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SEEA Implementation in Canada

UNSD SEEA Training of Trainers Seminar

7-10 July 2015, Santiago

Joe St. Lawrence

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“Beyond GDP”

“...we often draw inferences about what are good policies by looking at what policies have promoted economic growth; but if our metrics of performance are flawed, so too may be the inferences that we draw.”

Stiglitz, J.E., A. Sen, and J-P. Fitoussi, (2009), Report by the Commission on the Measurement of Economic Performance and Social Progress, p.7
www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf

Integrating the Environment and the Economy at Statistics Canada

1970s	Structural Analysis Division
1978	First edition of <i>Human Activity and the Environment</i>
1989	<i>Waste Management Industry Survey</i>
1994	<i>Survey of Environmental Protection Expenditures</i>
1995	<i>Environment Industry Survey</i>
1997	<i>Canadian System of Environment and Resource Accounts (CSERA)</i>
2003	<i>Environment and Sustainable Development Indicators</i>
2005	<i>Agricultural Water Use Survey</i>
2007	<i>Survey of Industrial Water Use</i>
2009	<i>Survey of Drinking water Treatment Plants</i>
2013	<i>Measuring Ecosystem Goods and Services project results published in Human Activity and the Environment</i>



The Green Plan

Initiation

1990 Federal Budget

Objectives

To initiate development of a system of environmental and resource accounts that would quantify the links between the environment and the economy.

Outcome

Canadian System of Environmental and Resource Accounts

Accounts: Physical Flows (water, energy, GHG)

Assets (minerals, energy, timber), Land

Related indicators

Surveys: Environmental Protection Expenditures,
Environmental Goods and Services

Environment and Sustainable Development Indicators

Initiation

2000 Federal Budget

Objectives

To find ways to track the impact of current economic practices on the natural and human assets that will be needed by future generations of Canadians.

Outcome

Reports: *2003 State of the Debate Report, 2006-08 Canadian Environmental Sustainability Indicators*

Indicators: *Air Quality, Water Quality, GHG Emissions*

Surveys: *Households and the Environment, Industrial Water Use, Agricultural Water Use, Drinking Water Treatment Plants*

Links: Ongoing contribution to Federal Sustainable Development Strategy indicators

Measuring Ecosystem Goods and Services

Initiation

2011 Interdepartmental funding request

Objectives

To develop experimental ecosystem accounts with the specific objective of supporting policy needs related to the valuation of ecosystem goods and services.

Outcome

Reports: *Human Activity and the Environment 2013: Measuring ecosystem goods and services in Canada*

Infrastructure: MEGS geospatial database, MEGS community of practice

SNA framework

	Industries	Final demand	Assets
Sectors			Financial and produced assets, opening balance
Commodities	Industrial output of goods and services		
	Industrial intermediate demand	Final demand	Gross fixed capital formation
Wastes			
Sectors			Other changes in volume & holding gains/losses on financial & produced assets
			Financial and produced assets, closing balance

System of Environmental-Economic Accounts (SEEA) framework

	Industries	Final demand	Assets		
Sectors			Financial and produced assets, opening balance	Natural resource assets, opening balance	Natural resource assets, opening balance
Commodities	Industrial output of goods and services				
	Industrial intermediate demand Environmental protection expenditures	Final demand Environmental protection expenditures	Gross fixed capital formation Capital expenditures for environmental protection		
	Resource production by industries Resource use by industries	Resource production by households/gov't Resource use by households/gov't			
Wastes	Waste consumption by industries Waste output by industries	Waste consumption by households/gov't Waste output by households/gov't			
Sectors			Other changes in volume & holding gains/losses on financial & produced assets	Changes in and holding gains/losses on natural resource assets	Changes in natural resource assets
			Financial and produced assets, closing balance	Natural resource assets, closing balance	Natural resource assets, closing balance

Physical Flow Accounting

Table 153-0113^{1, 2, 3}

Physical flow account for energy use
annual (terajoules)

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The data below is a part of CANSIM table 153-0113. Use the [Add/Remove data](#) tab to customize your table.

