


“Changing Arctic” Fact Sheet Project

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National Oceanic and Atmospheric Administration (NOAA)

Reminder of Project Goals

- To leverage and synthesize factual information from the Arctic Council's work to communicate to decision makers and the public;
- Contribute to cross-working groups cooperation on common topics;
- Contribute to the outreach aspect of the Arctic Council

Project Team

- Led by Finland and United States
- Permanent participants
- Invited PAME to nominate participants
- Reference group included representatives from AMAP and CAFF
- Consulted with authors of UK climate change fact sheets

Two Fact Sheets

Marine Protected Areas in a Changing Arctic

Food Security in the Arctic - Implications of a Changing Ocean

Approach

- Short, distilled information based on existing knowledge
  (focused on Arctic Council products)
- Targeted at policy makers and other non-specialists
- Use of graphics and maps
- No policy recommendations
- Inspired by UK example

TIMELINE: Up to PAME I-2020

Dec 2019: Scoping Meeting in Washington, DC

- Initial outlining and brainstorming

Feb 2020: PAME I-2020 Presentation

- Outline of FS1
- Introduced concept for FS2 (topic TBD)

TIMELINE: Since PAME I-2020

Fact Sheet 1

MAR: FS1 Bibliography circulated to ref group, CAFF, and AMAP for comment (due 4/10)

JUN: FS1 First Draft circulated to ref group, CAFF, and AMAP for comment (due 6/26)

JUN-AUG: Various conversations with AMAP and UK Report Card leads for additional input

AUG: FS1 Current Draft circulated to PAME (9/1: to AMAP)

Fact Sheet 2

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NOTE: Ref Group and AMAP have seen a previous draft of FS1

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Fact Sheet 1 Overview

“Marine Protected Areas in a Changing Arctic”

- MPAs as a Conservation Tool
- Climate Drivers
- Ecosystems, Habitats, and Species
- Changes in Human Activities
- Addressing Climate Change in MPAs
- MPAs as a Tool for Arctic Resilience

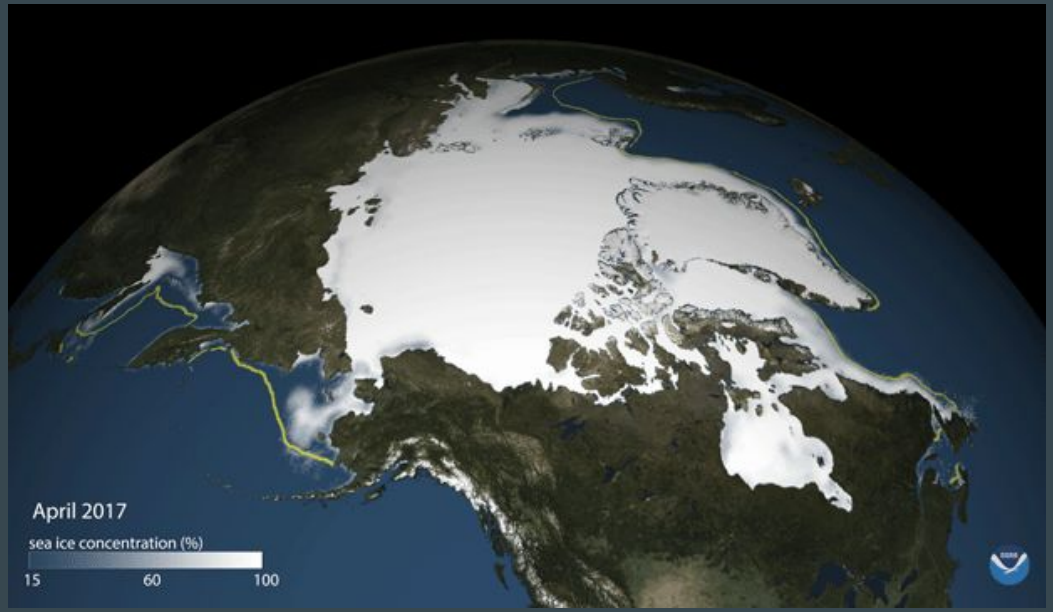
MPAs as a Conservation Tool

(CAFF/PAME Protected Areas Indicators Report, 2017)

