

Environment Protection Expenditure

Australia

1995–96 and 1996–97

**W.McLennan
Australian Statistician**

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INQUIRIES

- For further information about these and related statistics, contact Bob Harrison on Canberra 02 6252 7369, or any ABS office shown on the back page of this publication.

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P R E F A C E

This publication presents estimates of expenditure on environment protection by Australian governments, businesses and households and is one of a series of publications presenting information in this area. A key development of the series is the use of the European System for Economic Information on the Environment (SERIEE) to guide data analysis and presentation. The SERIEE framework broadens the range of data collected and differs from earlier approaches because expenditure is allocated to environmental domains.

Statistics on environment protection expenditure are important because they provide an indication of the economic impact of environment protection policies, regulations and practices on the different sectors within Australia. In addition to their use within Australia, the SERIEE framework provides scope for comparisons with other countries using the same framework. Given the importance of global issues such as greenhouse gas emissions and the related impacts of climate change, this capacity is particularly useful for international negotiations, agreements and initiatives.

Given the exploratory nature of this work and the use of the new SERIEE research framework, the ABS welcomes feedback from readers regarding the usefulness, range and quality of the data presented and the explanations provided. Please send any comments to the Director, Environment and Energy Statistics Section, Australian Bureau of Statistics, PO Box 10, Belconnen, ACT 2616.

W. McLennan
Australian Statistician

LIST OF ABBREVIATIONS AND OTHER USAGES

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ANZSIC	Australian and New Zealand Standard Industrial Classification
CFC	Chlorofluorocarbon
NPI	National Pollutant Inventory
OECD	Organisation for Economic Co-operation and Development
PAC	Pollution Abatement and Control
R&D	Research and Development
SERIEE	European System for the Collection of Economic Information on the Environment
SISCA	Standard Institutional Sector Classification of Australia
SNA	System of National Accounts
WSAA	Water Services Association of Australia

SYMBOLS AND OTHER USAGES

\$b	billion (a thousand million)
\$m	million (a thousand thousand)
n.a.	not available
n.e.c.	not elsewhere classified
n.p.	not published
..	not applicable
—	nil or rounded to zero

INTRODUCTION

This is the fifth in a continuing series of Australian Bureau of Statistics (ABS) publications reporting on estimates to protect the environment by Australian governments, the corporate sector and households. Since the release of the first issue of this publication in 1994, the scope for the collection of these statistics has continued to broaden, and data collection and presentation have been influenced by changing international frameworks in this field. Statistics presented in this edition are guided by the European System for Economic Information on the Environment (SERIEE).

The ABS continues to collect and present comprehensive estimates of environment protection expenditure and income for a number of reasons:

- they are indicative of the response of various sectors to environment protection regulations and policies;
- they provide some indication of the demand for goods and services provided by the 'environment management' industry;
- they form part of environment 'satellite' accounts designed to augment the core system of national accounts; and
- to estimate expenditure on environment protection, by sector and environmental domain.

In this issue, environment protection activities are classified according to the environmental media, or type of pollution/degradation concerned. The key domains provided within SERIEE are:

- waste management;
- waste water and water protection;
- ambient air and climate protection;
- protection of biodiversity and landscape;
- protection of soil and groundwater; and
- other environment protection activities.

Each chapter describes transactions relating to one of the above domains, allowing an analysis of who is using the service, who is paying for the service, and who provides the service.

The sectoral splits provided in the environment protection expenditure accounts are broadly consistent with the System of National Accounts. That is, transactions of general government, the corporate sector and the household sector are separately identified and described where possible (see the Explanatory Notes for descriptions of these sectors).

COMPARABILITY WITH PREVIOUS YEARS

The results for 1995–96 and 1996–97 are not directly comparable with previous results from *Environment Protection Expenditure, Australia* (ABS Cat. No. 4603.0) because the estimates are wider in scope and based on a different methodology (see paragraphs 1–3 and 38–42 in the Explanatory Notes). The approximate magnitude of the change between the different collection strategies can be seen in table 1.1 and in graph 1.2.

1.1 ENVIRONMENT PROTECTION EXPENDITURE, Comparison of results

<i>Financial year</i>	<i>PAC(a)</i> \$m	<i>SERIEE(b)</i> \$m
1992–93	6 632.0	n.a
1993–94	6 506.3	n.a
1994–95	6 989.7	n.a
1995–96	7 875.6	8 364.9
1996–97	n.a.	8 633.6

(a) Pollution abatement and control framework.

(b) European system for the collection of economic information on the environment.

1.2 ENVIRONMENT PROTECTION EXPENDITURE, Time series comparison



(a) Pollution abatement and control.

(b) European system for the collection of economic information on the environment.

SUMMARY RESULTS 1995–96 AND 1996–97

By environmental domain

Table 1.3 presents an overview of expenditure by environmental domain.

Total national expenditure for environment protection was estimated at \$8.4b in 1995–96 and \$8.6b in 1996–97. This represented approximately 1.6% of gross domestic product in both years. The majority of national expenditure to protect the environment was on waste water management and water protection (\$2.9b and \$3.0b in 1995–96 and 1996–97, respectively) and waste management activities (\$2.4b and \$2.5b in 1995–96 and 1996–97, respectively). Together these represented around 63% of environment protection expenditure.

