CAFF
Conservation of Arctic Flora and Fauna

CIRCUMPOLAR BIODIVERSITY MONITORING PROGRAM

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Arctic Freshwater Monitoring Plan Annual Report 2014

Annual report on the implementation of the Circumpolar Biodiversity Monitoring Program´s Arctic Freshwater Biodiversity Monitoring Plan

ARCTIC COUNCIL

Acknowledgements

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- Directorate for Nature Management, Trondheim, Norway
- Environment Canada, Ottawa, Canada
- Faroese Museum of Natural History, Tórshavn, Faroe Islands (Kingdom of Denmark)
- Finnish Ministry of the Environment, Helsinki, Finland
- Icelandic Institute of Natural History, Reykjavik, Iceland
- The Ministry of Housing, Nature and Environment, Greenland
- Russian Federation Ministry of Natural Resources, Moscow, Russia
- Swedish Environmental Protection Agency, Stockholm, Sweden
- United States Department of the Interior, Fish and Wildlife Service, Anchorage, Alaska

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- Russian Indigenous Peoples of the North (RAIPON)
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CAFF Designated Area

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Conservation of Arctic Flora and Fauna

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What is the Arctic Freshwater Biodiversity Monitoring Plan (CBMP-Freshwater Plan)?

The Arctic Freshwater Biodiversity Monitoring Plan (CBMP-Freshwater Plan) details the rationale and framework for improvements related to the monitoring of Arctic freshwaters, including ponds, lakes, rivers, their tributaries and associated wetlands. The framework aims to facilitate circumpolar assessments by providing Arctic countries with a structure and a set of guidelines for initiating and developing monitoring activities that employ common approaches and indicators. The CBMP-Freshwater Plan is part of the Circumpolar Biodiversity Monitoring Program (CBMP) of the Conservation of Arctic Flora and Fauna (CAFF) that is working with partners to harmonize and enhance long-term Arctic biodiversity monitoring efforts. A major goal is to facilitate detection and communication of environmental and biological change in the Arctic, and stimulate societal responses to significant trends and pressures.

Developed by the Freshwater Expert Monitoring Group (FEMG) of the CBMP, which was co-led by Canada and Sweden, the CBMP-Freshwater Plan is the result of work undertaken during workshops held in Uppsala, Sweden (2010) and Fredericton, New Brunswick, Canada (2011). Both workshops included freshwater experts with a broad range of expertise as well as FEMG leads for each Arctic nation (Canada, Sweden, Denmark, Finland, Iceland, Norway, Russia (first workshop only), and USA). These workshops included a preliminary assessment of the spatial and temporal coverage of available monitoring data and identified important elements, i.e., stressors, Focal Ecosystem Components (FECs: biotic or abiotic elements, such as taxa or key abiotic processes, which are ecologically pivotal, charismatic and/or sensitive to changes in biodiversity), parameters, and indicators, to be incorporated into the pan-Arctic Freshwater Plan. The mechanistic link between an environmental or anthropogenic stressor and the FECs was identified through "Impact Hypotheses," i.e., predictive statements that outline the potential ways in which selected stressors might impact the structure or function of FECs. Preliminary information on the spatial and temporal coverage of available freshwater monitoring data for FECs was summarized, and will form the basis for the first assessment of freshwaters in the Arctic.

The CBMP-Freshwater Plan was endorsed by the CAFF board in 2012, and represents an agreement among the Arctic nations on the approach to be taken to monitor and assess freshwater biodiversity across the pan-Arctic region. By establishing common approaches for monitoring and assessment, the plan is intended to improve our ability to detect changes to biodiversity and evaluate stressor impacts on a circumpolar scale, thus facilitating more effective management of these systems. The first status and trends assessment of Arctic freshwater biodiversity (planned for completion in 2016) will evaluate existing data and identify gaps in monitoring efforts and scientific knowledge of Arctic freshwaters. This first status and trends assessment will also provide recommendations and guidance for more effective, i.e., coordinated and stressor-targeted, future monitoring activities.

What is the Status of the CBMP-Freshwater Plan's Implementation?

This report describes the progress made since December 2012, when implementation of the CBMP-Freshwater Plan began. The first step in the implementation of the plan was the activation of a governing structure, with the establishment of the Freshwater Steering Group (Freshwater SG) and national Freshwater Expert Networks (FENs). The Freshwater SG is a continuation of the FEMG, with representation from each Arctic nation, Permanent Participants, and Arctic Council Working Groups (e.g., Arctic Monitoring and Assessment Program). A FEN has been established for each currently participating Arctic nation (Canada, Sweden, Denmark, Finland, Iceland, Norway, and USA), with members selected to maximize the coverage of expertise and to incorporate multiple affiliations (e.g., government, academia). FENs are tasked with collecting and analyzing national monitoring data to assess the status of Arctic freshwater biodiversity, detect trends, and determine the causes of any changes. The Freshwater SG is responsible for implementing the CBMP-Freshwater Plan, coordinating and overseeing the work of the national FENs, and developing the first State of Arctic Freshwaters Report in 2016.

