



Report of the Pacific Arctic Group (PAG) Meeting

April 17th, 2010
Katuag-Nuuk Culture House
Nuuk, Greenland

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**Pacific Arctic Group (PAG) Meeting
Nuuk, Greenland
April 17th, 2010**

1.0 Introduction

The spring 2010 Meeting of the Pacific Arctic Group was convened in Nuuk, Greenland on 17 April 2010 under the chairmanship of Dr. John Calder from the United States. The meeting began at 09.00 in the Katuaq Culture House of Greenland. The PAG meeting was the last meeting of the Arctic Science Summit Week (ASSW) 2010.

Ms. Lone Nukaaraq Møller welcomed participants to Nuuk at the beginning of the ASSW meeting on 15 April 2010. On that day she noted that the eruption of the Eyjafjallajökull Volcano in Iceland would prevent planes from Copenhagen arriving in Nuuk, thereby delaying (and ultimately cancelling) the arrival of several of the meeting participants. Fortunately, most PAG members and meeting participants had arrived the previous day.

Dr. Calder asked PAG meeting participants to introduce themselves. The list of attendees is attached at annex 1.

1.1 Joint Meeting with Arctic Ocean Science Board (AOSB)

In recognition of the significant overlap of interest between the AOSB and PAG, a joint meeting was convened on 17 April at 09.00 by Dr. John Calder and Dr. Harald Loeng (Chair, AOSB Working Group of IASC). Two projects were discussed. First, Ms. Gillian Lichota of the US NOAA Arctic Research Program presented information on the Marine Expert Monitoring Group (MEMG) of the Circumpolar Biodiversity Monitoring Program (CBMP), and Dr. Jackie Grebmeier of the US Chesapeake Biological Laboratory's University of Maryland Center for Environmental Science reported on the Distributed Biological Observatory (DBO) concept, which is reported upon in section 1.1.2 of this report.

1.2 Circumpolar Biodiversity Monitoring Program (CBMP)

Ms. Lichota informed the Board that the CBMP was created as a response to the Arctic Climate Impact Assessment (ACIA) which stated: “expand & enhance long-term Arctic biodiversity monitoring.” It is intended to provide an international network to improve detection, understanding and reporting of Arctic biodiversity trends. It is a focal point for current and credible Arctic biodiversity information and it intends to bridge the science-policy gap.”

The CBMP coordinates and integrates monitoring of marine, coastal, freshwater, and terrestrial Expert Monitoring Groups (EMG); uses an integrated, ecosystem-based approach (network of networks); provides a forum for scientists, community experts and managers; and facilitates more powerful and cost-effective monitoring.

In order to develop a marine integrated monitoring plan, the CBMP activated a Marine Expert Monitoring Group (MEMG).

The goals of the MEMG are to promote, facilitate, coordinate and harmonize marine biodiversity monitoring activities among circumpolar countries, and to improve ongoing communication amongst and between scientists, community experts, managers and disciplines both inside and outside of the Arctic. The Integrated Monitoring Plan (IMP) is the vehicle through which the MEMG hopes to achieve those goals. First and foremost the plan is based on existing monitoring activities, already active or planned and circumpolar in scope. If and when gap analyses identify new activities that are not addressed within existing projects, the MEMG will encourage the proper administrative/political jurisdictions to facilitate or fund the suggested new monitoring activity or it will seek funding from external sources. The plan is intended to be submitted to the CAFF management boards in June, 2010 for a 30 day review. The IMP will subsequently be sent to the other Arctic Council (AC) working groups by the end of July, 2010. The MEMG steering group would then be set up by September 2010 and implementation will proceed from that date beyond 2015.

Drs. Loeng and Calder thanked Ms. Lichota for her report and noted the importance of this effort.

1.3 Distributed Biological Observatory (DBO)

Dr. Jackie Grebmeier presented an initiative underway within PAG to establish a DBO in the Pacific Arctic sector. She explained that although recent major changes in the physical domain of the Arctic are well documented, such as extreme retreats of summer sea ice since 2007, large uncertainties remain regarding potential responses in the biological domain. She noted that observed changes have occurred at both lower prey and higher trophic predator levels, including shifts in species ranges for zooplankton, benthos, and fish, and loss of sea ice as habitat and platform for marine mammal species. DBO aims to increase our understanding of potential ecosystem changes under further loss of sea ice. The DBO is focused on known regional “hotspot” locations along a latitudinal gradient from the northern Bering to the western Beaufort Seas. It is envisioned as a change detection array for the identification and consistent monitoring of biophysical responses in pivotal geographic areas that exhibit high productivity, biodiversity and rates of change. The proposed regions are the: 1) northern Bering Sea, 2) Bering Strait/SE Chukchi Sea, 3) Central Chukchi Sea, and 4) Barrow Arc.