- Provides a general overview of MPAs
- Provides context for Fact Sheet
- Defines MPA and OECM
- Will pull from CAFF/PAME Indicators Report

Climate Drivers

- What is Happening and What Could Happen?
- Sea Ice Change
- Ocean Warming
- Sea Level Rise
- Ocean Acidification



Ecosystems, Habitats, and Species

- What are we already seeing?
  - Range shifts
  - Alterations to prey availability
    - Ex: Svalbard Ringed Seals
  - Changing primary production
- What could we see in the future?
  - Continued range shifts
  - Alterations to ecosystems

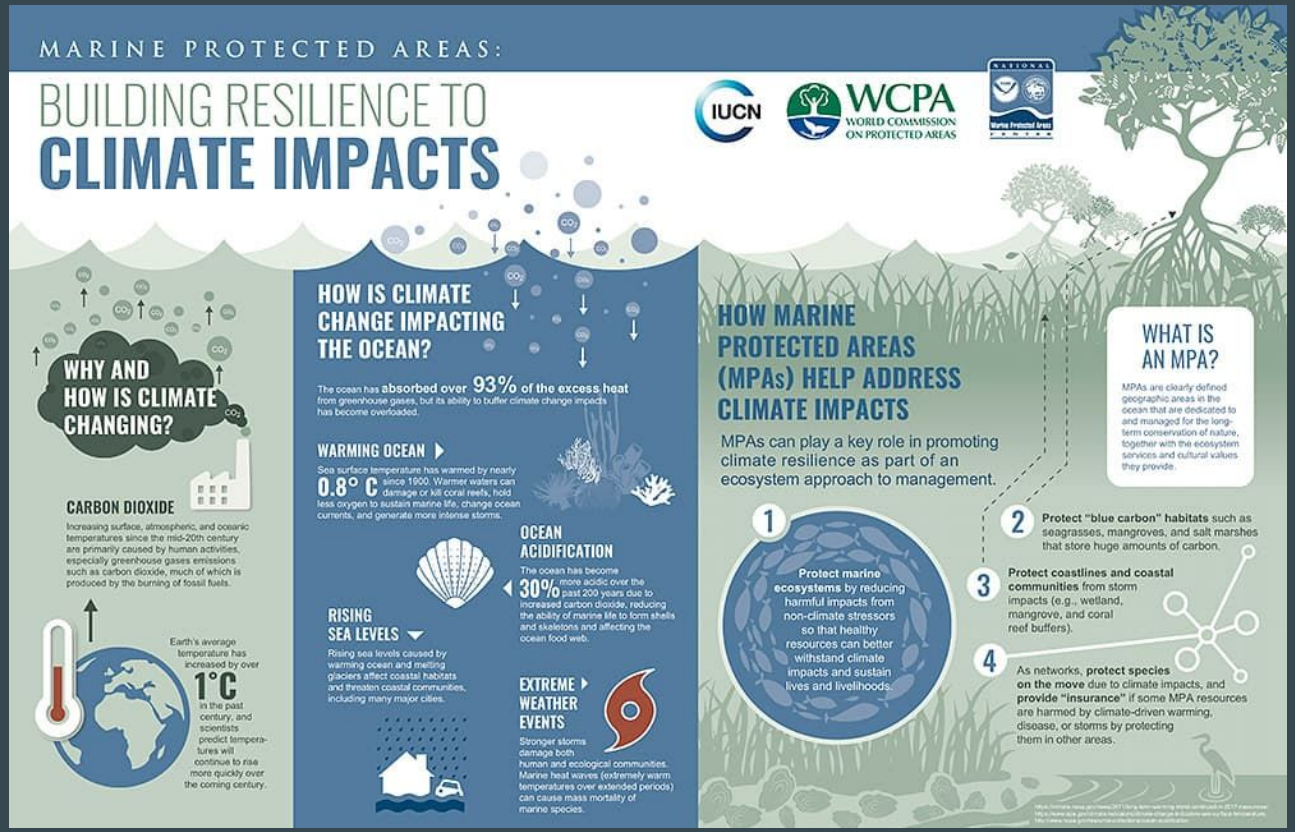
Changes in Human Activities

- Shipping
- Tourism
- Fishing
- Mineral Resource Extraction
- International Governance