At their 2013 Annual Meeting, held in June in Uppsala, Sweden, the Freshwater SG outlined the steps necessary to complete a circumpolar assessment of Arctic freshwaters, and devised a series of six projects to be completed by the national FENs in order to achieve that goal. In the first year of implementation, FENs (led by the Freshwater SG) have worked towards completion of the Project 1, which entails the collection of national metadata summarizing existing paleo, historical, and contemporary monitoring data. This project will be completed by March 2014 and form the base of information for the subsequent projects and will be vital to the completion of a circumpolar assessment of biodiversity.

Updates from the CBMP-Freshwater Plan Implementation Teams

Status of Work Plan

Milestone	Activities & Deliverables	Status
1. Plan published	a. Final plan endorsed by CAFF board	Completed Oct 2012
	b. Plan published by CAFF	Completed Dec 2012
2. Governing structure activated	a. Freshwater SG established	Completed, with most countries represented (still awaiting representation from Russia)
	b. Adoption of Terms of Reference	Completed
	c. Freshwater SG leads confirmed	Completed; Joseph Culp (Canada) and Willem Goedkoop (Sweden) continue their roles of co-leads
	d. National FENs established and membership recorded	Completed for all currently participating countries
3. Data management	a. FENs review/revise existing contemporary metadata file and add missing data (Project 1)	Started and ongoing (deadline February 28, 2014)
	b. FENs search for and add data from post-industrial period and pre-industrial (paleo) period to the metadata file (Project 1)	Started and ongoing (deadline February 28, 2014)
	c. Metadata added to Polar Data Catalogue	Metadata are currently being collected in Excel tables in Polar Data Catalogue format. Batch upload of metadata to PDC to be completed in March 2014
	d. FENs create summary maps for the FECs for the contemporary, post-industrial, and pre-industrial (paleo) periods (Project 2)	To be started after metadata collection is completed, in March 2014
	e. FENs complete summary reports describing existing data (Project 2)	To be started after metadata collection is completed, in March 2014
4. Indicator development	a. Existing data sets identified	Started and ongoing (deadline February 28, 2014)
5. Reporting and coordination	a. 2013 work plan submitted to CAFF	Completed
	b. Freshwater SG members acquire funding from country authorities to support implementation of plan according to Table 13 of the CBMP-Freshwater Plan	Funding opportunities have been explored for each country; details on funding provided below
	c. Scientific Publications	Several in progress. Published papers include: Culp, JM, J Lento, W Goedkoop, M Power, M Rautio, KS Christoffersen, G Guðbergsson, D Lau, P Liljaniemi, S Sandøy & M Svoboda. 2012. Developing a circumpolar monitoring framework for Arctic freshwater biodiversity. Biodiversity, 13:3-4, 215-227 Goedkoop, W, JM Culp, J Lento, KS Christoffersen, S Frenzel, G Guðbergsson, P Liljaniemi, S Sandøy, & M Svoboda. 2013. Biodiversity of Arctic freshwaters: developing the CAFF-CBMP Integrated Monitoring Plan. White paper prepared for the Arctic Observing Summit, Vancouver, BC.
	d. General communications	Video and poster produced; poster presented at conferences and other national and international venues (e.g., International Polar Year, ArcticNet, International Society of Limnologists)
	e. Freshwater SG meetings (in-person or teleconference)	6 teleconferences held during 2013 (February, March, August, October, November, and December). One in-person meeting held in Uppsala, Sweden in June, 2013.
	f. FEN meetings (in-person or teleconference)	First in-person meetings held in fall 2013 for FENs in Denmark, Iceland, and Norway. First in-person meeting for FENs in Canada, Finland, Sweden, and USA scheduled for early winter 2014.
	g. 2014 Work Plan	Preliminary plan presented below; plan to be finalized at 2014 Annual Meeting (June 2014)