Expenditure to protect biodiversity and landscape contributed a further 18% to total expenditure (\$1.5b in both years), with protection of ambient air and climate, and soil and groundwater representing only about 6% and 4%, respectively.

The remainder (less than 10%) was expenditure for research and development, noise and vibration abatement, and expenditures on other environment protection activities not able to be separately identified and allocated to a specific domain.

Graphs 1.4 and 1.5 present capital and current expenditure on each of the environmental domains for 1995–96 and 1996–97.

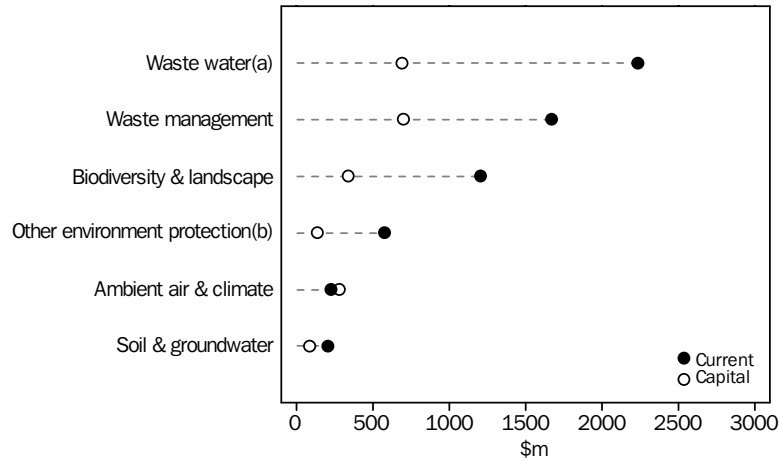
1.3 NATIONAL ENVIRONMENT PROTECTION EXPENDITURE, By Environmental Domain—Summary

Components	Waste management	Waste water and water protection	Air and climate	Biodiversity and landscape	Soil and groundwater	Other	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96							
Final consumption of environment protection services and products							
General government	255 649	121 334	31 702	928 643	114 697	410 492	1 862 516
Households	458 300	1 729 400	87 400	143 800	300	1 300	2 420 500
Total	713 949	1 850 734	119 102	1 072 443	114 997	411 792	4 283 016
Intermediate consumption of environment protection services and products							
All industries	957 526	377 276	105 625	131 331	88 302	166 232	1 826 292
Total consumption of services and products	1 671 475	2 228 010	224 727	1 203 774	203 299	578 023	6 109 308
Gross capital formation for environment protection activities							
General government	319 024	125 460	1 017	305 808	5 701	78 343	835 353
Corporate (public and private)	384 288	564 745	278 748	34 097	84 064	59 102	1 405 044
Total	703 312	690 205	279 764	339 905	89 765	137 444	2 240 394
National expenditure for environment protection(a)							
Current	1 672 884	2 236 663	225 001	1 205 994	205 783	578 216	6 124 540
Capital	703 312	690 205	279 764	339 905	89 765	137 444	2 240 394
Total	2 376 196	2 926 868	504 765	1 545 899	295 548	715 660	8 364 934
1996–97							
Final consumption of environment protection services and products							
General government	269 386	208 076	45 623	1 056 942	200 239	389 431	2 169 697
Households	617 400	1 749 900	100 000	168 700	300	1 400	2 637 700
Total	886 786	1 957 976	145 623	1 225 642	200 239	390 831	4 807 397
Intermediate consumption of environment protection services and products(a)							
All industries	1 194 716	431 520	61 454	153 010	82 085	308 283	2 231 068
Total consumption of services and products	2 081 502	2 389 496	207 078	1 378 651	282 624	699 114	7 038 465
Gross capital formation for environment protection activities							
General government	113 151	107 395	3 088	115 201	2 969	40 465	382 269
Corporate (public and private)	271 988	513 271	229 645	19 008	58 705	108 159	1 200 774
Total	385 139	620 665	232 733	134 209	61 674	148 624	1 583 043
National expenditure for environment protection(b)							
Current	2 082 056	2 397 593	207 127	1 379 193	285 399	699 162	7 050 530
Capital	385 140	620 666	232 733	134 209	61 674	148 624	1 583 043
Total	2 467 196	3 018 259	439 860	1 513 402	347 073	847 786	8 633 573

(a) Data for service industries not separately identified for air and climate, biodiversity and landscape, and soil and groundwater. These figures are included in 'other'.

(b) Includes subsidies.