Addressing Climate Change in MPAs

- Case Studies from Arctic MPAs
- Will be presented as a map
  - Tuvaijuittuq (Canada)
  - Alaska Maritime National Wildlife Refuge (AMNWR) (United States)
  - Svalbard MPAs (Norway)
  - New Siberian Islands Nature Reserve (Russia)
- Seeking additional case studies for broader representation

MPAs as Tools for Arctic Resilience



Fact Sheet 2 Overview

“Food Security in the Arctic: Implications of a Changing Ocean”

- Introduction
- Arctic Indigenous Peoples & Examples of Hunted/Harvested Species
- Climate Impacts on Availability & Accessibility
- Effects & Consequences
- Adaptive Management Case Studies (including MPAs)

Introduction

- Concept of rapid environmental change and ties to human health (One Health)

- Overview of food security, including availability and accessibility

Arctic Indigenous Peoples & Examples of Harvested Species

- Location of Indigenous Peoples by language family
- Examples of what species are important to different regions and groups

Impacts of Climate Change on Availability and Accessibility

- Sea Ice Loss
- Ocean Warming
- Ocean Acidification
- Other Combined Effects

Effects and Consequences

- Cultural Well-being
  - Identity and Community
  - Sharing of Traditional Knowledge
- Health Impacts
  - Nutritional and Mental Health
  - Safe Food Storage and Preservation

Adaptive Management Case Studies (including MPAs)

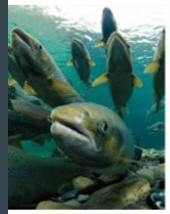
Submitted so far:

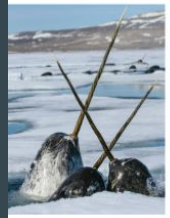
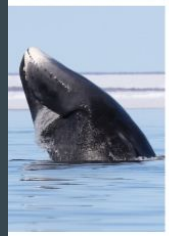
- Northwest Alaska Conflict Avoidance Agreement (United States)
- Bering Straits Port Access (United States)
- Tallurutiup Imanga - Lancaster Sound National Marine Conservation Area (Canada)
- Anguniaqvia niqiqyuam MPA (Canada)
- Tarium Niryutait MPA (Canada)
- Sarvarjuaq/Pikialasorsuaq (Canada and Greenland)
- [Placeholder for a Saami Case Study]

Seeking additional case studies for broader representation

Draft Mock-up





Introduction

Rapid social and environmental change in the Arctic - including climate change - affect the health and wellbeing of millions of people and animals that call the Arctic home[1]. To understand and manage these risks effectively, one needs to look at the ecosystem as a whole for a healthy environment, healthy humans, and healthy animals[1]- a conceptual framework often referred to as One Health.

Food security can be an important indicator of ecosystem health[2] and a major determinant of health among Indigenous peoples[3]. Indigenous communities rely on plants and animals from their environment (often termed “traditional” or “country” food), supplemented by imported store food. This use of natural resources is a central part of Indigenous cultures. However, rapid climate change is drastically changing the physical dynamics of the environment, and, consequently threatening traditional food acquisition.

Major environmental changes are linked to the warming Arctic, with rapid deterioration of the Arctic sea ice ecosystem among the most drastic effects. Such changes are altering the availability and accessibility of traditionally harvested species, with consequences to health and cultural wellbeing. The number and types of species harvested, as well as the methods by which various species are hunted and food is stored, vary by region, culture, and community[4]. Understanding these differences is important for determining the potential consequences of climate change for different groups and considering the adaptation needs of each community[4], though several common themes also emerge.

Arctic Indigenous Peoples and Examples of Harvested Species

NOTE: The species listed are intended to serve as an example of the diversity of species harvested by Indigenous communities and the shared nature of these stocks. It is not intended to be interpreted as a comprehensive representation.

Climate Impacts on Availability & Accessibility

"The two most important parts of our food security were the availability of the animals and the hunter's ability to hunt. Over the past hundred years, this has changed. … Pollution and climate change have had an impact on wildlife."
-Maggie Emudluk, Vice-President, Kativik Regional Government, Canada[5]

Climate change is leading to range expansions of some species, contractions of others, loss of habitats, and a wide range of other impacts on the Arctic's interconnected ecosystems and the services they provide[8], with implications for food availability. Thinner ice, late ice freeze-up, early ice break-up, more variable snowfall, unpredictable weather, warmer temperatures, and more frequent and intense storms have direct impacts on access to traditional foods[7]. The restructuring of Indigenous cultures in response to changes in species composition and the availability of subsistence food resources appears to be inevitable[8]. It is important to note, however, that adaptation has its limits, both in the rate and the amplitude of change that can be accommodated[7].