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Geography= Canada

Sector	2009	2010	2011
Total, industries and households	10,796,554	11,028,558	11,270,959
Total, industries	8,222,637	8,498,566	8,674,591
Crop and animal production	207,799	242,016	266,477
Forestry and logging	20,359	23,025	22,028
Fishing, hunting and trapping	7,154	8,723	9,529
Support activities for agriculture and forestry	12,815	13,233	12,368
Oil and gas extraction	1,406,705	1,459,208	1,484,357
Coal mining	17,716	22,949	21,442
Metal ore mining	73,703	80,354	82,968
Non-metallic mineral mining and quarrying	39,477	45,131	61,332
Support activities for mining and oil and gas extraction	102,392	97,750	102,082
Electric power generation, transmission and distribution	1,471,154	1,493,969	1,451,841

Asset Accounting – physical stock accounts

Table 153-0122 [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#)

Selected natural resource reserves
annual (data in thousands)

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Geography = Canada ⁸

Asset type = Established crude bitumen reserves (cubic metres) ¹⁰

Stock	2005	2006	2007	
Opening stock	1,660,000	1,620,000	3,340,000	
Additions	17,258	1,785,707	237,000	
Depletion	57,258	65,707	77,000	
Closing stock	1,620,000	3,340,000	3,500,000	

Asset Accounting – monetary stock accounts

Table 153-0121 ^{1, 2}

Value of selected natural resource reserves
annual (dollars x 1,000,000)

Data table

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Geography = Canada

Asset type = Established crude bitumen reserves

Stock	2008	2009	2010
Reconciliation account opening stock ^a	191,145.4	476,744.1	182,194.4
Reconciliation account additions ^a	97,122.8	103.7	611.1
Reconciliation account depletion ^a	8,426.2	3,733.8	7,618.1
Reconciliation account revaluation ^a	196,902.1	-290,919.7	161,310.8
Reconciliation account closing stock ^a	476,744.1	182,194.4	336,498.2

Asset Accounting – National Balance Sheet

Table 378-0005³

Natural resource assets and produced assets

annual (dollars x 1,000,000)

Data table

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Geography = Canada

Categories	2010	2011	2012
Non-financial assets	7,300,919	7,908,875	7,989,008
Produced non-financial assets	4,341,079	4,542,844	4,798,608
Residential structures	1,746,076	1,830,149	1,940,622
Non-residential structures	1,363,751	1,450,086	1,547,386
Machinery and equipment	311,650	306,210	318,904
Consumer durable goods	489,082	503,721	519,597
Inventories	232,458	248,493	260,014
Non-produced non-financial assets	2,959,840	3,366,031	3,190,400
Land	2,016,993	2,166,234	2,333,898
Timber	126,552	120,035	102,454
Subsoil resource stocks	816,295	1,079,762	754,048
Selected energy resources ¹	580,180	753,024	529,671
Selected mineral resources ²	236,115	326,738	224,377

Accounting for Environmental Transactions (Expenditures)

Table 153-0052 ^{1, 2, 9}

Capital and operating expenditures on environmental protection, by North American Industry Classification System (NAICS) and type of activity, Canada
every 2 years (dollars)

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Geography = Canada ³

Expenditures = Capital expenditures ⁴

North American Industry Classification System (NAICS) = Total, all industries ⁵

Type of activity	2006	2008	2010	2012
Total, all activities (x 1,000,000)	3,909.5 ^r	3,789.9 ^r	4,425.4	5,271.4
Environmental monitoring (x 1,000,000)	174.2 ^r	44.2 ^r	55.4	55.1
Environmental assessments and audits (x 1,000,000)	142.3 ^r	105.5 ^r	198.8	243.9
Reclamation and decommissioning (x 1,000,000)	429.1 ^r	496.6 ^r	608.3	449.9
Wildlife and habitat protection (x 1,000,000)	156.8 ^r	90.3 ^r	178.8	90.6
Waste management and sewerage services (x 1,000,000)	523.6 ^r	396.4 ^r	534.9	688.1
Pollution abatement and control processes (end-of-pipe) (x 1,000,000)	916.5 ^r	1,640.2 ^r	1,714.3	2,362.4
Pollution prevention processes (x 1,000,000)	1,566.9 ^r	964.7 ^r	1,070.9	1,043.8
Fees, fines and licences ⁴		
Other types of environmental protection (x 1,000,000) ⁴	..	52.1 ^r	63.9	337.6

Extensions – attribution to demand

Table 153-0129^{1, 2, 5}

Physical flows by final demand category annual

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Geography= Canada

Flow= Greenhouse gas emissions by final demand category (kilotonnes)

Sector	2009	2010
Total, industries and households	714,937	727,
Personal expenditure (households)⁴	313,692	314,
Non-profit institutions serving households' consumption expenditure	6,153	5,
Government net current expenditure	44,184	45,
Gross fixed capital formation	74,832	82,
International exports	276,077	279,

Extensions – direct and indirect intensities (multipliers)

Table 153-0115 [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [8](#)

Direct plus indirect energy and greenhouse gas emissions intensity, by industry
annual