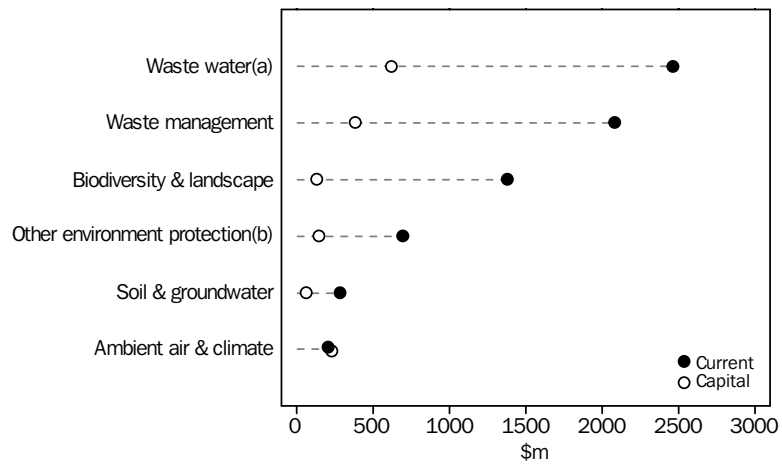
1.4 ENVIRONMENT PROTECTION EXPENDITURE, By Domain—1995–96



(a) Includes protection of water.

(b) Includes noise and vibration abatement, research and development.

1.5 ENVIRONMENT PROTECTION EXPENDITURE, By Domain—1996–97



(a) Includes protection of water.

(b) Includes noise and vibration abatement, research and development.

By environmental domain *continued*

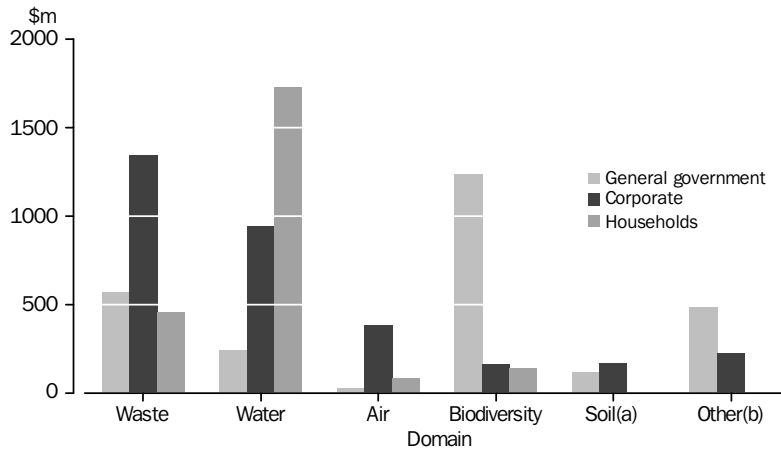
Graphs 1.6 and 1.7 present expenditures on each of the environmental domains by sector.

Expenditure for waste management and protection of air and climate is dominated by the corporate sector, followed by the consumption of these services and activities by the household sector, with smaller amounts spent by general government.

In contrast, general government contributed the greatest amount of resources towards the protection of biodiversity and landscape, with relatively small amounts spent on these activities by households and the corporate sector.

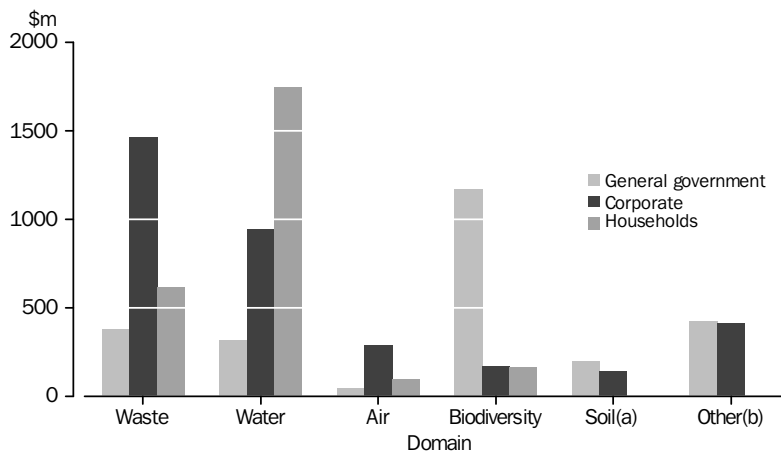
The household sector spent the most on waste water (and water protection) services. A substantial proportion of expenditure by the corporate sector was also for these purposes, with expenditure by general government on these activities being relatively small.

1.6 ENVIRONMENT PROTECTION EXPENDITURE, By Sector—1995–96



(a) Low household expenditure in Soil and Groundwater Protection and Other Environment Protection Expenditure.
 (b) Includes noise and vibration abatement, research and development.

1.7 ENVIRONMENT PROTECTION EXPENDITURE, By Domain—1996–97



(a) Low household expenditure in Soil and Groundwater Protection and Other Environment Protection Expenditure.
 (b) Includes noise and vibration abatement, research and development.

National expenditure by users

One of the prime objectives of the environment protection expenditure account is to identify who is using, or consuming, environment protection services and products. Environment protection services and products may be used in a variety of circumstances. These are:

- final consumption of these products and services by households to mitigate the impacts their activities have on the environment. This often takes the form of fees and charges for environment protection services provided by government or business;
- intermediate consumption of products and services by industries to mitigate the impacts of their production on the environment. This can take the form of payments to government agencies or private contractors, or own account expenditure for internal use of environment protection services; and
- final consumption by general government in their capacity as a collective consumer of environment protection services on behalf of the community.

