

# Developments in environmental-economic accounts at Stats NZ

Adam Tipper  
Jane Harkness  
Erica Deverall



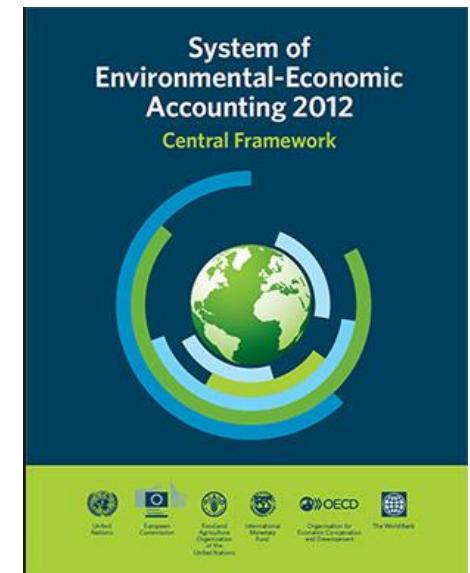
# Environmental-economic accounting

## ◎ Environmental accounts:

- measure the value and volume natural resources
- identify which industries use natural resources
- record the flow of residuals from the economy to the environment

## ◎ System of Environmental-Economic Accounting (2012) Central Framework

- Standard approach for showing the interface between the economy and the environment, in a consistent and comparable framework
- Adopted as the international standard for measuring natural capital by the UN



# The Statistics NZ experience

Year	
2000	Impetus as a result of the Budget. Government decided that more information was required on relationships between the economy, the environment and society.
2001	Statistics NZ's environment statistics team set up
2002	<i>Natural Resource Accounts For New Zealand</i> released
2007	5 FTEs on SEEA from 2002-07
2012	18 publications had been produced since 2001 across 7 accounts
2015	Environmental Reporting Act passed
2016-2017	Selected Accounts produced to support Environmental Reporting

# Environmental-economic accounts: 2018

- Natural capital: physical estimates
  - *Land cover, timber stocks (and carbon stocks and sequestration), water stocks*
- Natural capital: monetary estimates
  - Renewable energy, *timber (and value of carbon sequestration)*, fish
- Flows from the economy to the environment
  - *Greenhouse gases by industry*
- Environmental activity accounts
  - Environmental protection expenditure, *environmental taxes*, marine economy

# Land cover accounts

Land cover, New Zealand, 1996–2012

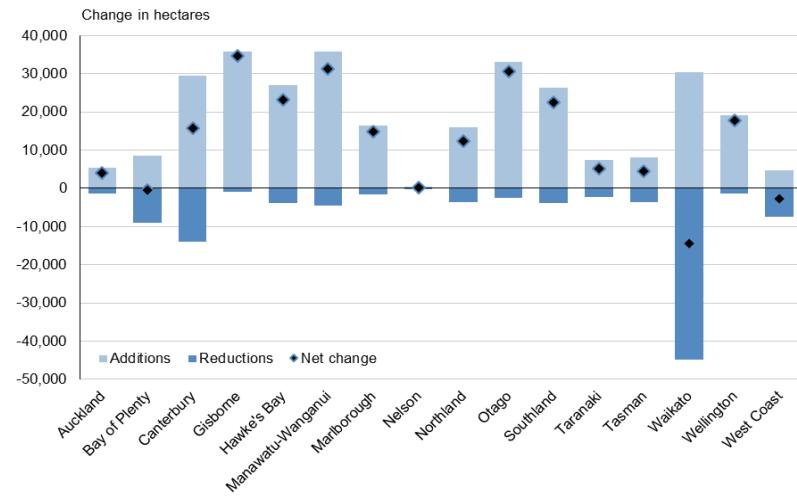
Land cover	Opening area (1996)	Additions	Reductions	Net change	Closing area (2012)
Hectares					
Artificial surfaces	221,419	25,078	858	24,220	245,640
Coastal water bodies and intertidal areas	94,271	79	59	20	94,291
Grassland	13,405,584	161,095	375,676	-214,581	13,191,003
Herbaceous crops	363,635	14,488	8,374	6,115	369,749
Inland water bodies	439,765	2,804	251	2,554	442,319
Mangroves	28,056	43	2	41	28,097
Permanent snow and glaciers	111,040	...	...	...	111,040
Shrub-covered areas	2,095,201	57,788	107,994	-50,206	2,044,995
Shrubs and/or herbaceous vegetation, aquatic or regularly flooded	166,600	221	1,705	-1,483	165,117
Terrestrial barren land	941,750	2,239	3,861	-1,622	940,128
Tree-covered areas	8,906,877	304,775	105,228	199,547	9,106,424
Woody crops	68,203	42,274	6,878	35,395	103,599
Total	26,842,401	610,885	610,885	0	26,842,401

