Explore the performance of, and feasibility to implement, spatial and temporal dynamic management measures through case studies
- Evaluate the effectiveness of feasibility of measures that increase flexibility in current and future Council- defined management actions which may allow for rapid responses to change
 - Seasonal flexibility in allocations, quota programs
 - Transferability amongst sectors and seasons
- Explore measures that support appropriate and timely response mechanisms in management
- Development of metrics to evaluate climate resilience in management measures
- Evaluate / re-evaluate OY cap performance under climate change and alternative sub-designs (e.g, proportional caps, dynamic as function of climate indices) below the 2MT to ensure this measure continues to impart stability and productivity benefits under future change.
- Identify enabling factors to support industry led measures to increase rapid adaptation, reduce impacts, and respond to climate driven changes (e.g., communication and near-real time information sharing).

SAFE Report Ranking

Ranking	Description	Section specific details
1. Not Ready	No climate information included	Climate change information does not occur implicitly or explicitly in the assessment model, text, or advice.
2. On the way to climate ready	Some implicit climate <u>variability</u> information included	Climate and ecological information is included in the assessment but climate change information does not occur implicitly or explicitly in the assessment model, text, or advice.
3. Somewhat ready	Some implicit climate <u>change</u> information included	Climate and ecological information is included in the assessment but climate change information is implicit only (not explicitly discussed) in the assessment model, text, or advice.
4. Nearly ready	Few modifications would result in climate readiness	Climate and ecological information is included in the assessment but climate change information is only explicitly discussed in a few places to set the context for future directions but it is not used to explain trends or future directions, nor is used to adjust ABC, modify the model, or provide other advice.
5. Climate ready	Process and information in place for regular (operational) climate change informed advice	Climate change information is used to explain trends or future directions (or lack of sensitivity to climate change), and is used to adjust ABC, modify the model, or provide other advice. The assessment is therefore “climate change informed”.

SAFE Report Ranking

Ranking	Description	Section specific details
1. Not Ready	No climate information included	Climate change information does not occur implicitly or explicitly in the assessment model, text, or advice.
2. On the way to climate ready	Some implicit climate <u>variability</u> information included	Climate and ecological information is included in the assessment but climate change information does not occur implicitly or explicitly in the assessment model, text, or advice.
3. Somewhat ready	Some implicit climate <u>change</u> information included	Climate and ecological information is included in the assessment but climate change information is implicit only (not explicitly discussed) in the assessment model, text, or advice.
4. Nearly ready	Few modifications would result in climate readiness	Climate and ecological information is included in the assessment but climate change information is only explicitly discussed in a few places to set the context for future directions but it is not used to explain trends or future directions, nor is used to adjust ABC, modify the model, or provide other advice.
5. Climate ready	Process and information in place for regular (operational) climate change informed advice	Climate change information is used to explain trends or future directions (or lack of sensitivity to climate change), and is used to adjust ABC, modify the model, or provide other advice. The assessment is therefore “climate change informed”.

Figure 21



Near term on ramps:

Potential on-ramps	Near Term Feasibility
1. Indicator / climate change section in ESR	
a. Add ESR indicator regarding long term projections of climate variables (e.g., bottom temperature, cold pool, OA)	High
b. Add climate change synthesis section, similar to the climate variability and forecast section (Bond et al.) of the ESR	Medium
2. Separate section in SAFE or an independent climate change report	Low-Medium (requires an author to produce annually)
3. Intro section for each SAFE report could include a climate change section (e.g., in the ecosystem section)	Medium- High
4. SAFE Chapters (each species individual assessment) could include climate change information	Medium
a. Species specific climate change paragraph in each safe chapter	Medium
b. Each stock assessment chapter could include a climate change information section or slightly modified ESP	
c. Risk, vulnerability (and adaptation potential) table	
d. Safe author survey of climate readiness of each stock (based on their opinion and set criteria for climate readiness)	
5. Econ Safe Report could include climate change information (especially around risk, portfolio approaches to reduce risk, and future opportunities)	Low-medium
a. General paragraph on climate change, global demand, and global to regional economics	
b. Risk, vulnerability (and adaptation potential) table	
c. Synthesis of integrated socio-econ MSE results (e.g. ACLIM)	
6. Include a climate briefing as part of the Plan Team meetings to help inform this section	High
7. CCTF climate report(s) can be used to periodically update this information through producing synthesis sections for each species as well as the ecosystem as a whole.	Medium (will take coordination to draft and dedicated resources)