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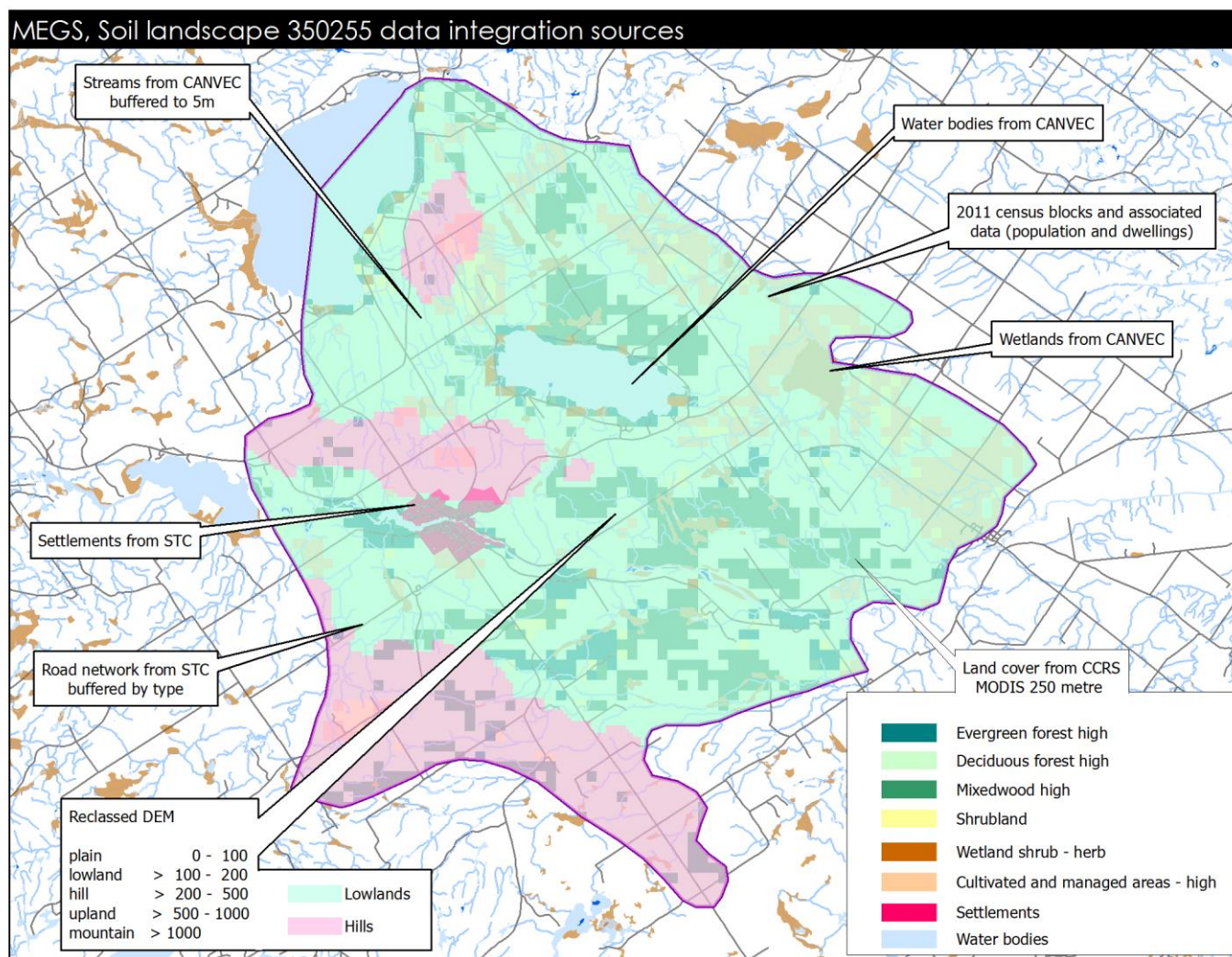
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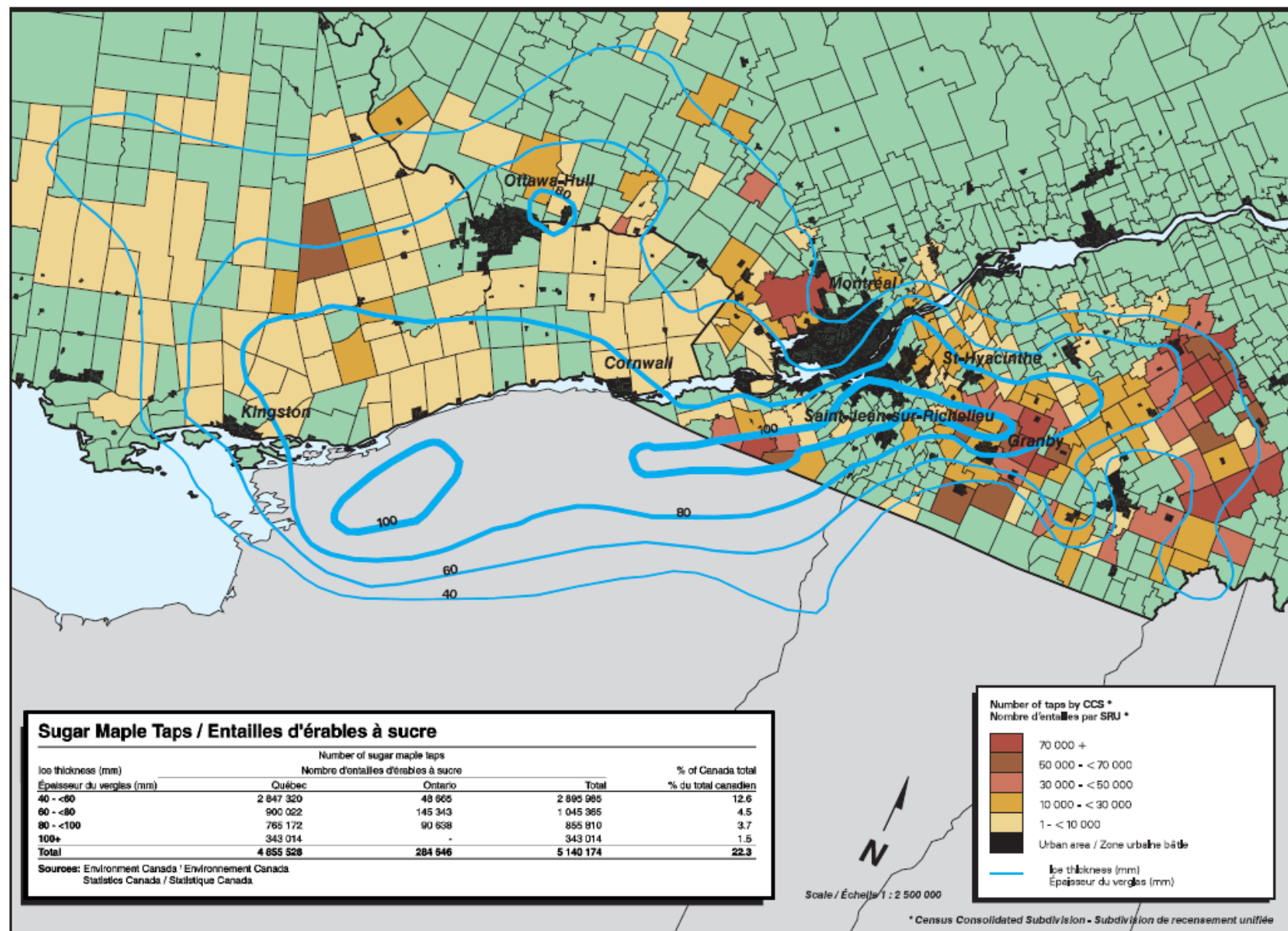
Geography = Canada

