

Land Cover Change: 2013-2015

Phase I progress report

Supporting Arctic Biodiversity Assessment and monitoring activities

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1. Introduction

Satellite data is underutilized in the Arctic, but there is a desire among the various science disciplines to use remote sensing to support ongoing biodiversity assessments and monitoring. In addition remote sensing data also has value for site-specific and regional applications. In response the Conservation of Arctic Flora and Fauna (CAFF) Arctic Council working group initiated a *Land Cover Change* (LCC) initiative to create a framework to harness remote sensing potential for use in Arctic biodiversity monitoring and assessment activities. This document reports on progress made in Phase I of this initiative 2013-2015.

2. Phase I: 2013-2015

During this first phase in partnership with the Michigan Tech Research Institute (MTRI) and the Arctic Spatial Data Infrastructure (SDI)¹ focus was on (1) summarizing long time series satellite records available for the Arctic; (2) indicating where to obtain data records; (3) providing selected examples of satellite-documented Arctic change; (4) identifying critical data layers needed for biodiversity monitoring; (5) summarizing future satellite platforms that can support biodiversity monitoring; (6) adding metadata; (7) serving data services from the [Arctic Biodiversity Data Service](#) (ABDS); and (8) convening an expert workshop to inform steps 1-6.

3. Phase I: Outputs

Phase I produced the following outputs describing data discovery, analysis and delivery:

3.1. Reports

- *Circumpolar Remote Sensing: 2013-2017 - supporting Arctic Biodiversity Assessment and monitoring activities*: the project plan describing project goals, timelines and workplan [under review].

¹ Arctic SDI is cooperation between the eight National Mapping Agencies of Canada, Finland, Iceland, Norway, Russia, Sweden, US and Denmark (including the administrations of the Faroe Islands Home Rule and the Greenland Self-Government).

- *Summary of Products: long time series satellite records available for the Arctic:* describes data and derived products developed for Phase I [under review].
- *Analysis of Selected products:* highlights derived products, example maps and plots. It considers preliminary findings as suggestions for further investigation [under review].

3.2. Data

- Suite of MODIS satellite remote sensed products developed (Annex 2) and converted to a user-friendly format, clipped to the pan-Arctic extent (as defined by the CAFF boundary), and projected to polar projection to facilitate display and analysis.
- CAFF Secretariat assisted by the Arctic SDI Technical Working Group on publishing according to international standards.

3.3. Tools

- Developed a means of facilitating access to remote sensed data from ABDS, via international Open Geospatial Consortium and ISO standards, to any standards compliant application.
- Metadata applied and data services implemented served from ABDS into the Arctic SDI GeoPortal.
- The Arctic SDI GeoPortal now seamlessly streams remote sensed products from the ABDS.



3.4. Expert input

- Expert workshop convened to provide input, advice and review of LCC. Participants from all Arctic Council countries including chairs of each of CAFFs Circumpolar Biodiversity Monitoring Program (CBMP) steering groups (terrestrial, marine, freshwater, coastal) attended (Annex 1).
- CBMP Steering group chairs defining demonstration products based on priorities and table outputs from workshop.
- Discussions ongoing with partners to connect data streams from ABDS i.e. the intergovernmental Group on Earth Observations (GEO) and the Global Biodiversity Information Facility (GBIF).

4. Phase I: Workplan

Actions		2013-15	2015-17	Status	Products
Phase I					
1	Summarizing long time series satellite records available for the pan-Arctic	x		Completed	Technical report
2	Provide selected examples of satellite-documented Arctic change	x		Completed	Technical report
3	Identify critical data layers needed for biodiversity monitoring	x		Ongoing	
4	Identify pilot areas to ground truth remote sensed data	x		Completed	Technical report
5	Metadata applied and data services implemented conforming to international standards	x		Completed	ABDS

6	Advisory data expert group (CAFF Secretariat and the Arctic SDI Technical Working Group)	x		Completed	
7	Metadata applied and data made accessible via ABDS			Completed	ABDS
8	Data services implemented conforming to international standards and remote sensed data served from ABDS into the Arctic SDI GeoPortal	x		Completed	ABDS/Arctic SDI GeoPortal
9	Publication of LCC reports as CAFF technical reports	x		Ongoing	
10	Discussion with partners to make their data portals interoperable with remote sensed components of ABDS	x	x	Ongoing	
11	Convene workshop that addresses steps 1-4	x		Completed	1 st December 2014

Annex 1: Phase I: Workshop participants

Last name	First name	Affiliation
Aronsson	Mora	Swedish University of Agricultural Sciences
Barry	Tom	CAFF Secretariat
Christensen	Tom	Arctic Research Centre
Crane	Kathleen	NOAA
Culp	Joseph	Environment Canada
Culyer	Christine	Greenland Nature Institute
Dahle Strom	Guro	Norwegian Space Agency
Danks	Fiona	UNEP WCMC
Gill	Mike	Environment Canada
Goedkoop	Willem	Swedish University of Agricultural Sciences
Helgason	Holgrímur	CAFF Secretariat
Hindrum	Reidar	Environment Agency
Højlund Pedersen	Stine	Aarhus University
Ibarguchi	Gabriela	Arctic Institute of North America (AINA), University of Calgary
Ingrid Handa	Bysveen	Norwegian Environment Agency (NEA)
Jenkins	Liza	Michigan Tech Research Institute
Johan	Danielsen	Norwegian Environment Agency (NEA)
Kenchington	Ellen	Ocean and Ecosystem Sciences Division/Fisheries and Oceans Canada
Kristoffer	Helgasson	Norwegian Space Agency
Larusson	Kári Fanar	CAFF Secretariat
Markon	Carl	USGS
McClennan	Donald	CHARS
Mokievsky	Vadim	P.P. Shirshov Institute of Oceanology
Moss-Davies	Pitseolalaq	ICC
Myers-Smith	Isla	School of GeoSciences, University of Edinburgh
Payne	John	North Slope Science Initiative
Pedersen	Thomas	Greenland Institute of Natural Resources
Ragnvald	Larsen	Norwegian Environment Agency (NEA)
Schmidt	Niels	Aarhus University/Scientific leader, Zackenberg Research Station
Shuchman	Robert	Michigan Tech Research Institute
Stine Højlund	Pedersen	
Syroechkovskiy	Evgeny	ARRINC
Talbot	Stephen	U.S. Fish and Wildlife Service
Taylor	Jason	U.S. National Park Service
Wedegge	Morten	Norway Environment Agency

Annex 2: Phase I: [Remote sensed products](#)

Products		Discipline
1	Vegetation Indices	Terrestrial
2	Land Cover Dynamics (vegetation phenology)	Terrestrial
3	Land cover type	Terrestrial
4	Land water mask	Marine
5	Albedo	Terrestrial
6	Snow covered area	Terrestrial
7	Sea surface temperature	Marine
8	Land Surface Temperature	Terrestrial
9	Chlorophyll a (chl)	Marine
10	Dissolved organic Matter (CDOM);	Marine
11	Primary productivity	Marine
12	Sea ice concentration	Marine