



Convention on
Biological Diversity



Compilation of data, tools, methods and pilots in Canada

DRAFT

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Version: 0.2 (9 December 2014)

This work was undertaken as part of the project Advancing the SEEA Experimental Ecosystem Accounting. This note is part of a series of technical notes, developed as an input to the *SEEA Experimental Ecosystem Accounting Technical Guidance*. The project is led by the United Nations Statistics Division in collaboration with United Nations Environment Programme through its The Economics of Ecosystems and Biodiversity Office, and the Secretariat of the Convention on Biological Diversity. It is funded by the Norwegian Ministry of Foreign Affairs.

¹The views and opinions expressed in this report are those of the author and do not necessarily reflect the official policy or position of the United Nations or the Government of Norway.

Acknowledgements: The author would like to thank the project coordinators (UNSD, UNEP and the CBD), sponsor (the Norwegian Ministry of Foreign Affairs) and the reviewers, who contributed valuable insights. Special thanks to Statistics Canada and the Institut de la statistique du Québec (ISQ) for their kind contributions and reviews.

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0. Introduction

1. This report has been prepared as part of a project on **Advancing Natural Capital Accounting**² through testing of the System of Environmental-Economic Accounting (SEEA) Experimental Ecosystem Accounting. The objective of the report is to review the data, tools and methods for ecosystem accounting pilot work in Canada. It does so in the context of the current SEEA-EEA (United Nations Statistics Division, European Environmental Agency, World Bank 2013). A framework was established for such a review (**Deliverable 2.a.3** *A framework for comparison of approaches, data, tools and results of existing and previous ecosystem accounting approaches in selected jurisdictions*).

1. Links to SEEA-CF and SEEA-EEA

1.1 Discussion on links to EEA and how this guidance material is dealing with a particular issue

2. This report documents two Canadian ecosystem accounting initiatives that started about the same time as early expert deliberations on the SEEA-EEA. As such, they benefitted from discussions with international experts and their experiences contributed to the development of the SEEA-EEA.
3. The framework for comparing ecosystem accounting initiatives goes beyond concepts, methods and issues discussed in the SEEA-EEA. For example, the SEEA-EEA provides little guidance on implementation (governance structures, decision contexts and collaborative approaches). By setting a broader scope for documenting related initiatives, this will support the development of optional implementation approaches in the ANCA project's Guidance Document.

1.2 Why is this important?

4. Since the SEEA-EEA is “experimental”, it is important to systematically review the results of the experiments and to build that experience into guidance material for further testing.

1.3 What is the issue being addressed?

5. Overall, this report addresses the issue of documenting and reporting on ecosystem accounting initiatives. A framework was established for such reporting (see **Deliverable 2.a.3** *A framework for comparison of approaches, data, tools and results of existing and previous ecosystem accounting approaches in selected jurisdictions*).

2. Scope

2.1 What is in and why?

6. The report applies the framework for documentation as represented in **Deliverable 2.a.3**. It also provides a short descriptive summary of each project.
7. Two main activities are documented. These are included because of explicit links to the SEEA-CF and the SEEA-EEA:
 - The Measuring Ecosystem Goods and Services (MEGS) project, which was an inter-departmental collaboration of seven federal departments, led by Statistics Canada and Environment Canada. The project led to several spin-offs, which will also be described.

² See http://unstats.un.org/unsd/envaccounting/eea_project/default.asp.

- The Quebec Centre for Biodiversity Science Working Group 14 (QCBS-WG14) is a collaboration of several Quebec universities, government agencies and non-governmental organizations.

2.2 What is out and why?

8. The report does not review Canadian ecosystem services projects that have no explicit link to the SEEA-CF and SEEA-EEA. There are many, for example, that have been inspired by the Millennium Ecosystem Assessment, TEEB and the SCBD. These initiatives were excluded since the main objective of SEEA-EEA testing is to advance ecosystem accounting. Documenting these could be the subject of future reports.
9. In completing the metadata, several contributors made suggestions on improving the framework. These will be taken into account in future iterations.
10. Metadata were received from other jurisdictions outside of Canada. These are included in other reports on this series.

3. Discussion

11. The metadata for the two initiatives is presented in **Annex 1: Comparison table: MEGS and QCBS-WG14**. The following discussion highlights several aspects that would be illustrative for countries wishing to implement ecosystem accounting.