Intensity = Direct plus indirect energy intensity (gigajoules per thousand current dollars of production)


Sector	2009	2010	2011
Total, industries	5.31	5.14	4.91
Crop and animal production [BS11A00]	12.04	12.62	11.28
Forestry and logging [BS11300]	8.47	8.60	7.74
Fishing, hunting and trapping [BS11400]	8.45	8.59	7.49
Support activities for agriculture and forestry [BS11500]	11.08	10.88	9.71
Oil and gas extraction [BS21100]	17.58	15.55	13.48
Coal mining [BS21210]	6.60	6.83	5.71
Metal ore mining [BS21220]	11.60	6.03	4.32
Non-metallic mineral mining and quarrying [BS21230]	7.03	6.00	5.76
Support activities for mining and oil and gas extraction [BS21300]	9.29	7.01	6.32
Electric power generation, transmission and distribution [BS22110]	28.26	27.40	24.78

Experimental Ecosystem Accounting





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Questions?

Joe St. Lawrence

Statistics Canada | 170 Tunney's Pasture Driveway, Ottawa ON K1A 0T6

Statistique Canada | 170, promenade Tunney's Pasture, Ottawa ON K1A 0T6

Joe.St.Lawrence@statcan.gc.ca

Telephone | Téléphone 613-882-8598

Facsimile | Télécopieur 613-951-0634

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