Sea Ice Loss

Sea ice extent has shown decreasing trends in all months and virtually all regions of the Arctic (*Very likely*). [3,4] Arctic sea ice extent will continue to decline in all months of the year (*High confidence*). [3]

AVAILABILITY

Ice-associated species are very likely to be negatively affected by the loss of sea ice,[16] which may already be contributing to declines in numerous seal species throughout the Arctic,[15] reducing the availability of these important resources. However, expanding open waters may lead to new fisheries opportunities.[1,2]

ACCESSIBILITY

Climate change is disrupting the semipermanent ice and snow-based trails used to access hunting and fishing areas and affecting the safety of using boats in the open water.[3] Some areas of sea ice, over which hunters are accustomed to travel, are no longer stable, and in some instances the ice has not formed.[24]

Autumn open water conditions have become more common and are less in line with longstanding traditional skill sets and patterns.[24] For example, the spring hunt of walrus in Qaanaaq (northwest Greenland) used to be mainly over the sea ice at the edge of the North Water Polynya. However, with the reduction of sea ice, hunters are increasingly using skiffs to hunt walruses resting on ice floes.[3]

Ocean Warming

Sea surface temperatures are increasing over much of the Arctic,[3,5] largely due to increased absorption of solar radiation as a result of sea ice loss (*Virtually certain*).[3]

AVAILABILITY

Some species are shifting northward as the Arctic warms with largely unknown consequences for Arctic species and ecosystems.[5,15]

Further, some species, such as belugas in Hudson Bay,[15] may shift the timing of their migrations or geographic ranges in response to warming waters, which can lead to reductions or increases in abundance and availability, affecting the ability of people to find these animals.[1,2]

Arctic cod supports an economically important fishery in Norway and is vital to small-scale Indigenous fishermen.[25] Yet, Arctic cod stocks have declined in recent years due to poor recruitment resulting from warming and sea ice loss as well as increased competition with northward-expanding Atlantic cod.[16]

Other Impacts

The Arctic Ocean is experiencing some of the fastest rates of acidification in the world.[8,9] Total precipitation in the Arctic has increased by 8% through the 20th century and is projected to increase another 20% by 2100.[14]

AVAILABILITY

Fish species such as salmon, char, muskun, and many others could also be indirectly impacted through the effects of climate change on their prey.[19] Ocean acidification greatly increases the risk of fishery collapse in Northeast Atlantic cod,[21,22] which could drastically reduce the availability of this important fish despite the fact that warming in the has thus far been beneficial to this species.[21]

ACCESSIBILITY

For coastal communities, changing coastal sea ice regimes, river runoff, and coastal erosion can also impact community provisioning – for example, by blocking food and fuel shipments.[24] Access to traditional foods is also being affected by more variable snowfall, unpredictable weather, warmer temperatures, and more frequent and intense storms documented across the Baffin Bay/Davis Strait region.[3]

Effects and Consequences

Although many communities have a dual food system with both traditional and store-bought foods, country foods are important to the provision of sufficient nutrients and are essential to self and cultural-identity.[3,18] Traditional knowledge holders emphasize the relationship between food security and quality of life.[35]

Health Impacts

Physical and Mental Health

Food security reduces susceptibility to a range of physical and mental health issues.[35] Country foods contain key nutrients that contribute to individual health and may lower the risk of disease.[5,8] The people of Chukotka depend on a successful autumn hunt of Pacific walrus as a critical source of protein and fat during the long winter.[1,24] Among Inuit communities, Beluga maktak is an important source of vitamin C and seals are a traditional source of food and medicine.[35]

Safe Food Storage

Traditional foods are often transported and stored outdoors using time-honored practices,[3] such as Sugluag (ice cellars) and underground chambers cut into permafrost in Inuit communities.[10,17,24,28] However, climate change is threatening the effectiveness and safety of these techniques. Warmer and wetter weather may cause bacteria build up during traditional preservation processes.[30,31]