A suite of primary standard station measurements are proposed for each of the DBO stations to be occupied by multiple international ships and dedicated national programs. Core standardized measurements include seawater temperature, salinity, chlorophyll and nutrients. Biological measurements would include biomass and composition of phytoplankton and zooplankton on an annual basis, biomass and composition of benthic fauna on a 1-3 year time basis, and seabird and marine mammal observations in transect mode during each cruise. A second tier of sampling would include fishery acoustics and bottom trawling surveys every 3-5 years. Multidisciplinary moorings and satellite observations at focused regional locations would also be encouraged.

Dr. Grebmeier proposed creating a forum to discuss expanding the DBO to a pan-arctic program.

Dr. Loeng thanked Dr. Grebmeier for her presentation and suggested that perhaps AOSB could work with the International Council for the Exploration of the Seas (ICES) to expand the program beyond the Pacific Arctic. The Board was supportive of the DBO and in

particular creating a forum for further discussions. Dr. Michael Klages from Germany offered to work with Dr. Grebmeier on this effort.

ACTION: The Board supports the DBO pilot program in the Pacific Arctic sector and will co-sponsor with PAG a workshop to identify ways to expand the program into a pan-Arctic DBO. The AOSB SG will consult with ICES to determine their interest in the DBO concept.

1.4 Review of PAG Initiatives

Dr. Jackie Grebmeier provided an overview of the Pacific Arctic Region (PAR) Synthesis effort, which is a contribution of the PAG to the post-IPY legacy. The PAG defines the Pacific sector of the Arctic as the marine area from the Northern Bering Sea into the Chukchi Sea and adjacent Seas, and extending into the deep basins of the Arctic Ocean, with model boundaries from Aleutian Island and deep Bering Sea northward to the Canada Basin.

Objectives of the Synthesis are to:

- Present results from research, observation and modeling activities related to the PAG area, both retrospective and IPY efforts
- Share information on current modeling activities covering the PAG synthesis area
- Work toward a shared modeling system
- Identify status trends, and major new findings and understanding of state and processes in the PAG area; using best available model projections, prepare hypotheses regarding the future evolution of the physics and biology of the region; prepare scientific conclusions and recommendations to Guide future PAG science activities
- Specifically for the PAG region, identify critical marine components of an Arctic Observing Network.

While presenting the overview of the PAR Synthesis effort and objectives, Dr. Grebmeier also discussed elements of the PAR that are important components for consideration. These include:

- The geographic area over which modeling data is to be considered: Upstream (Bering Sea) to downstream (Chukchi Sea, portions East Siberian and Beaufort Sea, Canadian Arctic Archipelago, Arctic Ocean)
- The time period to be considered: Decades leading up to IPY, IPY, and build scenarios decades past IPY

- Science questions to be addressed by the synthesis and types of data to be included in the synthesis: Pacific-influenced Arctic system status and trends in atmosphere, sea ice, physical forcing, and biogeochemical/biological ecosystem response
- Linkage between observational data and modeling: Results from PAG Modeling/data fusion workshop and other chapters
- The products: Special book volume confirmed by Springer for PAG synthesis chapters; special science volumes: a) published Chinese Journal of Polar Science, b) in progress DSR (Wei-Jun Cai et al.), also likely post Oslo 2010
- The scope: Synthesis through workshops and invited participants
- Who the synthesis is endorsed by: IASC, AOSB, and the ICSU IPY project office as an IPY legacy effort

Many successes have come out of the PAR Synthesis workshops to date. A PAR Modeling Workshop held in Sanya, China, in January 2008 resulted in a special issue of Chinese Journal of Polar Science, Vol.9, 2008. Additionally, a PAR Biology Workshop held in May 2009 in Seattle, WA, USA resulted in a feature article for EOS (May 4 2010) and 2 chapters for the Springer book in progress). Furthermore, a PAR Marine Carbon Cycling Workshop held in June 2009 in Xiamen, China resulted in development of a special issue *Deep Sea-Research* (in progress, Wei-Jun Cai *et al.*).