Freshwater Steering Group Update

Membership

The Freshwater Steering Group (Freshwater SG) was co-led by Canada and Sweden in the first year or implementation. National representatives were: Joseph Culp (Canada; Environment Canada and Canadian Rivers Institute, University of New Brunswick), Willem Goedkoop (Sweden; Swedish University of Agricultural Sciences), Kirsten S. Christoffersen (Denmark/Greenland; University of Copenhagen and the University Centre in Svalbard), Petri Liljaniemi (Finland; Lapland ELY-centre), Guðni Guðbergsson (Iceland; Institute of Freshwater Fisheries), Steinar Sandøy (Norway; Directorate for Nature Management, Norwegian Environmental Agency from July 2013), Matthew Whitman (USA representative through December 2013; Bureau of Land Management), and Christian Zimmerman (USA representative from December 2013; USGS Alaska Science Center). The Freshwater SG also had participation in the first year of implementation from Carolina Behe (Inuit Circumpolar Council Alaska), Jan René Larsen (Arctic Monitoring and Assessment Programme), and Michael Svoboda (CBMP). The Freshwater SG is lacking representation from Russia, and is endeavoring to resolve this issue.

Challenges

The most significant challenges to the Freshwater SG in the first year of implementation were securing funding and ensuring representation from all Arctic nations. These are ongoing issues, and efforts will continue to be made in 2014 to overcome these challenges.

1. **Funding**
   Freshwater SG members are responsible for securing funding for FEN operations each year. In the first year of implementation, Freshwater SG members secured modest funding from national and international sources to cover the FEN budget, which included inaugural meetings and metadata collection. With increasing project responsibilities and additional meetings, there is a need to obtain additional funding to meet a larger budget in the years leading to the completion of the 2016 State of Arctic Freshwaters report. Freshwater SG members will continue to apply for funding from national and international organizations, seeking assistance from the CAFF Secretariat and national CAFF representatives where appropriate. The Freshwater SG will also recommend that FENs increase their level of collaboration with the Association of Polar Early Career Scientists (APECS) in an effort to meet project deadlines within budget.

2. **Representation**
   Early efforts of the FEMG to design the CBMP-Freshwater Plan were strengthened by participation from members of all Arctic nations. However, there is currently no formal Russian representative on the Freshwater SG nor a Russian FEN, despite a need for Russian participation in the implementation and assessment process. The Freshwater SG will continue to work with members of the CBMP and CAFF in 2014 to secure Russian representation, assist in the formation of a Russian FEN, and ensure full participation of all Arctic nations in the implementation process.

The Freshwater Expert Monitoring Group at their Fredericton workshop to develop the Arctic Freshwater Biodiversity Monitoring Plan. Photo: The Circumpolar Biodiversity Monitoring Program

Freshwater Expert Network (FEN) Update

Membership

National FEN	Member	Affiliation	Expertise
Canada	Joseph Culp (lead)	Environment Canada and Canadian Rivers Institute, University of New Brunswick	Benthic invertebrates, benthic algae, fish
	Jennie Knopp	Joint Secretariat - Inuvialuit Renewable Resource Committee, and APECS	Fish, traditional knowledge, community-based monitoring
	Steve Kokelj	Northwest Territories Geocience Office	Permafrost
	Jennifer Lento	Canadian Rivers Institute, University of New Brunswick, and APECS	Benthic invertebrates
	Donald McLennan	Canadian High Arctic Research Station	Remote sensing
	Michael Power	University of Waterloo	Fish
	Milla Rautio	Université du Québec à Chicoutimi	Zooplankton, phytoplankton
	Heidi Swanson	University of Waterloo	Fish
	Fred Wrona	Environment Canada and University of Victoria	Hydrologic and ice regimes, benthic invertebrates
Denmark & Greenland	Kirsten S. Christoffersen (lead)	University of Copenhagen and The University Centre in Svalbard	Phytoplankton, zooplankton, fish
	Nikolaj Friberg	Norwegian Institute of Water Research	Benthic invertebrates
	Ole Geertz-Hansen	Greenland Institute of Natural Resources	Macrophytes, aquatic birds
	Dean Jacobsen	University of Copenhagen	Benthic invertebrates
	Torben L. Lauridsen	University of Århus	Phytoplankton, zooplankton, fish
	Frank F. Riget	University of Århus	Fish, ecotoxicology
Finland	Petri Liljaniemi (lead)	Lapland ELY-centre	Water quality, Benthic invertebrates
	Jaakko Erkinaro	Finnish Game and Fisheries Research Institute	Fish
	Laura Forsström	University of Helsinki	Paleolimnology, phytoplankton
	Jani Heino	The Finnish Environment Institute	Benthic invertebrates
	Seppo Hellsten	The Finnish Environment Institute	Macrophytes
	Satu-Maaria Karjalainen	The Finnish Environment Institute	Benthic algae
Iceland	Guðni Guðbergsson (lead)	Institute of Freshwater Fisheries	Fish
	Arni Einarsson	Myvatn Research Station	Aquatic birds, Paleolimnology
	Hilmar Malmquist	Icelandic Museum of Natural History	Benthic invertebrates
	Jon Olafsson	Institute of Freshwater Fisheries	Benthic invertebrates