Note: The SEEA land cover classification includes classes for 'multiple or layered crops' and 'sparsely natural vegetated areas'. These are, however, not relevant in New Zealand.

Symbol: ... not available. Permanent snow and glaciers was measured in 1996 but has not been updated since.

Source: Stats NZ using data from Landcare Research

Change in tree-covered areas  
By region  
1996–2012



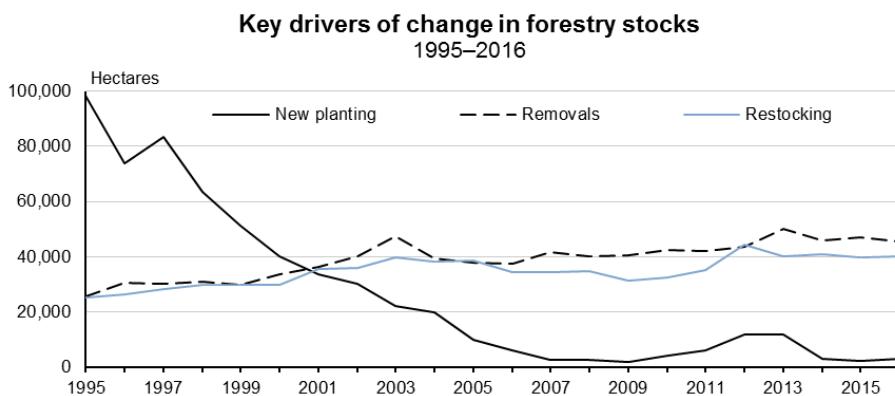
Source: Stats NZ using data from Landcare Research

- Grassland accounted for 49.1% of New Zealand's land cover; tree-covered areas a further 33.9%.
- From 1996-2012, tree-covered areas increased 199,547 hectares (2.2%).
  - Additions of 304,775 hectares, 105, 228 hectares of reductions.
- Of the net change in tree-covered areas, 162,968 (or 82 percent) were classed as grassland in 1996 while a further 38,901 (20 percent) hectares were classed as shrub-covered areas. <sup>5</sup>

# Timber physical stock accounts

	Cultivated timber resource	Natural timber resources		Total timber resources	Total timber resources
	Available for wood supply	Available for wood supply	Not available for wood supply	Available for wood supply	
<b>Thousand cubic metres</b>					
<b>Opening stock of timber resources</b>	501,716	365,231	1,909,067	866,947	2,776,014
<b>Additions to stock</b>					
Natural growth	41,643	...	...	41,643	41,643
Reclassifications	...	...	...	...	...
<b>Total additions to stock</b>	41,643	0	0	41,643	41,643
<b>Reductions in stock</b>					
Removals	29,914	0	0	29,914	29,914
Harvesting (recoverable volume)	25,008	...	...	25,008	25,008
Harvesting (non-recoverable volume)	4,413	...	...	4,413	4,413
Thinning (recoverable volume)	419	...	...	419	419
Thinning (non-recoverable volume)	74	...	...	74	74
Natural losses	...	...	...	...	404
Catastrophic losses	...	...	...	...	...
Reclassifications	...	...	...	...	...
<b>Total reductions in stock</b>	29,914	0	0	29,914	30,318
<b>Balancing item<sup>(1)</sup></b>	-11,985	...	...	-11,985	-11,581
<b>Closing stock of timber resources</b>	501,460	365,231	1,909,067	866,691	2,775,758