3.1 Measuring Ecosystem Goods and Services (MEGS)

12. In 2011, Statistics Canada received federal funding to develop prototype ecosystem accounts with the specific objective of filling policy needs related to the valuation of ecosystem goods and services. The project, MEGS, proposed to develop the statistical infrastructure, to consolidate existing ecosystem data and to build knowledge across the partner federal departments and agencies.
13. MEGS served as the hub for a government-wide virtual community of practice on ecosystem services. The project was managed jointly by Statistics Canada and Environment Canada. It partnered with Agriculture and Agri-food Canada, Fisheries and Oceans Canada, Policy Horizons Canada, Natural Resources Canada (Canadian Forest Service and Canadian Centre for Remote Sensing) and Parks Canada. Policy Horizons Canada supports medium-term federal policy development through scanning and foresight. The project was governed by a director-general Steering Committee, which oversaw the work of a Working Committee, which in turn coordinated the work of six subject-specific working groups (Soulard, Filoso et al. 2012).
14. Statistics Canada served as the main link with the international statistical community by contributing to the development of the SEEA-EEA.
15. Statistics Canada (2013) published preliminary results from the MEGS project as *Human Activity and the Environment 2013: Measuring Ecosystem Goods and Services in Canada*. The publication focussed on ecosystem accounting concepts, examples of national ecosystem accounting and the results of the case studies. It included:
 - National-level land cover maps, land cover change matrix and municipal-level land use change;
 - Experimental national indicators of ecosystem quality and services (human landscape modification, national biomass extraction);

- Case studies including (a) the dependence of coastal communities on marine ecosystem services; (b) wetland water purification potential and (c) pressures on protected areas and alternative approaches to valuing ecosystem services of protected areas.
16. The publication was also supplemented with a companion *Teacher's Kit* (Statistics Canada 2014) to promote awareness of ecosystem services and ecosystem accounting in secondary and post-secondary classrooms.
 17. The partnership continues as a collaborative Working Committee that supports related initiatives through (a) the refinement and application of its geodatabase and (b) identifying opportunities for collaboration. Related projects include the development of an Ecosystem Potential Index for Canada (Malouin, Doyle et al. 2013) and a toolkit for ecosystem services assessment (Preston, Satterfield et al. 2012).
 18. *Human Activity and the Environment 2014: Agriculture in Canada* (Statistics Canada 2014) further implemented many of the SEEA-CF, SEEA-EEA and MEGS concepts by focussing on agricultural ecosystem services, agricultural landscapes and linking to economic accounts.

3.2 The QCBS Working Group 14 (QCBS-WG14)

The Quebec Centre for Biodiversity Science is a research network that, in 2014 connects more than 110 researchers and 700 graduate students, undergraduate students, and national and international partners to foster integrated biodiversity science in Quebec. Part of their program is to fund working groups with seed funds to develop further proposals.

The goal of the Working Group 14 is to develop a core of researchers and students who are trained in undertaking research into the development of a set of ecosystem and biodiversity accounts for Quebec. This research includes both biophysical and economic value measurements. The ecosystem accounts are proposed to eventually become part of the larger set of environmental accounts in Quebec, to be developed by the Institut de la Statistique du Québec (ISQ).

Work thus far has focussed on (a) developing a pilot ecosystem account for one administrative region, the Chaudière-Appalaches Regional Municipality, building on the ISQ pilot land account for that area (Uhde 2013) and (b) convening international workshops on ecosystem accounting (CIRANO 2014, CIRANO 2014). The European Space Agency recently supported the pilot ecosystem accounting work as a Demonstration Project to develop custom and multi-scale interpretations of land cover with links to ecosystem services for the Chaudière-Appalaches region (ESA 2013).

4. Further work

19. The framework will be updated and revised in a future iteration.

5. Links to further material

20. See references.

6. References

CIRANO, 2014-last update, Accounting for the Environment in a System of National Accounts [Homepage of Center for Interuniversity Research and Analysis of Organizations (CIRANO)], [Online]. Available: <http://www.cirano.qc.ca/icirano/webevents/201202/?l=en> [12/10, 2104].

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- UHDE, S., May 10, 2013, 2013-last update, Comptes des terres au Québec : projet pilote pour la région de Chaudière-Appalaches [Homepage of Colloque de l'ACFAS sur l'économie de la biodiversité et des services rendus par les écosystèmes], [Online]. Available: <http://qcbs.ca/wp-content/uploads/2013/02/Stephanie-UHDE-ACFAS-2013c.pdf> [12/10, 2014].
- UNITED NATIONS STATISTICS DIVISION, EUROPEAN ENVIRONMENTAL AGENCY, WORLD BANK, 2013. *SEEA Experimental Ecosystem Accounting: White Cover Version*. New York, NY: United Nations Statistics Division.