National FEN	Member	Affiliation	Expertise
Norway	Steinar Sandøy (lead)	Norwegian Environmental Agency	Zooplankton, fish
	John Brittain	University of Oslo and Norwegian Water Resources & Energy Directorate	Benthic invertebrates
	Marit Mjelde	Norwegian Institute for Water Research	Macrophytes
	Ann Kristin Schartau	Norwegian Institute for Nature Research	Zooplankton, benthic invertebrates
	Jan Idar Solbakken	Sami University College	Fish
	Martin Svenning	Norwegian Institute for Nature Research, FRAM - High North Research Centre on Climate	Fish
Sweden	Willem Goedkoop (lead)	Swedish University of Agricultural Sciences	Benthic invertebrates
	Maria Kahlert	Swedish University of Agricultural Sciences	Benthic algae
	Jan Karlsson	Umeå University	Water quality, phytoplankton, C-turnover
	Johan Östergren	Swedish University of Agricultural Sciences	Fish
	Tobias Vrede	Swedish University of Agricultural Sciences	Zooplankton
USA	Christian Zimmerman (lead)	USGS Alaska Science Center	Fish
	Chris Arp	University if Alaska Fairbanks	Hydrologic and ice regimes
	Benjamin Jones	US Geological Survey	Remote sensing
	Trey Simmons	National Park Service	Benthic invertebrates
	Matthew Whitman	Bureau of Land Management	Fish

The FEN membership table provides details on the members of each national FEN, including their affiliations and expertise. FEN membership was finalized in early fall 2013, and the first in-person meetings were held for the FENs of Denmark, Iceland, and Norway in October-November 2013. The first in-person meetings of the FENs for Canada, Finland, Sweden, and USA will take place in January-February 2014. Each FEN is led by its national representative to the Freshwater SG, who will guide the group in its completion of the Freshwater SG-designed projects and will act as a communication link between the FEN and the Freshwater SG.

Challenges

In addition to the lack of participation from Russia (a Russian FEN has not yet been established because there is no Russian representative on the Freshwater SG), securing representation from Permanent Participant groups remains a challenge within the national FENs. The Norwegian FEN includes a Permanent Participant group member representative in its FEN (Jan Idar Solbakken; Sami representative), and the Canadian FEN includes an expert on Traditional Knowledge (TK) and community-based monitoring (Jennie Knopp; Joint Secretariat - Inuvialuit Renewable Resource Committee). Efforts will be made in 2014 to establish contact with other Permanent Participant group members and keepers of Traditional Knowledge (TK) who are willing and able to join the national FENs. A lack of funding remains a barrier to participation in some countries, and increasing efforts to secure funding in 2014 may provide a means to facilitate increased participation and foster the incorporation of TK into national freshwater assessments.

Financial Report
Status of Funding for 2013 and Outlook for 2014

a. Canada

Environment Canada supported Canada's participation on the Freshwater SG and the creation of the Canadian FEN by funding travel costs. Environment Canada also provided funding for secretariat support to the Freshwater Steering Group through a grant to the Canadian Rivers Institute. The available 2013-14 budget to cover travel costs for the Canadian participants and the secretariat was US$70K. In addition, the FSG co-lead from Environment Canada has contributed approximately 5% of his time to managing Freshwater SG and FEN activities. Canadian data that are available for the CBMP Freshwater group originate from various federal, territorial and provincial monitoring programs and university research programs. For 2014, the Canadian FEN will be seeking an additional US$40K to subsidize acquisition of data, analysis and travel associated with a writing workshop that will produce reports for Projects 2 and 3.

b. Denmark and Greenland

Funding from the Danish Environmental Protection Agency in 2012 and 2013 allowed the national representative to participate in Freshwater SG activities, establish the Danish FEN, collect historical data and perform a literature survey (including the creation of an electronic collection of the literature) for the CBMP Freshwater group. The combined 2012-13 budgets (US$60K) will also have to cover 2014 activities as no funding was granted for the coming year. The University of Copenhagen has contributed approximately 0.5 work-months per year to Freshwater SG member activities. Data collection (historical and recent) will continue in 2014 in close collaboration with the national FEN. Additional funding will be needed for acquisition of data, analysis and travel associated with a writing workshop that will produce reports for Projects 2 and 3.