By definition, the unit investing in environment protection activities (capital expenditure to protect the environment) is also regarded as the user of that investment. Hence, gross capital formation for environment protection activities by industry and government completes the picture of total use of these products and services by the nation.

Households were the largest consumers of environment protection services and products, spending \$2.4b in 1995–96 and \$2.6b in 1996–97. These amounts represented less than 1% of total final consumption expenditure by the household sector (0.8% for both years). Most of this expenditure was for waste water management (approximately 70% for both years). Chapter 3 describes waste water management and water protection expenditure in more detail.

General government spent approximately 22% (\$1.9b) and 25% (\$2.2b) of national expenditure for environment protection in 1995–96 and 1996–97, respectively. This represented around 1.9% of total final consumption expenditure by general government for 1995–96, and 2.2% in 1996–97.

These amounts describe the non-market activities of government, and represent expenditure on environment protection made by government on behalf of the community (collective consumption). Such expenditures include general government programs related to flora and fauna conservation, climate protection, non-market waste management activities of local government etc.

General government also invested \$835m in 1995–96 and \$382m in 1996–97 for environment protection purposes. This was about 7% and 3% of total gross fixed capital formation by general government in 1995–96 and 1996–97, respectively.

Industry and business spent \$1.2b (in 1995–96) and \$1.5b (in 1996–97) on the purchase of market services and products to protect the environment. A further \$657m (in 1995–96) and \$747m (in 1996–97) was own account expenditure by industries to mitigate the impacts of their production activities on the environment.

Industries invested \$921m (in 1995–96) and \$787m (in 1996–97) in gross capital formation for environment protection activities. In terms of total investment by the private sector in gross fixed capital formation, these amounts represented 1.0% (in 1995–96) and 0.8% (in 1996–97).

1.8 NATIONAL ENVIRONMENT PROTECTION EXPENDITURE, By User of Products and Services

Components	ENVIRONMENT PROTECTION INDUSTRIES(a)....		OTHER PRODUCERS	CONSUMERS(b).....					Total
	General government	Other	Total industries	Commonwealth	State	Local	Households		
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	
1995-96									
Final consumption of environment protection services and products									
Market	..	..	..	..	..	..	2 420 500	2 420 500
Non-market	..	..	..	443 693	1 063 770	355 053	n.a.	1 862 516
Total	..	..	..	443 693	1 063 770	355 053	2 420 500	4 283 016
Intermediate consumption of environment protection services									
Market	(c)	(c)	1 169 465	..	..	..	..	1 169 465
For internal use	(c)	(c)	656 827	..	..	..	..	656 827
Total	(c)	(c)	1 826 292	..	..	..	..	1 826 292
Total consumption of services and products	..	..	1 826 292	443 693	1 063 770	355 053	2 420 500	6 109 308
Gross capital formation for environment protection activities	835 352	483 933	921 109	..	..	..	..	2 240 394
Subsidies on production	(c)	(c)	15 232	..	..	..	—	15 232
National expenditure for environment protection									
Current	..	..	1 841 524	443 693	1 063 770	355 053	2 420 500	6 124 540
Capital	835 352	483 933	921 109	..	..	..	..	2 240 394
Total	835 352	483 933	2 762 633	443 693	1 063 770	355 053	2 420 500	8 364 934	
1996-97									
Final consumption of environment protection services and products									
Market	..	..	..	..	..	..	2 637 700	2 637 700
Non-market	..	..	..	597 564	1 241 508	330 625	n.a.	2 169 697
Total	..	..	..	597 564	1 241 508	330 625	2 637 700	4 807 397
Intermediate consumption of environment protection services									
Market	(c)	(c)	1 483 689	..	..	..	..	1 483 689
For internal use	(c)	(c)	747 379	..	..	..	..	747 379
Total	(c)	(c)	2 231 068	..	..	..	..	2 231 068
Total consumption of services and products	..	..	2 231 068	597 564	1 241 508	330 625	2 637 700	7 038 465
Gross capital formation for environment protection activities	382 269	414 153	786 621	..	..	..	..	1 583 043
Subsidies on production	(c)	(c)	12 065	..	..	..	—	12 065
National expenditure for environment protection									
Current	..	..	2 243 133	597 564	1 241 508	330 625	2 637 700	7 050 530
Capital	382 269	414 153	786 621	..	..	..	..	1 583 043
Total	382 269	414 153	3 029 754	597 564	1 241 508	330 625	2 637 700	8 633 573	

(a) Primarily waste management and waste water management.

(b) General government as collective consumers; households as actual consumers.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

Financing of environment protection

The units which consume environment protection products and services, or invest for environment protection, may not necessarily bear the full cost of the activity from their own resources. Table 1.9 presents the actual financing of national expenditure on environment protection by institutional sector, taking into account subsidies, grants and other transfers where these have been identified. In theory, there may be transfers between institutional sectors that have not been able to be identified and extracted.

The corporate sector was the largest financier of environment protection measures in both years, contributing approximately 40% towards national expenditure to protect the environment.

Most of this (\$2.7b in 1995–96 and \$3.0b in 1996–97) was by industries engaging in environment protection activities as secondary to their primary purpose. This includes both internal activities aimed at mitigating the effects of own production on the environment, and the purchase of market goods and services for environment protection.