7. Annex 1 Comparison table: MEGS and QCBS-WG14

Parameter group	Parameter code	Parameter	MEGS	QCBS-WG14
01. Description	01.01	* Name of activity (text)	Measuring Ecosystem Goods and Services	QCBS WG14 Chaudière-Appalaches Pilot Ecosystem Account (formerly WG5)
	01.02	Acronym (code)	MEGS	QCBS-WG14
	01.03	Summary description (text, 500 words or less)	MEGS was initiated in May 2011 as an interdepartmental project among seven federal government departments and agencies. Statistics Canada was funded for 2 years to develop statistical infrastructure to support the Government of Canada in valuing ecosystem services.	The goal of the working group is to develop a core of researchers and students who are trained in undertaking research into the development of a set of ecosystem and biodiversity accounts for Quebec. This research includes both biophysical and economic value measurements. The ecosystem accounts are proposed to eventually become part of the larger set of environmental accounts in Quebec, to be developed by the Institut de la Statistique du Québec (ISQ).
	01.04	* Country(countries) covered	Canada	Canada
	01.05	* Lead agency (agencies)	Statistics Canada, Environment Accounts and Statistics Program, 9th floor, Jean Talon building, Tunney's Pasture, Ottawa, K1A 0T6	Agricultural Economics, Macdonald Stewart Building, MS3-40, Macdonald Campus, McGill University, Ste. Anne-de-Bellevue, Quebec, H9X 3V9, Canada
	01.06	Membership	Environment Canada (co-lead), Statistics Canada (co-lead), Agriculture and Agri-food Canada, Fisheries and Oceans Canada, Horizons Canada, Natural Resources Canada (Canadian Forest Service and Canadian Centre for Remote Sensing), Parks Canada.	McGill University, Laval University, Sherbrooke University, University of Ottawa, Université du Québec à Montréal (UQAM), Université du Québec en Outaouais, Institut de la statistique du Québec, MDDELCC (Québec), Canards Illimités (Ducks Unlimited), Statistics Canada.
	01.07	Contact person	François Soulard, Statistics Canada (Francois.Soulard@statcan.gc.ca); Céó Gaudet, Environment Canada (Ceó.Gaudet@ec.gc.ca)	Paul Thomassin, McGill University (Paul.Thomassin@mcgill.ca)
	01.08	* Governance structure	Interdepartmental Director General Steering Committee, Interdepartmental Coordination Committee, Six Interdepartmental Working Groups	One working group
	01.09	* Nature of activity	Experimental, pilot and production (mostly experimental. Pilot accounts were produced and published)	Experimental and pilot
	01.10	* Status	Completed	Active in progress
	01.11	* Years active (range of years)	2011-2013	2011-present

Parameter group	Parameter code	Parameter	MEGS	QCBS-WG14
	01.12	* Period of record (years covered by output data)	2001-2011	2001-2011
	01.13	* Frequency of data	Various (annual, quinquennial Census)	Various (annual, quinquennial Census)
	01.14	* Collaborative model applied	Federal government only; seven agencies	Governmental, multi-level (federal, provincial,-regional, etc.) plus academic multiple researchers
	01.15	* Disciplinary approach	Largely inter-disciplinary. Working groups consisted of substantial collaboration between economists, ecologists, statisticians and geographers.	Largely inter-disciplinary
	01.16	Author and time of metadata	François Soulard, Mark Henry, Michael Bordt; Dec. 9, 2014	Stéphanie Uhde, Michael Bordt; Dec. 9, 2014.
02. Public description and outputs	02.01	Internet address of project description	http://www.statcan.gc.ca/pub/16-201-x/2013000/part-partie1-eng.htm	http://qcbs.ca/research/working-groups/working-group-14/
	02.02	Online data: (internet address and description)	Published document only.	None yet published.
	02.03	Output documents: (internet address and description)	Human Activity and the Environment 2013: Measuring Ecosystem Goods and Services. Published Nov. 29, 2013. http://www.statcan.gc.ca/pub/16-201-x/16-201-x2013000-eng.htm	Web event Feb. 2012: http://www.cirano.qc.ca/icirano/webevents/201202/
	02.04	User aids available: (meta-data, concepts and methods; internet address and description)	Daily release (http://www.statcan.gc.ca/daily-quotidien/131129/dq131129b-eng.htm) Teacher's kit (http://www.statcan.gc.ca/pub/16-507-x/16-507-x2014001-eng.htm) Canadian System of Environmental and Resource Accounts - Natural Resource Stock Accounts (http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5114)	None yet published.
	02.05	Maps: (internet address and description)	In published document http://www.statcan.gc.ca/pub/16-201-x/2013000/maps-cartes-eng.htm	None yet published.
03. Linkages	03.01	* SEEA-EEA linkage	SEEA-EEA is applied and tested	SEEA-EEA is applied and tested