Photo: Incredible Arctic/ Shutterstock.com

c. Finland

In 2013, the Finnish Ministry of the Environment supported Freshwater CBMP work by granting funding for US$13.6K. The funding was used for two months of salary for data collection and metadata preparation. An application has been submitted for the sum of USD$20K to cover the salary and meeting costs in 2014, but the final amount of funding is uncertain at the moment.

d. Iceland

There was no specific funding in 2013 for involvement in the Freshwater SG from Icelandic authorities. The meeting and travel costs for the Icelandic members in 2013 (US$3.3K) were covered by the Icelandic Institute of Natural History's (IINH) budget and the CAFF office. The contribution and work of the Freshwater SG member and Icelandic FEN members is according to their Institutes' budgets.

A request has been made to fund four months of labour from specialists at relevant research institutes in Iceland. No secure funding is available for 2014, although the IINH has a budget to cover 1-2 Steering Group meetings. The Freshwater SG will rely on the courtesy of the FEN members' Institutes for the work scheduled for 2014, as well as for access to available data.

e. Norway

The Ministry of Environment (MoE) supported the Norwegian activities of the Freshwater SG in 2013 by funding travel and meeting costs for the FSG meeting and for the kick-off meeting of the Norwegian FEN. The work-hour costs for the Freshwater SG member from Norway were covered by the Norwegian Environmental Agency (NEA). The work-hour costs for the FEN members were partly supported by the MoE, in addition to internal financing in the participating institutes. The total budget available from the MoE for the Norwegian FSG work was US$25K in 2013.

2014 will be the first full working-year for the Norwegian FEN. The NEA will apply for US$85-100K from the MoE for the work in 2014 according to the FSG work plan. The Norwegian FEN will also consider other potential funding sources

f. Sweden

The Swedish Environmental Protection Agency (EPA) and the Department of Aquatic Sciences and Assessment at the Swedish University of Agricultural Sciences (SLU) provided funding in 2013 to support Freshwater SG activities. The Department of Aquatic Sciences and Assessment contributed US$6K towards salary costs for a data manager to compile metadata, and US$27.4K towards salary costs for the FSG co-lead. The Swedish EPA contributed US$11K to fund the Freshwater SG annual meeting in Uppsala in June, 2013 and to provide travel support to allow the Swedish Freshwater SG representative to participate in the Marine SG meeting in Akureyri in October, 2013.

An application has been made to the Swedish Agency for Marine and Water Management (SWAM) for US$60K in funding for Swedish FEN activities in 2014. The proposed budget includes salary costs for FEN members, data support staff, and the FSG co-lead, funding to organize a Swedish FEN workshop, and travel support for FEN members and the FSG co-lead. In addition, US$35.3K is expected from the Department of Aquatic Sciences and Assessment to fund a portion of the salary of FEN members and data support staff who are affiliated with SLU.

g. USA

There was no specific funding in 2013 for involvement in the Freshwater SG from US authorities. The Bureau of Land Management provided in-kind personnel support for Freshwater SG member activities, but the US representative was unable to attend Freshwater SG meetings in person due to a lack of funding for travel. There is currently no secure funding available for US FEN activities in 2014.

h. Others (as applicable)

In 2011, the FEMG applied for and received DKK250K (approximately US$45K) in funding from the Nordic Council of Ministers to support the development of the CBMP-Freshwater Plan. These funds were applied to cover the cost of project management, communication, meeting costs, and travel. Similar sources of funding may be an option for the Freshwater SG in 2014.

Photo: Andreas Gradin/ Shutterstock.com

2013 Budget

Note: the costs outlined in the table are focused on new efforts to harmonize freshwater biodiversity monitoring, data management and reporting. They do not reflect the actual ongoing monitoring costs.