Dr. Grebmeier reviewed the status of the PAG Synthesis (Springer Book), requesting that a lead and co-lead be identified from each nation to assist with the completion of the publication. A team of physical oceanographers have been gathered to assist in the writing of a chapter, though no lead point of contact has been identified to ensure the chapter is completed. Dr. Grebmeier requested that a volunteer come forward to assist with this effort. Additionally Dr. Grebmeier requested direction from the PAG members to determine the relevance of including a chapter on the paleo aspect of the Arctic, although she already has a suggestion of a lead author for that chapter (contact pending).

Dr. Grebmeier presented an overview of the PAR Synthesis time line starting at its inception, with a special emphasis on upcoming dates and action items of importance. Chapter authors will present summaries at the IPY symposium in June 2010 in Oslo, Norway. A workshop will be held for lead authors in Oslo, Norway on June 12, 2010 following the IPY conference, with the anticipated target group being disciplinary and interdisciplinary Arctic marine scientists, from physical, biogeochemical and biological oceanographers to higher trophic organism specialists, climate and ecosystem modelers.

Draft chapters that were due late spring 2010, will be sent out to review in the summer by the editors. An executive summary (white paper) will be completed in late fall 2010, with a publication by the end of 2011 (Springer PAG Synthesis Special Issue). Dr. Grebmeier will request a 2nd PAR synthesis special session during the 2012 IPY conference in Canada. Dr. Grebmeier suggested using the next Arctic Science Summit Week (ASSW) meeting in Seoul, Korea, March 28th – April 1st, 2011 as an opportunity to meet and discuss the status of the PAR Synthesis. Ms. Sara Bowden suggested that the meeting be placed under one of the interdisciplinary sessions at the end of the ASSW.

1.5 International Study of Arctic Change (ISAC)

Dr. Jackie Grebmeier gave an ISAC presentation on behalf of Maribeth Murray, Executive Secretary of ISAC who was unable to attend the PAG meeting.

Dr. Grebmeier informed the PAG that ISAC recently completed its Science Plan, with a number of scientific questions framed around a series of key issues. ISAC was one of the main co-sponsors of the State of the Arctic Conference 16-19 March 2010, Miami, Florida, USA. The contributions it solicited will form the core of a discussion paper on international collaboration in that will be widely distributed including to those now involved in the continuing SAON process. All the conference materials are available at the conference web site. In October 2009 ISAC co-sponsored a workshop entitled *Synthesizing International Understanding of Changes in the Arctic Hydrological System*.

ISAC is currently in the planning stage for a large workshop focused on the development of the *Responding to Change* component of the program. The ISAC Science Steering Group views the *Responding to Change* component of the ISAC Science Program as the critical element that differentiates ISAC from all other programs.

ISAC will hold a third annual Open Science Discussion at the December AGU meeting in 2010, following a meeting of the Science Steering Group. ISAC will also sponsor a number of different science session at meetings and conferences throughout the year.

For more information please go to: www.arcticchange.org

You may write ISAC at: info@arcticchange.org

2.0 PAG Business Meeting

2.1 2010 Summer Cruise Plans and a Look Ahead to 2011 and Beyond

2.1.1 Canada

Mr. Robert Fudge, from the Department of Fisheries and Oceans (DFO) Canada, discussed the 2010 Canadian Ocean Science Plan with the PAG.

Overviews of the 2010 cruise plan in the Pacific Arctic zone, as well as main program priorities were presented.

The Pacific Arctic zone 2010 cruise plan includes;

- Canada's Three Oceans (C3O) (Turbo) on the CCGS Louis S. St-Laurent (July 20-August 4) and CCGS Sir Wilfred Laurier (July 6-21);
- AON/BG/Joint Ocean-Ice Study (JOIS) on the CCGS Louis S. St-Laurent (September 15-October 15);
- AIM (Arctic Ice Monitoring/MGH (Mackenzie Gas Hydrate) on the CCGS Sir Wilfred Laurier (September 21-October 21);
- Seabed mapping (UNCLOS) on the CCGS Louis S. St-Laurent in collaboration with the USCG Cutter Healy (August 4-September 15); and
- ArcticNet on the CCGS Amundsen (3 legs: July 1-August 12; August 12-September 23; September 23-mid October).