Capital expenditure by specialised producers of waste management and waste water management services accounted for the remainder of this sector's expenditure (\$484m in 1995–96 and \$414m in 1996–97).

The general government sector financed \$2.7b of environment protection expenditure in 1995–96, and \$2.6b in 1996–97. State Government accounted for 45% of this amount in 1995–96, and 51% in 1996–97, with the Commonwealth Government and local governments sharing the remainder of the costs. Increased expenditure by local government in 1995–96 is due to large capital investment by local government in this year as a result of a transfer of responsibilities from the State Government sector to local government.

Householders also financed a substantial proportion of national expenditure on environment protection—approximately 29% in 1995–96, and 31% in 1996–97. The bulk of this was for waste water charges and services (see chapter 3).

1.9 FINANCING OF NATIONAL EXPENDITURE FOR ENVIRONMENT PROTECTION, By Source and User

Financing units	ENVIRONMENT PROTECTION INDUSTRIES(a).....			OTHER PRODUCERS		CONSUMERS(b).....			Total
	General government	Other	Total industries	Commonwealth	State	Local	Households		
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	
1995-96									
General government									
Commonwealth	22 434	—	n.a.	438 895	44 285	705	n.a.	506 320	
State	176 156	—	n.a.	4 798	1 019 485	17 007	n.a.	1 217 446	
Local	636 113	—	n.a.	—	—	337 341	n.a.	973 454	
Total	834 703	—	18 958	443 693	1 063 770	355 053	n.a.	2 716 177	
Corporations									
Environment protection industries	n.a.	483 933	—	n.a.	n.a.	n.a.	n.a.	483 933	
Other producers	n.a.	..	2 743 675	n.a.	n.a.	n.a.	n.a.	2 743 675	
Total	649	483 933	2 743 675	n.a.	n.a.	n.a.	n.a.	3 228 257	
Households	..	..	..	n.a.	n.a.	n.a.	2 420 500	2 420 500
National expenditure	835 352	483 933	2 743 675	443 693	1 063 770	355 053	2 420 500	8 364 935	
1996-97									
General government									
Commonwealth	11 408	—	n.a.	580 317	89 853	813	n.a.	682 391	
State	126 959	—	n.a.	17 247	1 151 655	19 924	n.a.	1 315 785	
Local	240 931	—	n.a.	—	—	309 888	n.a.	550 819	
Total	379 298	—	17 648	597 564	1 241 508	330 625	n.a.	2 566 643	
Corporations									
Environment protection industries	n.a.	414 153	—	n.a.	n.a.	n.a.	n.a.	414 153	
Other producers	n.a.	..	3 012 106	n.a.	n.a.	n.a.	n.a.	3 012 106	
Total	2 971	414 153	3 012 106	n.a.	n.a.	n.a.	n.a.	3 429 230	
Households	..	..	..	n.a.	n.a.	n.a.	2 637 700	2 637 700
National expenditure	382 269	414 153	3 029 754	597 564	1 241 508	330 625	2 637 700	8 633 573	

(a) Primarily waste management and waste water management.

(b) General government as collective consumer; households as actual consumers.

Note: Sums will not necessarily equal totals as some splits not available.

Production of environment protection services

Tables 1.10 and 1.11 summarise the production of environment protection services for Australia. They describe who is providing the environment protection service and what type of output they are producing.

The environment protection industries consisted primarily of producers of waste management services and waste water management services (sewerage operators), and comprised the bulk of total environment protection output (85% (\$6.8b) in 1995–96 and 84% (\$7.0b) in 1996–97). Production of these services was shared between government and the corporate sector.

The remainder of production (\$1.2b in 1995–96 and \$1.3b in 1996–97) was by other producers that executed environment protection activities as either secondary to their principal (non-environmental) activity, or for internal use. The transactions of these producers are further broken down by the industry executing the activity, as well as the type of activity being executed, in the chapters to follow.

Of the total environment protection output produced by government and industry the majority was market output (68% in 1995–96 and 67% in 1996–97). Environment protection products and services provided free or at minimal cost to the consumer (non-market output) accounted for approximately 23% (in 1995–96) and 24% (in 1996–97) of total products and services produced. The remainder (8% in 1995–96 and 9% in 1996–97) was the production of environment protection activities for internal use by industries.

Tables 1.10 and 1.11 also show the inputs in the form of current uses received and consumed in the production of the environment protection output described above, as well as investment by government and industry for environment protection activities.

It should be noted that some of the inputs may include resources utilised for non-environmental protection activities. These amounts have not specifically been identified and deducted.