Milestone	Activities & Deliverables	Total Cost (USD)	Cost Details	Responsibility
1. Governing and operational structure activated	a. 2013 Inaugural meeting of CBMP-FSG b. Annual meeting of CBMP-FSG	50K (10 people at 5K each) plus 5K venue costs per year	Meeting costs (travel support for CBMP-FSG members and venue costs) and conference call costs	Arctic nations for travel support for their members. Lead FSG country for venue costs
2. Data management structures established	a. Data nodes and hosts, web-entry interfaces, and data standards established	2013: 30K (data node establishment)	Web-entry interface and web-based databases and nodes and data entry manuals established	CAFF CBMP Office
	b. Data nodes linked to web portal and analytical tools developed	2013 onwards: 20K (web portal maintenance)	Data Portal linked to data nodes via XML, and canned analysis tools developed	CAFF CBMP Office
	c. Metadata added to Polar Data Catalogue	2013 onwards: 0K (in-kind support from PDC and CAFF Data Manager)	Metadata entry by University of Laval and CAFF Data Manager free of charge	CAFF CBMP Office
3. Indicator development	a. Identification of existing data sets and historical data, collection of metadata, and spatial assessment of data coverage for national report (Project 1)	2013-2014: 30-60K per country	Costs for 1 person for 3-6 months per country (depending on country).	Arctic nations
	b. Aggregation of existing data, national and regional dataset compilations, QA/QC, data agreements, and formatting (Project 2)	2014-2015: 30-60K per year per country	Costs will vary depending on state of national datasets. Costs for 1 person for 3-6 months per year per country (depending on country).	Arctic nations
3. Indicator development	c. Analysis of indicator baseline status for each nation, summarized in national report (Project 3)	2015-2016: 30-60K per year per country	Costs for 1 person for 3-6 months per year per country (depending on country)	Arctic nations
	d. Dataset compilations archived	Minimal cost (10K). CAFF Data manager staff time.	All datasets compiled and used to be archived at CAFF Secretariat.	CAFF Secretariat
	e. Accumulation of links to national/ regional protocols, identification of intercalibration needs, and definition of indicator comparison limits (Project 4)	2014-2015: 30K	Costs for 1 person for 3 months.	CBMP-FSG
4. Reporting	a. Annual performance reports and work plans	0K per year starting in 2014	Performance report/work-plan layout and digital publication	CBMP-FSG
	b. Compilation of national reports to create State of Arctic Freshwater Biodiversity Report	50K (10 people at 5K each) plus 5K venue costs per year	Meeting costs (travel support for CBMP-FSG members and venue costs) and conference call costs	Arctic nations for travel support. Lead FSG country for venue costs.

Milestone	Activities & Deliverables	Total Cost (USD)	Cost Details	Responsibility
5. Program Review and adjustments	a. Review of parameters and sampling approaches.	0K – costs reflected above.		CBMP-FSG
	b. Independent review of data management approach, analysis, and reporting using performance measures	30K every ten years starting in 2016	Contract independent review of Monitoring Program	CBMP Office
TOTALS		2013: 35-65K per country 2014-2016: 65-125K per year per country		

Looking Ahead

Much of the first year of implementation of the CBMP-Freshwater Plan was spent establishing the Freshwater SG and national FENs, and collecting information about the data that will form the basis for the national and circumpolar assessments of the state of Arctic freshwaters. In 2014, the FENs, under the direction of the Freshwater SG, will take significant steps towards the assessment of national trends by collecting existing freshwater monitoring data and completing summary reports detailing the spatial and temporal coverage of those data. The Freshwater SG will support the national FENs in their efforts by securing funding and working to increase involvement by all Arctic countries, Permanent Participants, and CAFF working groups during the coming year.