# Timber physical stock accounts



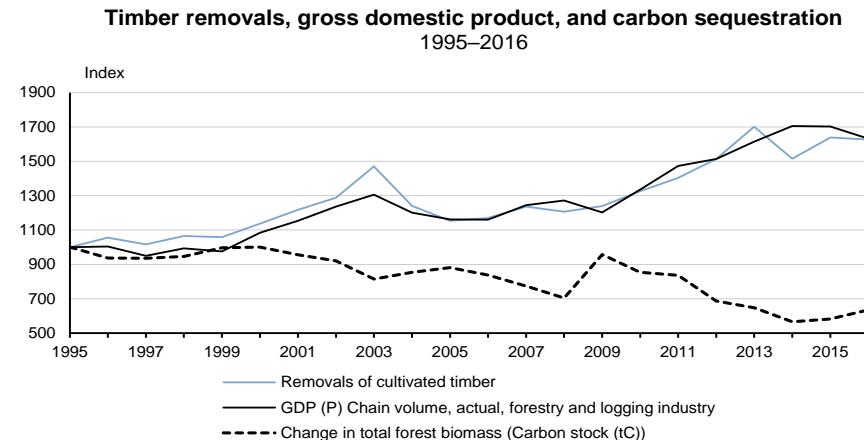
From 1995-2016:

- Total natural timber resources decreased 0.2% (10,546 ha or 3.8 million cubic meters).
- Total cultivated timber stocks increased 90%, driven by new planting in the 1980s and 1990s, and natural growth.
- Carbon stocks in cultivated forests increased 69%.
- Total timber available for wood supply stocks increased 25%.

In 2016:

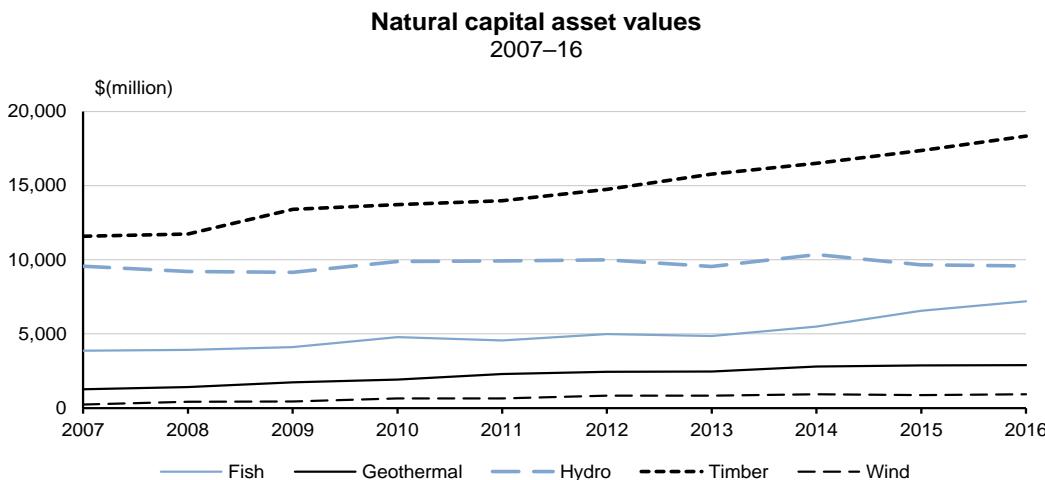
- Total timber stocks fell 256 thousand cubic metres (0.0%)
- Land area harvested exceeded land area planted by 2,503 ha.

Cultivated timber will reach maturity over the next decade. GDP for the forestry and logging industry is expected to rise while carbon sequestration services are expected to fall.