Near term on ramps:

Possible JPT recommendation for WG coming out of NovPT

section (e.g., in the ecosystem section)	
4. SAFE Chapters (each species individual assessment) could include climate change information	Medium
a. Species specific climate change paragraph in each safe chapter	Medium
b. Each stock assessment chapter could include a climate change information section or slightly modified ESP	
c. Risk, vulnerability (and adaptation potential) table	
d. Safe author survey of climate readiness of each stock (based on their opinion and set criteria for climate readiness)	

Knowledge base Ranking

Ranking	Description	Section 3 Specific Details
Not Ready	Climate information and knowledge not included	Climate information is present in the knowledge base but is not discussed or utilized in the management/decision-making process.
On the way to climate ready	Some climate variability information and knowledge mentioned sporadically but not substantively/formally discussed or utilized	Climate variability information is present in the knowledge base and may be mentioned sporadically but is not substantively discussed nor utilized in management/decision-making processes.
Somewhat ready	Some information and knowledge relating to climate change discussed formally in process but not explicitly utilized in management/decision-making	Climate change information is present in the knowledge base and discussed informally and formally in the process but does not figure explicitly in management and decision-making.
Nearly ready	Significant level of climate change information and knowledge included for context	Significant amounts of climate information are present in the knowledge base and discussed explicitly/ formally in the management/ decision-making process in an informing-manner, but are not used to direct and adjust management actions and decisions.
Climate ready	Process for significant and meaningful climate change information and knowledge input is in place and operational	Climate information is present in the knowledge base and discussed explicitly/formally in the management/decision-making process in both an informing and action/decision-directing manner.



Knowledge base Ranking

Ranking	Description	Section 3 Specific Details
Not Ready	Climate information and knowledge not included	Climate information is present in the knowledge base but is not discussed or utilized in the management/decision-making process.
On the way to climate ready	Some climate variability information and knowledge mentioned sporadically but not substantively/formally discussed or utilized	Climate variability information is present in the knowledge base and may be mentioned sporadically but is not substantively discussed nor utilized in management/decision-making processes.
Somewhat ready	Some information and knowledge relating to climate change discussed formally in process but not explicitly utilized in management/decision-making	Climate change information is present in the knowledge base and discussed informally and formally in the process but does not figure explicitly in management and decision-making.
Nearly ready	Significant level of climate change information and knowledge included for context	Significant amounts of climate information are present in the knowledge base and discussed explicitly/ formally in the management/ decision-making process in an informing-manner, but are not used to direct and adjust management actions and decisions.
Climate ready	Process for significant and meaningful climate change information and knowledge input is in place and operational	Climate information is present in the knowledge base and discussed explicitly/formally in the management/decision-making process in both an informing and action/decision-directing manner.



Table 32

subsection ranking

Sub-Section	Ranking	Details
Indigenous Community Knowledge Integration	1	Community knowledge is expansive and contains detailed information about changes and impacts. There is not a meaningful system of on-ramps for this knowledge to systematically enter into NPFMC/NMFS management and decision-making processes, and lack of sufficient collaborative engagement from research and management to bring together other information with community information.
Industry Knowledge Integration	2-3	Fishery dependent information is included in stock assessments and industry representatives participate in the Plan Team and Council processes to offer their insights and fishery observations. While much of this is qualitative it is explicitly incorporated into the management process.
Agency (Council, NMFS) Knowledge Integration	2-3	See rankings in Sections 1 & 2, as well as discussion of unique climate-relevant functions of various Council bodies below in Section 3.5. With regard to the latter, most higher-ranking activities most likely occur within the Ecosystem Committee, while an overall assessment of other activities would be lower ranking.
Other Knowledge Bases Integration	1-2	There are no distinct on-ramps currently available for the diversity of “other” knowledge bases described here other than through invited presentations, stakeholder testimony, or being indirectly brought into the process via other mechanisms (e.g., analyses). See Section 3.6 Gaps and Next Steps for recommendations regarding assessing the level of how these knowledge bases are incorporated into the process.