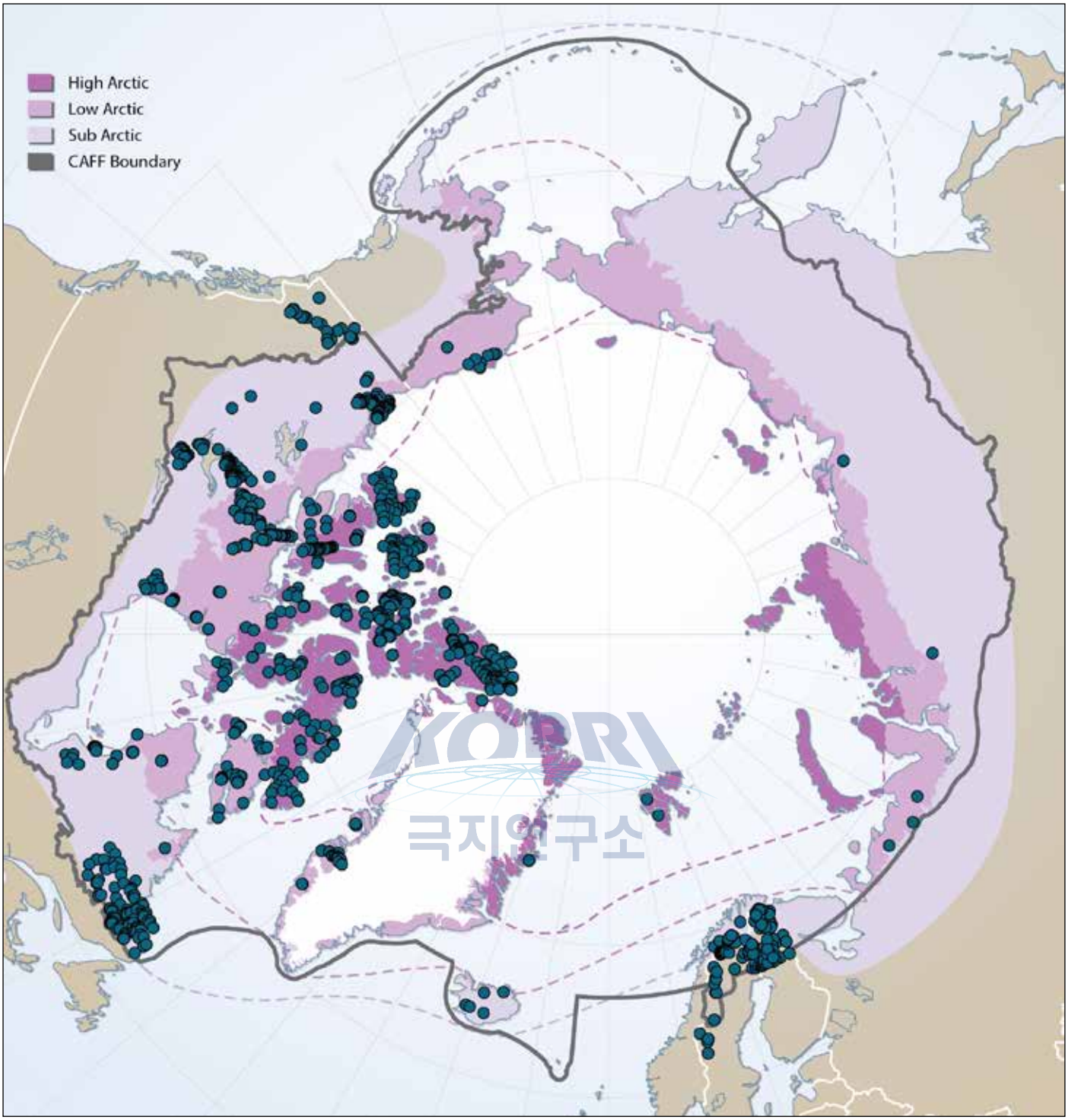
The Freshwater SG will work to enhance recognition of the CBMP-Freshwater Plan through general communications, scientific publications, and contributions to national and international efforts such as the annual NOAA Arctic Report Cards. Freshwater SG members will increase and coordinate their efforts to secure funding from national and international organizations to cover the costs of the time and travel associated with the implementation of the CBMP-Freshwater Plan. The Freshwater SG and FENs will also seek collaborations with organizations such as the Association of Polar Early Career Scientists (APECS) to enhance capacity and facilitate project completion.

A draft work plan for 2014 is presented below; work plan details will be finalized by the Freshwater SG during their annual meeting in June 2014. The proposed budget for this work plan follows that which was presented in the CBMP Freshwater Plan, with specific details to be determined at the Freshwater SG annual meeting.