Note: Removals data is year ended 1 April, GDP data is year ended March, and carbon stock data is year ended December. The carbon stock data has been converted to the closest possible March year i.e. December 2010 becomes March 2011. GDP is provisional (P)

# Timber monetary stock account

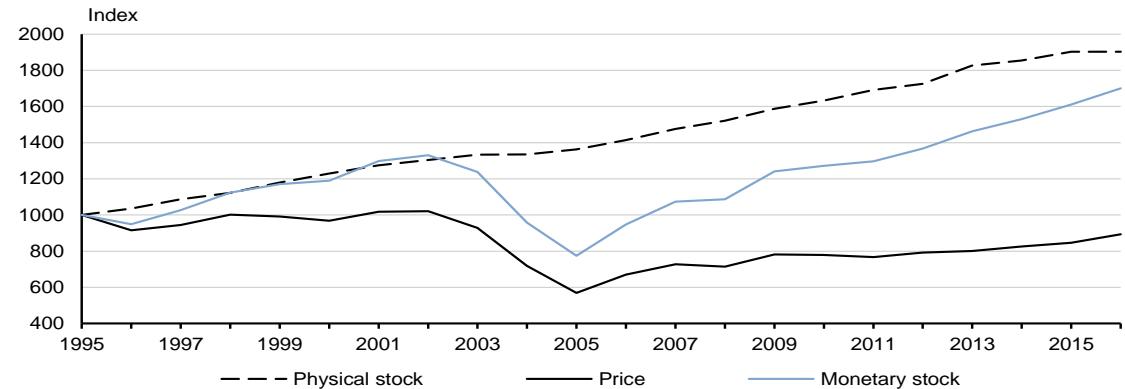


Source: Stats NZ

- Growth in value was driven by an increase of 90% in stock volumes, offset by an 11% decrease in the price of timber per cubic metre.

- The value of cultivated (exotic and commercially viable) timber stocks reached \$18.3 billion, highest of all measured assets

**Forestry monetary stock account  
1995–2016**

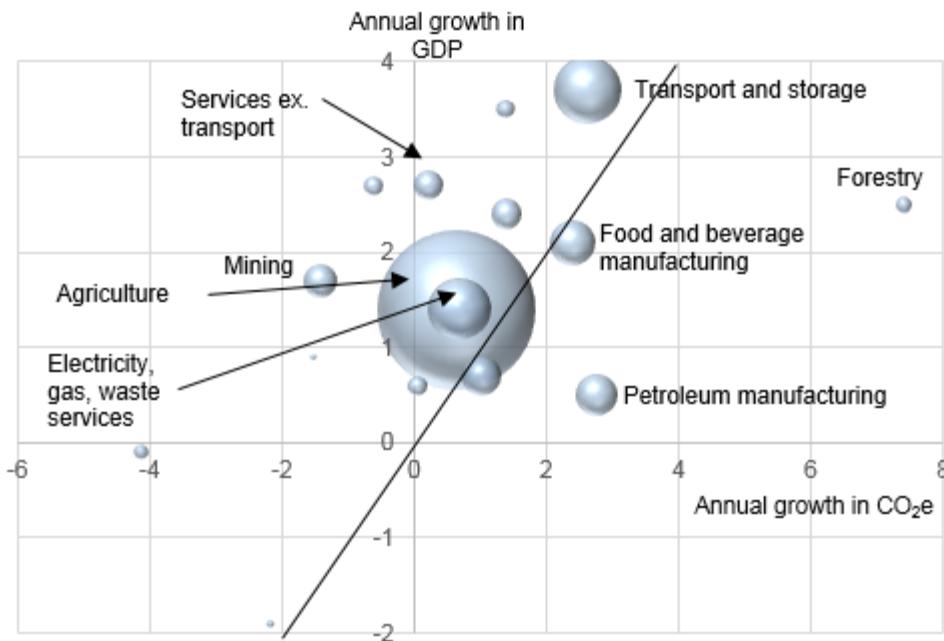


Source: Stats NZ. Ministry of Primary Industries

# Air emissions account

## Annual growth in GDP and emissions

By industry  
1990-2015



Source: Stats NZ using data from: Ministry for the Environment ; Ministry for Business, Innovation and Employment;