1.10 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1995–96

	ENVIRONMENT PROTECTION INDUSTRIES(a).....		OTHER PRODUCERS.		Total
	General government	Other	For sale(b)	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT					
Environment protection					
Non-market	1 862 516	..	..	..	1 862 516
Market	1 538 423	3 386 154	495 580	..	5 420 157
For internal use	(c)	(c)	(c)	656 827	656 827
Total	3 400 939	3 386 154	495 580	656 827	7 939 500
INPUTS					
Current uses					
Intermediate consumption	2 126 016	2 695 371	(c)	(d) 727 176	5 548 563
Compensation of employees	885 899	245 708	(c)	n.a.	1 131 607
Consumption of fixed capital	170 334	251 575	(c)	(e)	421 909
Other taxes on production	22 285	290 373	(c)	35 253	347 911
Less other subsidies	40 808	81	(c)	15 220	56 108
Environment protection income					
Market output	1 538 423	3 386 154	495 580	..	5 420 157
Current transfers	66 796	..	n.a.	n.a.	66 796
Total	1 605 219	3 386 154	495 580	..	5 486 953
Capital transactions					
Gross fixed capital formation	833 973	483 513	(c)	833 752	2 151 238
Other capital uses	1 380	420	(c)	n.a.	1 800
Total	835 353	483 933	(c)	833 752	2 153 038
Investment grants received	8 963	—	(c)	3 725	12 688

(a) Primarily waste management and waste water management.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(d) Includes compensation of employees.

(e) Not collected.

Note: Output does not include non-environmental protection output.

1.11 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1996–97

	ENVIRONMENT PROTECTION INDUSTRIES(a).....		OTHER PRODUCERS.....		Total
	General government	Other	For sale(b)	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT					
Environment protection					
Non-market	1 961 621	..	..	..	1 961 621
Market	1 662 497	3 329 162	550 305	..	5 541 964
For internal use	(c)	(c)	(c)	747 379	747 379
Total	3 624 118	3 329 162	550 305	747 379	8 250 964
INPUTS					
Current uses					
Intermediate consumption	2 292 876	2 621 521	(c)	(d)822 439	5 736 836
Compensation of employees	918 886	635 521	(c)	n.a.	1 554 407
Consumption of fixed capital	184 368	301 209	(c)	(e)	485 577
Other taxes on production	21 342	297 523	(c)	35 597	354 463
Less other subsidies	9 851	538	(c)	10 174	20 564
Environment protection income					
Market output	1 662 497	3 329 162	550 305	..	5 541 964
Current transfers	127 837	n.a.	n.a.	n.a.	127 837
Total	1 790 334	3 329 162	550 305	..	5 669 801
Capital transactions					
Gross fixed capital formation	382 206	426 577	(c)	681 432	1 490 215
Other capital uses	63	-12 424	(c)	n.a.	-12 361
Total	382 269	414 153	(c)	681 432	1 477 854
Investment grants received	15 710	—	(c)	5 581	21 291

(a) Primarily waste management and waste water management.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(d) Includes compensation of employees.

(e) Not collected.

Note: Output does not include non-environmental protection output.

CHAPTER 2

WASTE MANAGEMENT

INTRODUCTION

Australia has a much higher production of municipal solid waste per head than other Organisation for Economic Co-operation and Development countries, with only the United States producing more domestic solid waste per capita (SoE 1996). Of this solid waste it has been estimated that about half is generated by private households, with the majority of this household waste ending up in landfill (ABS 1996a).

Most of the waste generated in Australia in terms of volume is non-hazardous, in the sense that it does not pose the extreme risk to human health and the environment posed by toxic, infectious or highly radioactive materials. However, because of the inherently dangerous nature of hazardous wastes and their persistence in the environment, expenditure on hazardous waste management can be significant and ongoing, potentially requiring long-term monitoring programs to ensure effective and safe disposal. In this chapter the figures presented for waste management are not distinguished into hazardous or non-hazardous categories, although some detail may be available on request. See the Explanatory Notes, paragraph 44, for more information on special data services and related statistics.

Waste management activities comprised about 28% of total expenditure for environment protection in both years (\$2.4b in 1995–96 and \$2.5b in 1996–97) (table 2.1). Most of this expenditure (greater than 85%) was on non-hazardous waste management.

Consumption by industry of waste management services (intermediate consumption) accounted for 40% of the total expenditure on these activities in 1995–96 (\$957m), and 48% in 1996–97 (\$1.2b).

Householders spent approximately 19% (in 1995–96) and 25% (in 1996–97) of total expenditure for waste management services in the form of taxes, fees and fines for these activities, as well as national estimates on waste management products such as composting bins.

2.1 NATIONAL EXPENDITURE FOR WASTE MANAGEMENT, Summary

	1995-96	1996-97
<i>Components</i>	\$'000	\$'000
.....		
Final consumption		
General government	255 649	269 386
Households	458 300	617 400
<i>Total</i>	713 949	886 786
Intermediate consumption		
<i>All industries</i>	957 526	1 194 716
Gross capital formation		
General government	319 024	113 151
Corporate (public and private)	384 288	271 988
<i>Total</i>	703 312	385 139
National expenditure(a)		
Current	1 672 884	2 082 056
Capital	703 312	385 140
Total	2 376 196	2 467 196

(a) Includes subsidies

NATIONAL EXPENDITURE BY USERS

Local government accounted for the largest proportion of general government consumption of waste management products and services (table 2.2). This amounted to \$234m in 1995-96, and \$209m in 1996-97. These amounts represent the extent to which local government consumed waste management services on behalf of the community.

Industry purchased waste management products and services to the value of \$638m in 1995-96, and \$853m in 1996-97. These expenditures included payments to both government agencies (including waste disposal/landfill levies specified in government rates) and private contractors for waste management services.