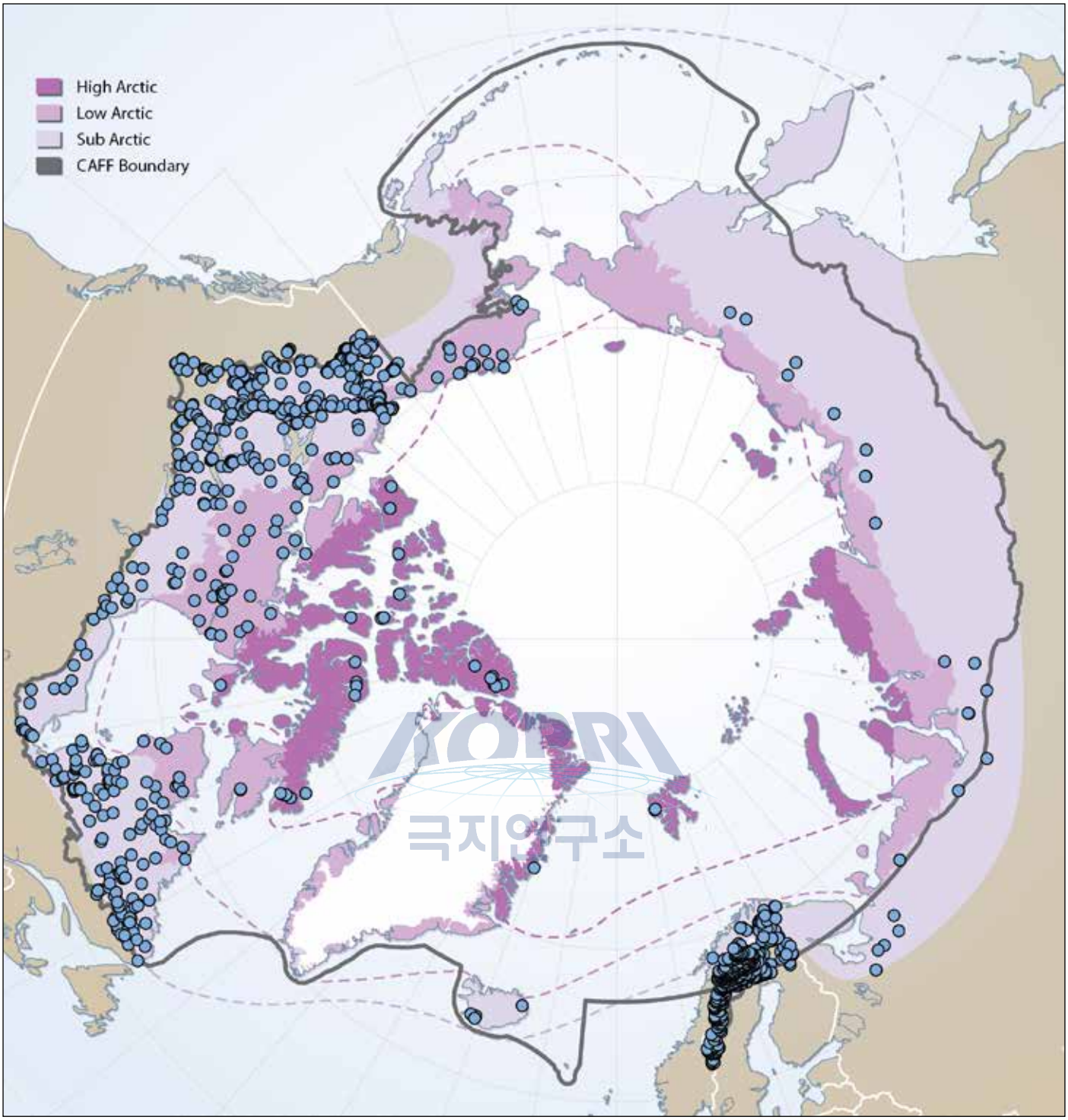
Photo: Marcel Clemens/ Shutterstock

Draft Work Plan for 2014

Milestone	Activities & Deliverables	Timeline
1. Plan published	a. Final plan endorsed by CAFF board	Completed 2012
	b. Plan published by CAFF	Completed 2012
2. Governing structure activated	a. Freshwater SG established	Completed 2013 (awaiting Russian representation)
	b. Adoption of Terms of Reference	Completed 2013
	c. Freshwater SG leads confirmed	Completed 2013
	d. National FENs established and membership recorded	Completed 2013 (awaiting Russian FEN)
	e. Support involvement by all Arctic countries	Ongoing
3. Data management	a. FENs review/revise existing contemporary metadata file and add missing data (Project 1)	Ongoing until March 2014
	b. FENs search for and add data from post-industrial period and pre-industrial (paleo) period to the metadata file (Project 1)	Ongoing until March 2014
	c. Metadata added to Polar Data Catalogue	March 2014
	d. FENs create summary maps for the FECs for the contemporary, post-industrial, and pre-industrial (paleo) periods (Project 2)	February – July 2014
	e. FENs complete summary reports describing existing data (Project 2)	February - July 2014
	f. FENs acquire data and conduct QA/QC (FSG Project 3)	February 2014 - February 2015
4. Indicator development	a. Existing data sets identified	March 2014
5. Reporting and coordination	a. 2013 annual performance report submitted to CAFF	January 2014
	b. 2014 work plan submitted to CAFF	August 2014
	c. General communications	Ongoing
	d. Freshwater SG members secure funding from country authorities to support implementation of plan according to Table 13 of the CBMP-Freshwater Plan	Ongoing
	e. Freshwater SG meetings (in-person or teleconference)	Ongoing
	f. National FEN meetings (in-person or teleconference)	Ongoing
	g. Scientific publications	Ongoing



Preliminary contemporary sampling coverage maps by FEC for lake monitoring data in the Arctic. Points of the map may represent more than one sampling site or lake. Geographic boundaries of sub, low and high Arctic are as defined and utilized in the Arctic Biodiversity Assessment.



Preliminary contemporary sampling coverage maps by FEC for river monitoring data in the Arctic. Points of the map may represent more than one sampling site or river. Geographic boundaries of sub, low and high Arctic are as defined and utilized in the Arctic Biodiversity Assessment.

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