



### CBMP Arctic Marine Biodiversity Monitoring Plan (Russia, Canada, USA, Greenland, Iceland, Norway)

### Kathleen Crane and Reidar Hindrum Co-Chairs









### Developing a Marine IMP: Overall Process & Timeline

- Marine Expert Monitoring Group (MEMG) activated (Aug'08) consisting of:
  - Norway & U.S. (Co-leads), Canada, Russia, Greenland/Denmark, Iceland, Aleut International Association (AIA), (CAFF), Arctic Monitoring & Assessment Program (AMAP), & Protection of Arctic Marine Environment (PAME)
- Background paper (Dec'08)
- 1<sup>st</sup> Expert Workshop Tromsø, Norway (Jan'09)
- 2<sup>nd</sup> Expert Workshop Coral Gables, U.S. (Nov'09)
- ✓ Marine IMP 1<sup>st</sup> Draft for review (Jan'10)
- ✓ Marine IMP 2<sup>nd</sup> Draft for review (June'10)
- Arctic Council Endorsement & Implementation (2010-2011)



Marine EMG members:

Co-leads: Dr Kathleen Crane, US Mr Reidar Hindrum, Norway

Dr Sue F. Moore Dr Russ Hopcroft Dr Katrin Iken

Russia:

Dr Igor A. Melnikov Dr Boris L. Sirenko Dr Olga S. Liubina Dr Nina Denisenko

Greenland: Mr Fernando Ugarte Ms Aili Labansen

Iceland:

Dr. Gudmundur Gudmundsson

Canada:

Dr. Jill Watkins Dr Jim D. Reist

CIRCUMPOLAR BIODIVERSITY MONITORING PROGRAM

Norway: Dr Ingrid Bysveen Mr Dag Vongraven Dr Per Arneberg

**CBMP** Secretariat: Mr Mike Gill

Aleut International Association: Ms Victoria Gofman

### AMAP

Mr Jason Stow

#### PAME:

Ms Soffia Gudmundsdottir



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US:





### Arctic Marine Areas (AMA's)







### Marine Expert Network groups









### **Benthic Sentinel Stations**

Sentinel Benthic Regions, Stations and Transects









### **Plankton Sentinel Stations**



Sentinel Plankton Stations and Transects







### **Fish Sentinel Stations**

Sentinel Fish Regions, Transects, and Stations







### **Marine Mammal Sentinels**

Sentinel Marine Mammal Regions and Tagging Sites



N., I., and F.I. (Norway, Iceland and Faroe Islands)







### **Seabird Sentinel Stations**

**Sentinel Seabird Monitoring Sites** 





# AMBMP suggested Observations in the Pacific Arctic Region (DBO)

Core standardized <u>ship-based</u> sampling:

- CTD
- Chlorophyll
- Nutrients
- Ice algae/Phytoplankton (size, biomass and composition)
- Zooplankton (size, biomass and composition)
- Benthos (size, biomass and composition)
- Seabird (standard transects, no additional shiptime)
- Marine mammal observations

"Change detection array" – same measurements every year, process information in near real time <6 mos; detect regime shifts in rapid changes

### Second tier ship-based sampling:

Fishery acoustics (less effort than standardized bottom trawling)
Bottom trawling (every 3-5 years)

Additional leveraged programs both domestic and international





## Data Management Objectives

- Mandate to report on trends in a timely and compelling manner
- Data reporting focused on the "Art of the Possible"
  - Systems to facilitate improved access to existing biodiversity data
  - Integrations of these data between disciplines
  - Data management support from participating countries.
  - Support from the CAFF data manager will facilitate this by adoption of common data and metadata standards.





## CBMP Web-Based Portal and Data Nodes

- Distributed data management
- Establishment of discipline nodes for input of data
- Each node will be supported by the CAFF data manager
- CBMP will establish data entry interface
- Database will be located at an organization of the expert's choosing.
- Still need data nodes for:
  - Sea ice biota
  - Plankton
  - Benthic
  - Fish
  - Marine mammals







### Start up phase 2011-2015 2015 and later include other nation input

- Expert Discipline Networks supported by the nations will be established by the Marine Expert Monitoring Advisory Committee (MEMAC) (supported by nations)
- Task: Discipline Networks will establish "baselines" from historical data
- Task: Discipline networks will aggregate existing Pan Arctic data sets (including those contributed by non-Arctic countries).





## Data, Temporal and Spatial

- Discipline Networks will need to find co-located data or make an assessment of not co-located data
- Discipline Networks will need to address the seasonal variability to decadal variability
- Community input is needed





## 1<sup>st</sup> activity: CURRENT DATA COMPARISONS TO HISTORICAL BASELINES

- Document trends
- Determine natural variability (seasons, decades etc)
- Produce Arctic Wide maps of baselines
- Produce Arctic Wide maps of trends
- Update maps of Arctic Marine Areas as new information becomes available





## Baseline data (from Arctic and Non-Arctic Nations) Zooplankton Stations: (a)









### Background Plankton Data (Russia and USA)

### Zooplankton Stations: (b)









## Reporting timeline

# 20122013

### 2015 (Include participation of Non-Arctic Nations) 2020 2025

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### Thanks







## Iceland meeting 2010

- Implementation structure
- Data management
- Funding needs
- Indicator and parameter process
- Arctic Marine Areas vs. LME's
- Timeline and reporting issues





### Metadata

- Housed on existing meta-database (Polar Data Catalogue)
- The Discipline Networks will input data from observed parameters to calculate the trends of change (indicators)
- Data Node Hosts will maintain the time series of the indicators for each discipline.





## DATA Formats agreed upon

- IPY Data policy
- Documented with metadata supported by the Federal Geographic Data Committee and National Biological Information Infrastructure.
- Adopted by OBIS, GCMD GBIF





## TESTING HYPOTHESES ABOUT HUMAN INDUCED CHANGES

- Analysis methodologies
  - Biodiversity indicators
  - Techniques to analyze archived samples
  - Techniques for including indigeneous knowledge
  - Conceptual models of arctic marine ecosystem
  - Hypotheses about impacts of human stressors
  - Determination of temporal or spatial differences
  - QA/QC







### Data Management Approach

- Review of Proposed Data Management Approach
- Clarifying Data Management roles between CBMP, nations and monitoring networks
- Ensuring links to **SAON**
- **Funding** of **Data management activities** under the AMBMP\*\*





THEME	INDEX	INDICATOR	ELEMENTS	SUB-ELEMENTS	NETWORK LEADS	CURRENT MONITORING AND REPORTING CAPACITY
Species	Arctic Species	Trends in	Terrestrial	Wild Rangifer	CARMA	Yes
Composition	Trend Index*	Abundance of Key Species + Trends in other species parameters (e.g. distribution, productivity, survival, body condition, etc.)	Fauna	(Caribou/Reindeer)		
				Invasive Species	NatureServe International	Partial (incomplete geographic coverage)
				Invertebrates	None	No
				Landbirds	US Fish and Wildlife Service, Canadian Wildlife Service, etc.	Partial (incomplete geographic coverage and statistical deficiencies)
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### New acronyms

- AMBMP= Arctic Marine Biodiversity Monitoring Plan (previous the marine IMP)
- MEMAC= Marine Expert Monitoring Advisory Committee (partly a continuation more or less of today's MEMG)
- MEN= Marine Expert Networks (discipline groups)
- NMEN= National Marine Expert Networks (?)





## Functions of Data Management

- Quality assurance
- Consistency across parameters and networks
- Sustainability (archiving and Pan-Arctic Trends (change detection))
- Enhanced communications
- Improved linkages
- Enhanced credibility