An additional \$319m (in 1995-96) and \$342m (in 1996-97) was spent on own production of waste management services for internal use by industry. Table 2.3 describes intermediate consumption and investment by industry in more detail.

2.2 NATIONAL EXPENDITURE FOR WASTE MANAGEMENT, By User of Products and Services

Components	WASTE MANAGEMENT INDUSTRIES.....		OTHER PRODUCERS	CONSUMERS.....				Total
	General government	Other	Total industries	Common-wealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96								
Final consumption of environment protection services and products								
Market	..	..	..	..	..	..	458 300	458 300
Non-market	..	..	..	5 922	(c) 15 494	234 233	n.a.	255 649
Total	..	..	..	5 922	15 494	234 233	458 300	713 949
Intermediate consumption of environment protection services								
Market	(d)	(d)	638 065	..	..	..	..	638 065
For internal use	(d)	(d)	319 461	..	..	..	..	319 461
Total	(d)	(d)	957 526	..	..	..	..	957 526
Total consumption of services and products	(d)	(d)	957 526	5 922	15 494	234 233	458 300	1 671 475
Gross capital formation for environment protection activities	319 024	190 418	193 870	..	..	..	..	703 312
Subsidies on production	(d)	(d)	1 409	..	..	..	..	1 409
National expenditure for environment protection								
Current	..	..	958 935	5 922	15 494	234 233	458 300	1 672 884
Capital	319 024	190 418	193 870	..	..	..	..	703 312
Total	319 024	190 418	1 152 805	5 922	15 494	234 233	458 300	2 376 196
1996-97								
Final consumption of environment protection services and products								
Market	..	..	..	..	..	..	617 400	617 400
Non-market	..	..	..	7 071	53 285	209 030	n.a.	269 386
Total	..	..	..	7 071	53 285	209 030	617 400	886 786
Intermediate consumption of environment protection services								
Market	(d)	(d)	852 582	..	..	..	..	852 582
For internal use	(d)	(d)	342 134	..	..	..	..	342 134
Total	(d)	(d)	1 194 716	..	..	..	..	1 194 716
Total consumption of services and products	(d)	(d)	1 194 716	7 071	53 285	209 030	617 400	2 081 502
Gross capital formation for environment protection activities	113 151	125 624	146 364	..	..	..	..	385 139
Subsidies on production	(d)	(d)	554	..	..	..	..	554
National expenditure for environment protection								
Current	..	..	1 195 270	7 071	53 285	209 030	617 400	2 082 056
Capital	113 151	125 624	146 364	..	..	..	..	385 140
Total	113 151	125 624	1 341 634	7 071	53 285	209 030	617 400	2 467 196

(a) General government as collective consumers.

(b) Households as actual consumers.

(c) Some State government expenditures were not able to be separately identified. These are included as 'other' environment protection expenditure (chapter 7).

(d) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

NATIONAL EXPENDITURE BY USERS *continued*

Service industries combined spent approximately \$740m in 1995–96 and \$948m in 1996–97 on waste management products and services. The largest increase occurred in the consumption of market services for waste management, including tip fees, skip and bin hire etc. It should be noted that the construction industry was comprehensively surveyed in 1996–97, resulting in better reporting of waste management expenditures in this sector. Capital and current expenditure by type of service industry is presented in chapter 8.

Manufacturing spent \$308m on waste management products and services in 1995–96, and \$317m in 1996–97. A relatively small proportion of intermediate consumption by manufacturing industries was spent on production for internal use (10% in 1995–96 and 12% in 1996–97). The bulk of their expenditure was for the purchase of market products and services for waste management (\$204m in both years).

This is in contrast to mining, where approximately 50% of intermediate consumption by these industries was for internal production of waste management services. In both years, mining industries invested heavily in gross capital formation for waste management activities, products and services, with 41% of their national expenditure on capital in 1995–96, and 48% in 1996–97. Chapter 8 presents further industry breakdowns for capital and current expenditures.

2.3 EXPENDITURE FOR WASTE MANAGEMENT, By Other Producers

Components	Agriculture	Manufacturing	Mining	Utilities	Service industries	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96						
Intermediate consumption of environment protection services and products						
Market	3 210	204 269	13 345	12 587	404 653	638 064
For internal use	3 028	23 161	14 437	7 632	271 204	319 461
Total	6 238	227 430	27 782	20 219	675 857	957 525
Gross capital formation for environment protection activities	1 626	79 672	19 606	28 896	64 071	193 870
Subsidies on production	197	1 190	5	17	<i>n.a.</i>	1 409
National expenditure for environment protection						
Current	6 435	228 620	27 787	20 236	675 857	958 934
Capital	1 626	79 672	19 606	28 896	64 071	193 870
Total	8 061	308 292	47 393	49 132	739 928	1 152 804
1996–97						
Intermediate consumption of environment protection services and products						
Market	3 458	203 730	11 531	10 973	622 889	852 582
For internal use	2 023	26 767	11 332	10 728	291 285	342 134
Total	5 481	230 497	22 863	21 701	914 174	1 194 716
Gross capital formation for environment protection activities	1 231	86 330	21 195	3 994	33 614	146 364
Subsidies on production	21	487	1	46	<i>n.a.</i>	555
National expenditure for environment protection						
Current	5 502	230 984	22 864	21 747	914 174	1 195 271
Capital	1 231	86 330	21 195	3 994	33 614	146 364
Total	6 733	317 314	44 059	25 741	947 788	1 341 635

FINANCING OF WASTE MANAGEMENT SERVICES

The corporate sector financed the bulk of national expenditure on waste management activities. In 1995–96, this sector financed waste management to the value of \$1.3b and in 1996–97 the corporate sector financed waste management to the value of \$1.5b (table 2.4).