Main program priorities include ecosystem science and climate change; marine protected areas (Beaufort Sea and Lancaster Sound); hydrocarbon industry expansion and increased vessel traffic; new and existing fisheries/hunts, as well as expanding quotas; and UNCLOS program (hydrographic mapping).

Mr. Fudge reviewed Canadian program leads and contacts.

For more information on Canadian vessel programs contact:

- Robert Fudge – Director NCAARE (robert.fudge@dfo-mpo.gc.ca), Fisheries and Oceans Canada, Science, <http://www.dfo-mpo.gc.ca/science/index-eng.htm>

- Martin Fortier – Scientific Director ArcticNet (martin.fortier@arcticnet.ulaval.ca), University of Laval, Quebec, www.arcticnet.ulaval.ca

Science Program Leads:

- Canada's Three Oceans – Dr. Eddy Carmack
- Joint Ocean Ice Study – Dr. Fiona McLaughlin
- Arctic Ice Monitoring – Dr. Humfrey Melling
- UNCLOS – Dr. Jacob Verhoef
- ArcticNet – Dr. Louis Fortier

An overview of the Northern Coastal Marine Study (Nahidik) was also given by Mr. Fudge. The program began in 2002, with a 53ft ice-strengthened vessel with a 2m draft, capable of conducting a coastal shelf program.

The ship is no longer operable. The program is looking for alternative platforms for operations in 2011 and beyond.

Mr. Fudge provided an overview of the Canadian Ranger Ocean Watch (CROW) Program, being developed by Dr. Ed Carmack at the Institute for Ocean Sciences (IOS). CROW is a DFO/Department of National Defence (DND) partnership, that provides training, instrumentation and a science plan that addresses international priorities (i.e. iAOOS and SAON). DND-Rangers collect climate and environmental data, as part of annual training patrols. The program downscales from the 'global' scale perspective of C30 to regional and community scale. The Rangers have intimate knowledge of the area and unmatched skills of on-ice travel, and provide the strongest available platform to build a sustainable network to observe key climate and environmental parameters within the marine environment of the Canadian Arctic Archipelago.

2.1.2 China

Dr. Jianfeng He from the Polar Research Institute of China informed the PAG that the Xuelong will navigate in the Bering Sea and Arctic Ocean from July 1st – September 23rd, 2010, with a port stop in Nome, Alaska towards the end of July. The objective of the research cruise will be to gather data that will assist in understanding the mechanisms influencing the rapid change of sea ice cover in the Arctic Ocean, as well as the consequential responses of the marine ecosystem to these changes.

Dr. He will follow up with PAG members to ensure that the Chinese provide explicit information regarding exact latitudinal and longitudinal coordinates with respect to approximate time that the Xuelong will be in various locations in the Arctic. Dr. Jackie Grebmeier of the US will require this information as she will need to relay this information to the native groups in Barrow, Alaska who plan to engage in an annual traditional Bowhead whale hunt about August 15th-September 15th. In addition, Mr. Martin Bergmann of Canada requested that this information be sent to Mr. Robert Fudge so that he may provide it to the Canadian Coastguard as part of their ongoing notification of potential marine hazards.

Action (All PAG Countries) – Please provide the following information to the PAG Executive Secretariat, Gillian Lichota (Gillian.lichota@noaa.gov) (CC John Calder (John.Calder@noaa.gov) and Jackie Grebmeier (jgrebmei@cbl.umces.edu)). Ms. Lichota will place the information on the PAG website for access by all respective PAG member nations:

- Latitudinal and longitudinal coordinates of each planned station and approximate time (month and day) that ship(s) will occupy sites in the Arctic.
- Latitudinal and longitudinal coordinates where all moorings are located.

The Polar Research Institute of China intends to have additional cruises in 2012 and 2014.

2.1.3 Japan

Dr. Hiroshi Kanda provided PAG members with an overview of the *Report of “Oshoro-Marū” (Hokkaido University) 2009 activities for Arctic Ocean Science Board (AOSB) by Toru Hirawake*, which is a part of the *Ecosystem Studies of Subarctic and Arctic Regions (ESSAR) activity for IPY 2007-2008 by ESSAS/GLOBEC*. The report addresses the relationship among productivity, the diversity of marine organisms, ocean environmental conditions, and sea ice conditions under global change. The report also addresses fish distribution over time, and how marine ecosystems respond to global climate change.