Near term steps:

- Provide input into the **Research Priority setting process** foregrounding the importance of diverse sources of climate information and their relationship to climate-ready fisheries science and management
- **Test mechanisms within the CCTF** (e.g., Climate Briefings, Ecosystem Matrix tool, etc.) for bringing **diverse knowledge sources related to climate change into the Council process**
- Work on marine planning and protections that are equitable and inclusive of a diverse set of communities, people, knowledges, methodologies, and values
- Implement a number of the CEC Final Report (NPFMC 2021) recommendations which could increase the flow of diverse sources of climate change information (including resilience tools) into the Council process. [listed in document]
- **Increased uptake of broader climate change knowledge base not, or not fully, integrated into the Council process through exploring collaborations, partnerships and co-production**
- Conduct an analysis of Council documents to explore whether and how the climate-relevant information from a variety of 'other' knowledge bases are currently making their way into the Council process



Climate Readiness Synthesis

Section	Ranking	Description	Section Specific Details
Section 1: Management System	2	Implicit climate <u>variability</u> information associated with some management measures	Conceptually climate information informs management measure but is not directly implemented
Section 2: SAFE Reports	3	Somewhat ready	Climate and ecological information are included in the assessment, but climate change information is implicit (not explicitly discussed) in the assessment model, text, or advice.
Section 3: Knowledge Base Integration	2	Ranking depends on which knowledge base is being referred to. Overall, there are limited pathways for such information into management and decision-making.	Management measures include some/limited information from various knowledge bases and not others, though few are formally/explicitly informing, guiding, and directing actions and decisions. 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.

Work Plan 2022-2023[priorities]

1. Address Council comments on CRS [Oct -Nov]
 - a. **finalize and post to Council website (glossy version for posting and cross-referencing)[Dec 2022]**
2. Consider means to incorporate additional knowledge sources into Council research priorities [Feb]
3. Case study development (based on those explored in the CRS, e.g., herring closure area, 2 million MT cap, etc)
 - a. Possible stakeholder workshops/CCTF meeting
 - b. Use these to populate and build out the climate readiness toolbox (online database of climate informed measures)
4. Scope resources to support post-doc/contractor(s) to advance CCTF and Council (climate) products (funding, fellowships, NOAA LANTERN, etc).



Work Plan (cont)

5. Use scenario planning workshops to help build out climate readiness measures
 - a. Present case studies at scenario workshop
 - b. Develop metrics for effectiveness at addressing climate change risk / adaptation
 - c. Develop recommendations to address knowledge gaps and inform research ideas [Feb]
6. Potential management tools and measures that could be used to address climate change (using case studies to further develop these)
7. Using the rapid climate change search term methods from section 2 to conduct an analysis of Council documents to explore whether and how the climate-relevant information from a variety of 'other' knowledge bases are currently making their way into the Council process in order to facilitate a gap analysis and recommendations for improvement, as necessary.
8. Repeat rapid climate change search term review for 2022 SAFE reports (presently completed 2019-2021)
9. Assess whether CCTF proposed Climate Briefings as originally conceived still has merit or is duplicative of other activities and/or needs refinement [Jan-Mar 2023]
10. Scope information needs for the climate change report (see next bullet)
 - a. Use case studies from bullet 2 to scope tools and information needs for the report[Diana, Kirstin]
 - b. From Section 2 - optional author self-evaluation/review form of what information is needed to move individual safe chapters forward in readiness (and help scope information needs for the climate change report)[Jan-Mar 2023]
11. Outline Climate Readiness Report for input by FEP Team review, Ecosystem Committee, Council bodies [TRD 2023]

Summary and next steps

The CCTF has made considerable progress and the CCTF workplan is often referenced and cited at national meetings and workshops as an example of how to build a process to incorporate climate change information into management.

The Climate Readiness Synthesis Report represents a major milestone and is the first of its kind for fisheries management/Councils.

- Going forward: workshops and work sessions to develop case studies and toolbox and work to implement "near-term" options outlined in the CRS report; possibly update CRS next year at this time.
- Drafting begins for the longer Climate Change Report
- Present products to the Council annually
- Lessons learned from the CRS and workplan activities is that the CRS, multiple tasks listed, would advance faster with 1-2 people (post-doc or contractor) to help build out, finalize, and support workshops and work sessions to move products forward in an accelerated time frame





Thank you!!!