

Workshop on RS-based Monitoring Measures for the Arctic

Edmonton

February 19th-21st

DRAFT SUMMARY REPORT

Participants

- **ECCC**
 - jason.duffe@canada.ca
 - blair.kennedy3@canada.ca
 - jon.pasher@canada.ca
 - darren.pouliot@canada.ca

- **POLAR**
 - donald.mclennan@polar.gc.ca

- **PCA**
 - paul.zorn@canada.ca
 - justin.quirouette@canada.ca
 - katriina.okane@canada.ca
 - michee.lemieux@canada.ca
 - melissa.mcbride@canada.ca
 - melissa.beaujot@canada.ca
 - alison.cassidy@canada.ca
 - maureen.peniuk@canada.ca
 - jake.burton@canada.ca
 - josh.keitel@canada.ca
 - heather.daw@canada.ca
 - benjamin.curry@canada.ca
 - florence.lapierre-poulin@canada.ca
 - marie-be.leduc2@canada.ca
 - martin.raillard@canada.ca

30 RS-based monitoring measures discussed (mostly of them are unassessed)

Presentations could be find in Sharepoint

<http://sp2019.apca2.gc.ca/sites/paec/mei-sie/Working%20Documents/Guidance%20and%20Policy/Policy/1-Scope%20Policy/Nature%20Legacy/Arctic%20Workshop%20Edmonton%202019?csf=1>

22 national parks covered including 3 new parks



Context

- This workshop has been organized following the Science Symposium between PCA and ECCC “Identifying areas of collaboration for implementing Canada’s Nature Legacy” held in March 2019
- PCA and ECCC signed a MOU to amplify the science collaboration between these two organizations and will be in place to November 2022.
- Collaboration: integrating expertise in overlapping areas of interest or on the same topics with open communication between departments to share data and new technologies
- Remote Sensing is one of the initiatives discussed during that symposium

3.2.1 Initiative: Remote Sensing

#	Action/Task	Lead	Timeframe (Q / Yr)
1	Hold initial meeting	Jason Duffe and Steven McCanny	Q1/2019-20
2	Form working group	Jason Duffe and Steven Mc Canny	Q2/2019-20
3	Fund proposal - operations	Jason Duffe and Steven McCanny	Q2/2019-20
4	Determine standard ground plots (Arctic)	Olivier Bérard and Blair Kennedy	Q3/2019-20
5	Determine standard remote sensing indicators	Olivier Bérard and Benoit Monpetit	Q3/2019-20
6	Begin capacity training	Jason Duffe and Steven McCanny	Q4/2019-20
7	Provide support to protected areas network	Jason Duffe and Steven McCanny	Q1/2020-21
8	Invest in systems plan (PCA)	Steven McCanny	Q2/2020-21
9	Invest in carbon storage mapping	Scott Parker	Q2/2020-21
10	Invest in drones	Steven McCanny	Q4/2020-21

RS Initiatives from the Science Symposium

Background for northern Parks

- Empty boxes for monitoring measures have been filled up with ParkSPACE Protocols in order to be compliant with monitoring guidelines (number of measures per indicator)
- At that time, the ecological relevance of these measures or protocols was not assessed or discussed at the park level
- Most ParkSPACE Protocols are outdated and need to be updated as methods, technology and tools evolve a lot since 2010

Main Discussions

1. Purpose of the monitoring

- Monitoring for Reporting versus monitoring for Understanding
- Monitoring the Change versus Understand the Change

2. Quality and Relevance of the monitoring Measures

- The final quality of a RS-based monitoring measure depends entirely on the quality of field data available for calibration and validation
- The relevance of the Plant Productivity and Growing Season Change has been discussed and challenged by several attendees, but also indicated by others to be useful (change in growing season of interest)

3. Ground truth Data (Field Data Collection)

- Ground based vegetation change (ITEX? Lichen volume change?), Mingan

- Linking soil temperature to RS? – Mingan, Nahanni
- Scale dependant
- Ground truthing for vegetation monitoring – WAFU
- Remote cameras already installed for mammal occupancy monitoring
- Camera for phenology (Canadian network, Phenopix R package)
- Linking field images to satellite images
- Need guidance for equipment and photos collection in the field
- Need guidance about what kinds of simple protocols to do in the field while already at a location
- Standardized metadata collection, field picture protocol

4. Alpine Extent (Mountain Parks)

- The six Mountain Parks are currently working on a common Alpine Extent Monitoring Measure.
- This measure has been discussed during that workshop and the timings is very good. Brenda Shepperd from Jasper is organizing a workshop March 19th (Lake Louise) to get all of them in the same room to move the study design and field methods forward (combination of the 6 options presents (mountain legacy photographs, historical air photos, landsat imagery, best available RS imagery, drones, field measures).
- This is a good opportunity for collaboration with ECCC and make some significant progress for assessing these measures.
- Mapping ecotypes in alpine areas (alpine extent)