Japan has not completed its 2010 Arctic cruise plan.

Action: Japan will provide cruise plan to the PAG Executive Secretariat, Ms. Gillian Lichota (Gillian.Lichota@noaa.gov) (CC John Calder (John.Calder@noaa.gov)) so that this information may then be posted on the PAG website.

2.1.4 Korea

Dr. Sang Heon Lee from the Korean Polar Research Institute provided an overview of the first Korean Arctic cruise plan in the Western Arctic Ocean for the new icebreaker Araon. The Korean Arctic monitoring plan has an objective to detect changes in marine ecosystems under current climate changes, as well as monitor marine ecosystem responses to ongoing climate change in the Western Arctic Ocean. The tentative cruise plan for the Araon is from July 18th –August 16th, 2010 from Nome to Nome, AK. A total of 40 scientists (30 Korean, 10 international) will participate in the activities. Dr. Lee offered the opportunity to other PAG members to participate as there is still room available for interested members. There will be a water column study and sea ice study. For the water column study, hydrographic and flux mass studies will be done to examine physical properties in the Chukchi Sea. Zooplankton biomass and distribution will be examined using biological acoustics. A comparison of carbon flows in lower trophic levels between pelagic water and sea ice environments will be studied. A 10 day sea ice study will commence and will involve international collaboration with the US (NOAA) and UK (SAMS).

Collaborative work will take place between the Koreans and the Chinese on the 4th Chinese Arctic Cruise in 2010. Scientists will be exchanged between the Polar Research Institute of China (PRIC) and the Korea Polar Research Institute (KOPRI) to share basic physical and biological data. Extra ichthyoplankton collected as a bi-product will be given to the John Nelson (John.Nelson@dfo-mpo.gc.ca) of Canada.

2.1.5 Russia & the United States

Dr. John Calder from the US National Oceanic and Atmospheric Administration's Arctic Research Program gave an overview of the highlights from the 2009 Russian-American Long Term Census of the Arctic (RUSALCA), with a brief discussion of the 2010 cruise plan.

Dr. Calder described changes in the Arctic Ocean 2009 minimum sea ice extent 2009, as well as fluxes through the Bering Strait. These fluxes include a decrease in salinity, increase in freshwater flux, as well as temperature. Comparisons of the 2009 data to that collected in 2004 indicate that the hydrographic conditions were greatly different. Dr. Calder described how water masses on the western side of Herald Canyon were warmer in 2009 than in 2004. In addition, on the eastern side of the canyon, the summer water reached farther north than in 2004. The Siberian Coastal Current extended more than 70 km offshore in 2009; it was not present during the 2004 RUSALCA expedition. Also Dr. Calder described objectives to determine the magnitude and distribution of the flux of methane from submarine permafrost and other regions into the Arctic Ocean. In 2009 no evidence of present day methane fluxes has been located on our research site in the Chukchi Plateau pockmark field. An overview of the climate change impacts on benthic life was given, with observations showing zoobenthic biomass to the NW of Wrangell Island to be much higher in 2009 than in previous years. The highest infaunal biomass was located at the head of Herald Valley. Dr. Calder described impacts of climate change in the Arctic to include probable migration of fish northward. The most northerly trawl ever taken in the Pacific Arctic region showed many species rare to science. Dr. Calder described the fate of ice and non-ice dependent marine mammals, with populations expanding their range and decreasing in population numbers. In 2010 RUSALCA will transect the Bering Strait from August 1st -12th, 2010, deploying moorings in a strait array. As a secondary activity to the moorings, plankton, and CTD-rosette sampling will take place.

2.2 Status Report on Sustaining Arctic Observing Network (SAON)

Dr. John Calder from the United States informed the PAG and the AOSB about SAON. He noted that SAON is a process to support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues. SAON was convened by Arctic Council following the Salekhard Declaration in 2006 and renewed following the Tromsø Declaration in 2009.

In January 2009, the SAON Initiating Group (IG) presented its findings to the Arctic Council. The recommendations were:

- The Arctic Council should lead efforts to ensure a sustainable pan-Arctic observing system.
- Arctic Council member states should commit to sustaining and enhancing current observing activities and data and information services.
- Arctic states are urged to increase inter-governmental cooperation in coordinating and integrating Arctic observing and data management activities.
- Arctic issues are of global common concern and open for scientific study by all states; therefore Arctic Council member states are urged to welcome non-Arctic states and international organizations as partners in sustaining and improving Arctic observing capacity, and data and information services.