Communities are forced to find new ways to store food as warmer temperatures threaten these traditional storage methods, which also play an important social role as family caches and food stores for village feasts.[17] This shift from traditional means of food storage can sometimes be dangerous. A switch from fermentation in wooden containers to storage and fermentation in plastic containers has even led to outbreaks of botulism.[3,17] Even drying meat is becoming less effective as an increase in rainy weather causes meat to become moldy before it can dry, forcing a switch to alternate drying techniques.[18]

Cultural Well-being

Identity and Community

Beyond sustenance, traditional foods are the basis for social identity, cultural survival and spiritual life.[5, 9] Hunting, harvesting of marine mammals, and fishing define a sense of family and community, while reinforcing and celebrating the relationship between Arctic Indigenous Peoples and the environment.[5 ,13]

Sharing of Traditional Knowledge

Sharing extends beyond the physical harvest. Much of the time spent hunting is devoted to imparting Traditional Knowledge about wildlife hunting and harvesting, and core values like sharing, responsibility, and respect for the environment to younger generations.[10,13,18,32] However, climate change compromises elders' predictive knowledge of weather, ice conditions, wildlife migration patterns, and the type, timing, and location of hunt.[6,13,35] Loss of opportunities to pass on Traditional Knowledge threatens the intergenerational importance of country foods.[32]

Adaptive Management Case Studies

While changes in the marine environment are affecting food security, many Indigenous communities are taking action to improve food security and prepare for and adapt to climate change. [statement about MPAs and tools?]

1 Pikialasorsuaq Commission (Canada and Greenland)

Pikialasorsuaq means "great upwelling" and for thousands of years, this North Water polynya shared by Canada and Greenland has sustained Inuit subsistence culture. Today it is at risk from the impacts of climate change. In 2016, the Inuit Circumpolar Council created the Pikialasorsuaq Commission to develop recommendations consistent with existing Inuit governance for confronting climate change impacts.The Commission found a desire to rebuild a collective Inuit management regime between Inuit communities in Canada and Greenland to monitor the living resources and the health of communities dependent on those resources in the Pikialasorsuaq region.

2 Northwest Alaska Conflict Avoidance Agreement (United States)

The Conflict Avoidance Agreement, between the Alaska Eskimo Whaling Commission and the oil and gas industry along Northwest Alaska, aims to reduce noise impacts and potential use conflicts in whaling areas. In addition, in accordance with the Marine Mammal Protection Act, federal agencies enter into co-management agreements with Alaska Native Organizations to co-manage marine mammal populations, including monitoring, research and data collection.

3 Bering Straits Port Access (United States)

As ship traffic increases through the Bering Straits, the U.S. Coast Guard conducted the Port Access Routing Study to plan shipping routes for increased ship traffic. Several tribes submitted comments expressing concerns about potential shipping impacts on subsistence activities, including Diomede Islands, King Island and the western tip of St. Lawrence Island. In addition, Kawerak, a local research organization, worked with multiple tribal communities to map important habitat and subsistence areas to inform the study. After considering all public comments, the United States and Russia submitted a proposal to the International Maritime Organization to implement a set of routing measures for safety and environmental protection. In 2018, the IMO's new voluntary routing measures for the Bering Sea and Bering Straits region went into effect. These include a two-way route that would not restrict access for subsistence activities, but provided additional safety measures for increased shipping and three Areas to Be Avoided around St. Lawrence, King and Nunivak Islands.

4 Tallurutiup Imanga - Lancaster Sound National Marine Conservation Area (Canada)

In 2017, the Nunavut Government and the Qikiqtani Inuit Association signed a landmark agreement to establish Tallurutiup Imanga. The inclusion of Inuit traditional knowledge in the planning and design of this MPA led to a more ecologically and socially holistic boundary recommendation. The Impact and Benefit Agreement that formed the foundation for the MPA noted that ecosystem health and biodiversity of Tallurutiup Imanga NMCA is of fundamental importance to Inuit and Canadians, and that Inuit "views, expertise and understanding should, to the fullest extent possible, be applied to encourage the wise use of wildlife, on which Inuit depend, and this traditional knowledge and understanding will be imparted to younger generations."

