Adaptation Actions for a Changing Arctic (AACA) Section C: AMAP proposed Work Plan for completion by 2017

AACA Overarching Goal: "*To enable more informed, timely and responsive policy and decision-making related to adaptation action in a rapidly changing Arctic." (Dep. Min. meeting*[1]*)*

AACA Section C): "*Work with other relevant, recognized scientific organizations to consider Arctic-focused climate and integrated environmental frameworks/models that can improve predictions of climate change and other relevant drivers of Arctic change. This would support the goal of obtaining better predictions to inform the development and implementation of adaptation actions by Arctic Council members and Permanent Participants. This work will be led by AMAP as part of its existing workplan, in collaboration with other Working Groups and scientific organizations as appropriate, and will be completed by 2017." (Dep. Min. meeting*[1]*)*

Objective: This paper describes how the AMAP Working Group will fulfill the mandate given by the Deputy Ministers to complete responsibilities related to Sections C of the AACA, while contributing to an inventory of all previous AMAP work and related recommendations in support of section A, coordinated by SDWG. In response to AACA Part C, AMAP (in collaboration with other scientific and stakeholder organizations) will put together an inventory of existing frameworks, scenarios and models that can improve: 1) climate change predictions; and 2) integrated predictions of climate change together with other relevant drivers of Arctic change. In addition, AMAP will produce an inventory of specific Arctic change information along with a scientific analysis of this information that identifies, describes and predicts natural and human-induced climate change and other changes in the Arctic. These changes may occur in response to interactions among some of the most significant drivers/stressors on Arctic ecosystems and societies.

A summary report presenting the main results of an integrated analysis of the combined effects of various stressors on selected Arctic ecosystems, societies and human populations will be prepared for the Arctic Ministerial meeting in spring 2017. Additional reports and other related deliverables regarding key steps and milestones throughout the late 2013 to 2017 timeline will also be included in the final work plan (described in Part III, below; available in early 2013). Together, these reports when completed will fulfill the AMAP requirements for Part C of the AACA.

Background: Many different stressors are impacting the Arctic ecosystems, societies and humans due to climate change, the global need for natural resources to feed and support the growing global human population, and the desire to improve the socio-economic conditions in the Arctic as a whole. The melting of the sea ice and thawing of the permafrost are examples of elements that are changing much faster than predicted only a few years ago; thus, the Arctic

[1] Item 4 at the Deputy Minister Meeting 15 May 2012 in Stockholm

countries and their people have to prepare for a future that may look very different from what we have today.

Several analyses of conditions in the Arctic and scenarios of how the near-future may develop have been performed over the past two decades related to, for example, climate change, pollution, human health, issues faced by indigenous and local peoples, Arctic economy, biodiversity, shipping, and oil and gas activities. All of these reports and others that have been published in scientific articles and national reports will be assessed and utilized in this upcoming work. However, there are some important issues and areas that have not been analyzed to the degree necessary to support adaptation responses to multiple stressors; it is these issues that AMAP will provide new emphasis to this work which will allow for integration of findings from all relevant drivers of change and ultimately more effective adaptation actions by the relevant decision-makers.

A first stakeholder conference was arranged in Oslo in September 2011 with the objective to clarify the opportunities and concerns that core Arctic stakeholders could express at that stage. The outcome of that workshop will play a significant role in the detailed planning and implementation of this project. (AMAP Report 2011:2)

Work Plan Activities:

Three distinct but overlapping phases of work constitute AMAP's plan to address Part C of AACA: Phase I (Climate change follow-up)– updating effects and outcomes from recent climate change models and scenarios; Phase II (Identification of additional stressors)– addressing and reporting on information needs on additional stressors; and, Phase III (Integration)– developing an integrated understanding of the combined effects of drivers of Arctic change, their consequences and potential guidance on the use of the scientific information for stakeholder-driven adaptation actions.

Phase I, Climate Change Follow-up (late 2012-2013):

As part of the AMAP work to follow up SWIPA, and in response to the apparent greater than predicted rate of changes in Arctic climate, two workshops and a related synthesis of findings with proposed next steps will be undertaken. Both workshops will contribute to the AACA Part C requirements. The 1st workshop will work to clarify the climate scenarios for the Arctic area over the next 100 years as developed from recent information, determine the extent to which the existing global climate models replicate Arctic climate change and variability, and identify improvements needed. This workshop will also review historical and 21st-century scenario simulations. Based on these evaluations the workshop will design a work plan for progress toward development of scenarios of the physical climate system (including the cryosphere) in the Arctic. This workshop will be arranged in Seattle on 16-18 October 2012.

Based on the results of the 1st, a 2nd workshop will be held. The goal will be to analyze consequences that may occur in relation to combined effects of climate change on Arctic ecosystems and social and economic development. This workshop will review existing climate scenarios and the potential use of downscaling tools and techniques necessary to understand both regional and local climate impacts and effects, as well as guidance for subsequent adaptation actions. The workshop will be arranged during spring 2013 in St. Petersburg, Russia Federation.

Phase II, Identification of additional stressors (2013-2015):

Based on the outcomes from Phase I, as well as other relevant results from AACA part A, Phase II of this work plan will focus on information needs in our basic documentation and understanding of how the stressors are and will continue to impact various Arctic societal benefit areas. In addition, a description of related ongoing and planned activities that will address and respond to impacts in these selected societal benefit areas will be undertaken. The AMAP WG has identified the following key priorities for which new information/updating may be necessary to underpin the development and implementation of adaptation actions in the changing Arctic (i.e. Phase III):

- Climate Change
- Mining
- Food Security
- Fisheries
- Integrity of Ecosystem Services
- Industrialization
- Human Health
- Energy
- Contaminants
- Tourism
- Transportation/Shipping
- Water Availability and Quality

The list above will be modified to incorporate other areas identified by the other Arctic Council WGs (including PPs) as part of their own but complementary analyses and prioritization activities as well as other relevant work such as the ARR, Part B of AACA and EBM.

Once this work plan is approved, more detailed planning, development and delivery of information from the inventory and gap analyses will be initiated. The success of implementing the analysis, however, is dependent upon close cooperation and coordination amongst and across the various AC working groups.

Phase III, Integration (2013-2017):

The 2017 report will be planned in detail during 2013 and 2014 with the goal of developing a requisite work plan listing anticipated activities and deliverables with a timeline for their completion. An integration team (IT) composed of the lead experts from all scientific disciplines involved, contributing groups and key stakeholders will lead the development of this report aimed at connecting the past present and predicted future combined effects that impact the Arctic to the actual drivers or stressors. This integration and combined analyses will be performed during 2014 to 2016 with a final product to be delivered at the Arctic Council Ministerial meeting to be held in May 2017.

Several outcomes are envisioned:

- An integrated assessment report in 2017 will provide an overview of the most significant findings as well as recommendations and proposed actions related to adaptation at possibly multiple scales (e.g., pan-Arctic to local). This work will be linked to Part B of the AACA, once completed, which will provide advice/recommendations on best practices, opportunities and challenges for the development of adaptation tools and approaches.
- Peer reviewed science reports supported by traditional knowledge as outcomes of both Phases II and III.
- Based upon the needs expressed by stakeholders, workshops to discuss and communicate special issues of interest may be held, as well as town hall meetings to discuss and present results and proposals for adaptation actions. Special products are also envisioned, including regional and thematic products. These may include:
    - Operating frameworks, scenarios and models and guidance on adaptation activities and analyses
    - GIS products that are easily available and understandable, are interactive and thereby continuously updated
    - Videos, teaching materials, etc.