SAON Phase II began in April 2009 and will run until April 2011. In this new phase, the Arctic Council defined a new SAON Steering Group (SG) – Arctic Council (including member states, PPs, and working groups) and IASC as co-leads, with WMO and the AC suggested some priorities for this new SG. These include:

- Creating an inventory of Observing Networks;
- Facilitating Data Access, Archive and Sharing;
- Promoting Community Based Monitoring;
- Exploring Funding and Agency Cooperation; and
- Recommending an Institutional Framework for long-term future of SAON.

Dr. Calder noted that countries have provided inventories of established networks and data archives using a standard format and that work is well underway on facilitating data access and promoting community based monitoring. In addition, the SAON-SG sponsored a workshop during the State of the Arctic Conference in Miami focused on defining benefits from and means to accomplish improved coordination and collaboration in funding and performing Arctic observations.

Several issues came out of the Miami meeting including the agreement that there needs to be some core support for a SAON project offices and that governments need to make funding commitments. Over the next 6 months the SG will look at the input and set initial priorities. They intend to solicit descriptions with budgets and seek funding for each project and define and establish the institutional framework for the long term conduct of SAON.

2.3 PAG Operations

2.3.1 Status of PAG Website

Dr. John Calder, Chair of the PAG, discussed the status of the PAG website with PAG members. There was consensus among the group that the website requires an update. As the new PAG Executive Secretary, Ms. Lichota agreed to work with the Chair to update the website.

Action - Each member country is responsible for reviewing website content to ensure that it is correct, accurate, and up-to-date. Each country is to communicate with Ms. Lichota regarding any web-related PAG issues.

Dr. Calder reminded PAG members that the website is located at:
<http://pag.arcticportal.org/>

2.3.2 Status of PAG Executive Secretary Function

Ms. Lichota of the US National Oceanic and Atmospheric Administration's (NOAA) Arctic Research Program will serve as the new Executive Secretary for the PAG.

2.3.3 Status of PAG Officers

Dr. John Calder of the US's NOAA Arctic Research Program will continue to serve as the Chair of PAG. Dr. Jianfeng He of the Polar Research Institute of China will also continue to serve as the CO-Chair of PAG.

2.4 Schedule of Future PAG Meetings

Dr. John Calder led a member discussion to determine the status of future PAG meetings. It was determined that holding a PAG meeting coinciding with the June, 2010 Oslo IPY Conference will not be ideal since there will not be enough PAG members in attendance.

Instead, following an invitation by Dr. Hiroshi Kanda, a PAG meeting will be held in Tokyo, Japan December 10-11, 2010, following the 2nd International Symposium on Arctic Research. The location under consideration for the meeting will be at the National Institute for Polar Research (NIPR). A tour of the facility will be arranged. Dr. Kanda will work with Ms. Lichota to work out the details of the meeting logistics. Ms. Lichota will then provide the information to the members of the PAG.

3.0 Other Business

Mr. Martin Bergman suggested that the PAG consider broadening the discipline topic areas of the PAG beyond the marine sciences. There is a community of non-marine scientists who feel excluded. Dr. Calder noted that there may be benefit to including atmospheric modelers into the PAG. In addition, scientists who can provide expertise into understanding the dynamics of sea-ice, as well as meteorology, would be a benefit as well. However, the PAG did not reach a conclusion on this issue.

3.1 PAG Data Integration

A discussion was led by Dr. Calder regarding PAG data integration. Dr. Calder, Dr. Grebmeier, Dr. Kathy Crane, and Ms. Lichota will work together to create sample datasets as an example that will be used for integration purposes. These data sets will be forwarded to PAG members for review. From there datasets will be aggregated together. The goal is to aggregate 5 years worth of data sets (both metadata and actual data) by the next PAG meeting in December, 2010. Once the PAG members agree on a template to be used, each member nation can all build their own databases. Methods will be provided by the leads as a way to standardize the data. Ms. Lichota will include standard protocols for data collection on the PAG website.

Action – The US leads will prepare a draft template for the PAG review at fall 2010 meeting.

4.0 PAG Meeting Participants

April 2010 PAG Meeting Participants

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April 2010 PAG Meeting Participants