5 Tarium Niryutait MPA (Canada)

The Tarium Niryutait MPA was established in 2010 to conserve important summering habitat for beluga. The area was chosen using a Beluga Management Plan which identified traditional harvesting/concentration areas of beluga whales in the Beaufort sea. The Tarium Niryutait MPA protects important areas for beluga and from an Inuvialuit cultural and subsistence perspective. The Tarium Niryutait MPA's conservation objective is to conserve and protect beluga whales, other marine species (anadromous fish, water fowl, and seas birds), their habitats and their supporting ecosystem. Ensuring food security and the continuation of traditional practices are important outcomes of this conservation tool.

TIMELINE: What's Left to Do

Month	Marine Protected Areas in a Changing Arctic	Food Security in the Arctic: Implications of a Changing Ocean
Oct 2020	Revise text + send for graphic design	Revise text + circulate for second review
Nov 2020	Circulate full design for review	Revise text + send for graphic design
Jan 2021	Submit for final review for approval	Circulate full design for review
Feb 2021	Aim for approval at PAME I-2021	Submit for final review for approval (interessional)
Mar 2021	PAME submits Fact Sheets for SAO approval and forwarding to the Ministerial	
May 2021	Ministerial	
Post-Ministerial	Decision on translations	Decision on translations

Discussion

- Fact Sheet 2 Content (20 min)
- Break (10 min)
- Fact Sheet 1 Content (15 min)
- Design (10 min)
- Timeline (10 min)

Discussion

- **Fact Sheet 2 Content (20 min)**
- Break (10 min)
- Fact Sheet 1 Content (15 min)
- Design (10 min)
- Timeline (10 min)

- **Information presented clearly and at an appropriate level of detail?**
- **Missing any key aspects or sources? Representation?**
- **Other case studies available?**

Discussion

- Fact Sheet 2 Content (20 min)
- **Break (10 min)**
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- Design (10 min)
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Discussion

- Fact Sheet 2 Content (20 min)
- Break (10 min)
- **Fact Sheet 1 Content (15 min)**
- Design (10 min)
- Timeline (10 min)

- **Any final concerns with the text circulated?**

Discussion

- Fact Sheet 2 Content (25 min)
- Break (10 min)
- Fact Sheet 1 Content (15 min)
- **Design (10 min)**
- Timeline (10 min)

- **Thoughts on the mock-up?**
- **Amount of text?**
- **Can States and PPs provide additional images?**
- **Thoughts on translations?**

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- **Timeline (10 min)**

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Any additional questions?

Spare Slides

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5/26: discussion with PP leads on FS2 storyboard

6/17 & 6/29: AMAP provided info on AMAP confidence ratings

6/29: FS2 First Draft circulated to PP leads

→ **6/30 & 7/14**: discussion with PP leads on text comments and reorganization

7/23: AMAP provided info on process and types of reports to clarify sources

8/12: FS2 Second Draft circulated to PP leads

→ **8/13 & 8/20**: discussion with PP leads on final text comments before circulating to PAME

8/28: FS1 Second Draft circulated to PAME (9/1: to AMAP)

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8/12: FS2 Second Draft circulated to PP leads

→ **8/13 & 8/20**: discussion with PP leads on final text comments before circulating to PAME

8/28: FS2 Second Draft circulated to PAME (9/1: to AMAP)

TIMELINE: Since PAME I-2020

3/20: FS1 Bibliography circulated to ref group, CAFF, and AMAP for comment (due 4/10)

6/5: FS1 First Draft circulated to ref group, CAFF, and AMAP for comment (due 6/26)

6/17 & 6/29: AMAP provided info on AMAP confidence ratings

7/23: AMAP provided info on process and types of reports to clarify sources

8/28: FS1 Second Draft circulated to PAME (9/1: to AMAP)

3/9: discussion with PP leads to decide FS2 topic

4/8: FS2 Bibliography circulated to ref group, CAFF, and AMAP for comment (due 5/5)

→ **4/30:** FS2 discussion with PP leads on bibliography

5/26: discussion with PP leads on FS2 storyboard

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NOTE: Ref Group and AMAP have seen a previous draft of FS1

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NOTE: Ref Group and AMAP have NOT seen FS2 draft text