5. Improve current monitoring protocols (ParkSPACE protocols)

- Plant Productivity & Growing Season Change
- Subtle veg change (% shrub cover)
- Lake Ice Phenology – Nunavut, Nahanni
- Sea Ice Phenology
- Glacier Extent
- Plant phenology, Quttinirpaaq
- Marine productivity – Nunavut
- Land cover change – Nahanni
- ITEX Plant community – Nunavut
- Cormorant & windthrow forest dynamics, Mingan
- Room for Collaboration

6. Explore new measures

- Snow cover (summer snow banks? Spring snow melt?) – Torngat (late july snowbed extent)
- Active layer monitoring – Qausuittuq's mud problem
- Glacier Mass Balance monitoring complement – Sirmilik, Auyuittuq
- Drone based glacier change - Torngat

- Lichen for caribou - Wapusk
- Snow goose disturbance – Wapusk
- Windthrow dynamics - Mingan
- Impact of cormorants - Mingan
- Shrub change -> enough with subtle veg? Other needs?
 - Torngat, WBNP
- Ice characteristics – WBNP
- Whooping crane & muskrat habitat – WBNP
- Tuffa mountains (mineral deposits driven by groundwater dynamics), endangered aster species, habitat modelling – Nahanni
- Permafrost disturbances using drones - WAFU
- Room for Collaboration

7. Ecotype Map for New Parks and Update for existing parks

- Ecotype maps for new parks
- Sampling design based on ecotype maps and subtle veg results (plots)
- Updating vegetation classification within ecological land classification maps

8. Subtle vegetation change (shrubification)

- Useful for Western Newfoundland & Labrador FU
- The most important measure for every park

9. Permafrost – all Nunavut Parks

- Models for predicting ground ice
- ParkSPACE had a protocol, is there a new way?
- Permafrost depth (linked with ecotype maps)

10. Forest Change - Collaboration with CFS

- Forest and anthropogenic disturbance
- Collaboration should be extended to cover mountain parks and Wapusk

11. Caribou habitat/forage mapping

- Ivvavik
- Room for Collaboration

12. Wood Buffalo Action Plan

- Room for Collaboration
- They have a lot of money to invest in pilot projects that could eventually be extended to other parks

- Collaboration interests include: invasive thistle monitoring, willow monitoring, monitoring ice characteristics, flood progression mapping, whooping crane nesting & muskrat house distribution

13. Data management

- Sharing list of available products internally and what other parks are doing
- Transfer of products and information with staff turnover
- List of people with different RS expertise

Actions Plan

Actions	Who	Deadline
Prepare a Wish List to Martin (NAS, Soil temperature sensors, phenology cameras, remote cameras) related to ground truth data collection (standardization)	Olivier	March 15 th
Alpine Extent Meeting (March 19 th) – Provide guidance for this measure before this meeting	Jason and Olivier	March 15 th
Send material to Martin for his presentation at the FUS Meeting (April)	Olivier and Katriina	April 5 th
Guidance for Field Data Collection Protocol before the next field season (ECCC)	Olivier and Jason	April 15 th
Guidance for Cameras and sensors purchasing	Olivier and Jason	March 10 th
Organizing a call with each northern FU for RS measure (Monitoring Program) – Assess the relevance of the Plant Productivity and Growing Season Change	Olivier and Katriina	April 30 th
Follow-up with Science Symposium initiatives	Jason and Olivier	April 15 th
% Shrub for northern parks (6 of them)	Olivier	March 31 st
Cormorant Measure – Mingan and ECCC – Test a method	Jason and Marie-Bé	Spring 2020
Sampling design based on ecotype maps and subtle veg results (plots)		
Updating vegetation classification within ecological land classification maps		
Share any derived products for mountain park areas (ECCC)	Darren	Done
Coordinate field transportation for our staff with international research initiatives (with Martin). Should be reflected in the MOU	Martin and Donald	
Compiling Sampling Plots and Pictures from Ecotype maps to be integrated in the ECCC System	Olivier	
Funding for Remote Sensing Initiatives in the current MOU	Olivier and Jason	

Ecotype maps for new parks. See if there is a way to get money from international projects to get it done (Martin)	Olivier and Martin	
Platform of exchange of info and products (Sharepoint – Confluence)	Olivier	
Plant Productivity and Growing Season Change – How to get that measure better?	Olivier and Katriina	
Landscape Change for Mountain Parks – Talk to CFS and see if Forest Change could be applied	Olivier and Michee	
Active Layer - Permafrost and RS – Slumps – Develop a protocol (ECCC)		
Assess opportunities to have a FTS weather station by park and improve current weather stations (transmission, maintenance). Interest by Meteorological Service?	Martin and Olivier	
Nahanni – Predictive map for location of asters (ECCC)	Olivier and Jason	
Link Wood Buffalo Action Plan to Monitoring (Test techniques or protocols)	Paul, Olivier and Jason	
Collaboration with NRCAN (GSC) for Glacier Extent and Glacier Mass Balance – ECCC assess options for these measures	Katriina and Jason	
Provide a list of CORE Projects to Jason	Olivier	