- Negative CO<sub>2</sub>e growth, positive GDP growth:
  - fishing
  - mining
  - transport equipment, machinery and equipment manufacturing
- Positive CO<sub>2</sub>e growth greater than GDP growth:
  - forestry
  - food, beverage, and tobacco product manufacturing
  - petroleum, chemical, polymer, and rubber product manufacturing
  - metal product manufacturing
  - total manufacturing

## Future developments

- Indigenous timber stocks
- Forestry flow accounts (eg use of timber resources within the economy)
- Forest ecosystem services (eg avoided nutrients, water yield, recreation)
- Combined presentation using SEEA Agriculture, Forestry, and Fisheries

### **1997 Supply and Use Industry Breakdown Table**

### **Use of Forestry Products (cubic metres of roundwood equivalent)**

INTERMEDIATE CONSUMPTION BY INDUSTRIES - (ANZIND96 V5.0)														
COMMODITIES		Sheep & beef cattle farming	Dairy cattle farming	Forestry	Other agriculture, forestry and logging	Log sawmilling and timber dressing	Other wood product mfg	Pulp paper and paperboard mfg	Paper and paperboard containers	Printing and services to printing	Publishing recorded media mfg and publishing	Furniture mfg	Other mfg	Residential building construction
Forestry Products														
Logs and Poles	m3 RE \$000	47,921 11,083	51,536 11,919	36,917 8,538	69,147 15,992	4,940,651 580,481	1,356,239 159,343	3,151,402 129,255						83,740 14,487
Wood Chips (chipped logs)	m3 RE \$000	- -	- -	- -	- -	- -	750,800 32,181	2,940,620 126,041	- -	- -	- -	- -	- -	
Sawn Timber	m3 RE \$000	- -	- 87	261 34	102	35,044 11,661	1,223,525 407,113	137,231 45,662	- -	- -	- -	206,003 68,545	224,768 74,789	873,666 290,702
Veneer	m3 RE \$000	- -	- -	- -	- -	- -	131,275 23,727					334,978 60,545		

		Production; generation of residuals				
Supply		Wood and Paper Products Manufacturing	Forestry and logging	Petroleum, Chemical, Polymer and Rubber Product Manufacturing	Information Media and Telecommunications	...
Natural inputs						
Products						
Wood and non-wood forest products						
Wood						
Panels, boards, veneer sheets, and plywood						
Building joinery						
Wood containers and other wood products						
Pulp, paper, and paperboard						
Basic chemicals; other paper and paperboard products						
Books and other printed material						
Newspapers and journals						
Residuals						
Total supply						

## Economic and environmental accounting for the forestry and logging industry

### Economic variables

			2010	2011	2012	2013	2014	2015	2016
Output	Current prices								
Intermediate Consumption	Current prices								
Gross Domestic Product	Current prices								
Gross operating surplus and gross mixed income	Current prices								
Gross domestic product	Constant prices								
Employment	Count of people								
Export volumes									
Resource rent	Current prices								

### Capital stocks

Fixed assets	Current prices								
Fixed assets	Constant prices								
Timber stock	Current prices								
Timber stock	Cubic metres								
Carbon stock	Tonnes								

### Use of environmental assets

Total removals (recoverable volume)	Cubic metres								
Land use	Hectares								
Soil quality	Percent of sites meeting target, organic reserves								
Energy use	Petjoules								
Water use	Cubic metres								
Carbon sequestered	Tonnes								

### Residuals

Greenhouse gas emissions	CO2 equivalents								

## Access the report

<https://www.stats.govt.nz/reports/environmental-economic-accounts-2018>

Contact us: [environmental.accounts@stats.govt.nz](mailto:environmental.accounts@stats.govt.nz)