Parameter group	Parameter code	Parameter	MEGS	QCBS-WG14
	03.02	* Other international standards applied: (SEEA-CF, IMF DQAF, SNA 2008, others)	National and internal standards only (Standard Drainage Area Classification, Soil Landscapes of Canada), Millennium Ecosystem Assessment	National statistical standards are applied.
	03.03	* Links to policy	Report and methods developed are used by participating departments to support their mandates.	Objective is to develop policy-relevant ecosystem accounts for Quebec. Pilot ecosystem account to be linked to the land accounts for Southern Québec developed at the Institut de la statistique du Québec.
04. Scope and scale	04.01	* Geographic scope	Generally national. Some pilot accounts for sub-national areas (Wetlands in Prairies, Thousand Islands National Park)	Currently Chaudière-Appalaches administrative region
	04.02	* Geographic scale	National land use at 250m; sub-national at 30m	Land use at 30m, with 5m for specific study areas.
	04.03	* Thematic scope	Various, depending on section/pilot (extent, condition, services, values, combinations)	Objective is to be comprehensive.
	04.04	* Coverage of ecosystem types	Comprehensive for some indicators, focus on wetlands	Objective is to be comprehensive.
	04.05	* Coverage of services types	Comprehensive for some indicators	Objective is to be comprehensive.
	04.06	* Consideration of beneficiaries	Considered but not measured.	Objective is to consider beneficiaries.
	04.07	* Scale of beneficiaries	Various sub-national (downstream residents for wetlands, park users and nearby residents)	Comprehensive
	04.08	* Consideration of decision context	No (other than participating departments)	Not currently (other than participating stakeholders)
	04.09	* Scale of decision context	National (implied)	Regional, provincial
	04.10	* Consideration of drivers of change	Yes, for national indicators and wetlands.	Objective is to consider drivers of change
	04.11	* Scale of drivers of change	Local, sub-national and national	Local, national and global

Parameter group	Parameter code	Parameter	MEGS	QCBS-WG14
	04.12	* Range of human values considered in the valuation of ecosystem assets and services	Economic, risk oriented (wetland extent vs variability, water quality), contextual	Objective is to be comprehensive.
	04.13	* Time frame	Description of current and past conditions	Not yet determined
05. Classifications	05.01	* Spatial units	Based on SEEA-EEA land cover units, further distinguished by soil units, elevation and terrain; aggregated up with the National Ecological Framework of Canada and the Standard Drainage Area Framework.	Based on SEEA-EEA land cover units
	05.02	* Ecological (land cover) classification used	Largely SEEA-CF	Largely SEEA-CF. More detailed classification (4-digits) has been developed to facilitate ecosystem accounting.
	05.03	* Classification of services used	Various.	CICES to be tested.
06. Data sources	06.01	* Ecological data sources	Existing data, various sources	Forest inventory, existing local field results, estimates from earth observation (experimental), specific field research (wetlands)
	06.62	* Physical services data sources	Existing data, various sources, some benefits transfer	Existing local field results, estimates from earth observation (experimental), specific field research
	06.03	* Valuation data sources	Benefits transfer (EVRI and other studies)	Not yet determined
	06.04	* Spatial data sources	Satellite (30m Landsat), 250 MODIS, Peatlands database, statistical (Census)	Satellite (30m Landsat), aerial (forest inventory, insured cultivated land), statistical (Census, demographic data)
07. Methods	07.01	* Biophysical measures of ecosystem condition used	Ecosystem services potential, water quality	Not yet determined
	07.02	* Biophysical measures of ecosystem services used	Biomass extraction, multiple (wetland supply and demand(peat, extent, hydrology), HLM (distance to patch, average patch size)	Not yet determined
	07.03	* Valuation approach	Multiple (market and welfare, relative values from supply and demand comparisons (scarcity), depending on case study)	Not yet determined
	07.04	* Approaches to pricing	Multiple (Market exchange, Hedonic pricing, Travel cost, Contingent valuation)	Not yet determined

Parameter group	Parameter code	Parameter	MEGS	QCBS-WG14
	07.05	* Final aggregates used	Depends on case study; park study resulted in one monetary value;	Objective is to provide various aggregates including monetary and non-monetary.
	07.06	Specific modelling tools used (InVEST, AIRIES, EnSym, etc.)	None presently	None presently
	07.07	Matrix of data and sources for each ecosystem and service type	Not yet determined	Not yet determined
08. Usage notes	08.01	Languages available	English, French	English, French
	08.02	Access mechanism	Publication online, additional details via contact person.	via contact person
	08.03	Restrictions and conditions	Cite source of published materials	Cite source of published materials
	08.04	Price	Online documents free; special tabulations at cost.	Not yet determined
	08.05	Keywords	Canada, wetlands, Thousand Islands National Park, geodatabase.	Land accounts, wetlands
09. Additional information			The working committee established for the project continues to meet to discuss related ongoing projects.	