Financing by the corporate sector was comprised of: investment by specialised waste management industries and other industries in capital formation for waste management purposes; purchasing of market waste management services; and own account waste management for internal use.

General government financed just under one-quarter of these activities in 1995–96, and this fell to 16% in 1996–97, mainly due to a drop in capital expenditure by local government waste management authorities.

2.4 FINANCING OF NATIONAL EXPENDITURE FOR WASTE MANAGEMENT

Financing units	WASTE MANAGEMENT INDUSTRIES(a).....			OTHER PRODUCERS	FINAL CONSUMERS.....				Total
	General government	Other	Total industries		Commonwealth	State	Local	Households	
	\$'000	\$'000	\$'000		\$'000	\$'000	\$'000	\$'000	\$'000
1995–96									
General government									
Commonwealth	—	—	n.a.		5 922	92	—	n.a.	6 014
State	29 923	—	n.a.		—	15 402	6 558	n.a.	51 883
Local	289 101	—	n.a.		—	—	227 675	n.a.	516 776
Total	319 024	—	1 633		5 922	15 494	234 233	n.a.	576 306
Corporations									
Specialised producers	n.a.	190 418	—		n.a.	n.a.	n.a.	n.a.	190 418
Other producers	n.a.	..	1 151 173		n.a.	n.a.	n.a.	n.a.	1 151 173
Total	n.a.	190 418	1 151 173		n.a.	n.a.	n.a.	n.a.	1 341 591
Households	..	..	..		n.a.	n.a.	n.a.	458 300	458 300
National expenditure	319 024	190 418	1 152 805		5 922	15 494	234 233	458 300	2 376 196
1996–97									
General government									
Commonwealth	18	—	n.a.		7 071	11 047	—	n.a.	18 136
State	10 018	—	n.a.		—	42 238	7 878	n.a.	60 134
Local	103 115	—	n.a.		—	—	201 151	n.a.	304 267
Total	113 151	—	1 902		7 071	53 285	209 030	n.a.	384 439
Corporations									
Specialised producers	n.a.	125 624	—		n.a.	n.a.	n.a.	n.a.	125 624
Other producers	n.a.	..	1 339 734		n.a.	n.a.	n.a.	n.a.	1 339 734
Total	n.a.	125 624	1 339 734		n.a.	n.a.	n.a.	n.a.	1 465 358
Households	..	..	..		n.a.	n.a.	n.a.	617 400	617 400
National expenditure	113 151	125 624	1 341 635		7 071	53 285	209 030	617 400	2 467 196

(a) Capital expenditure by waste management industries.

Note: Sums will not necessarily equal totals as some splits not available.

PRODUCTION OF WASTE MANAGEMENT SERVICES

Tables 2.5 and 2.6 present the transactions of producers of waste management activities and services, that is, the supply of these services. Total waste management output by specialised waste management industries totalled \$2.1b in 1995–96 and \$2.2b in 1996–97. Of this, private waste management bodies produced output to the value of \$1.3b in 1995–96, and \$1.2b in 1996–97.

Local government waste management authorities totalled \$740m of output in 1995–96, and \$911m in 1996–97.

Other industries produced waste management services to the value of \$605m in 1995–96 and \$659m in 1996–97. Most of this production was for internal use (53% in 1995–96 and 52% in 1996–97), the remainder being waste management products and services produced for sale to others (secondary output). Most of this secondary output for waste management activities (approximately 90%) was generated by the service industries sector, with the construction industry, services to transport and selected business services comprising the bulk of this output (not shown).

Table 2.7 shows own account production for internal use by industry. Service industries produced the bulk of this production for internal use, comprising 85% of ancillary production in both years.

Inputs to production of waste management-related activities are also presented.

2.5 PRODUCTION OF WASTE MANAGEMENT SERVICES, Summary—1995–96

	WASTE MANAGEMENT INDUSTRIES.....				OTHER PRODUCERS.....		Total
	Common-wealth	State	Local	Other	For sale(a)	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT							
Waste management							
Non-market	5 922	15 494	234 233	..	..	..	255 649
Market	—	465	505 343	1 337 317	285 574	..	2 128 699
For internal use	(b)	(b)	(b)	(b)	(b)	319 461	319 461
Total	5 922	15 959	739 575	1 337 317	285 574	319 461	2 703 809
INPUTS							
Current uses							
Intermediate consumption	5 922	4 495	615 346	783 191	(b)	(c)348 015	1 756 969
Compensation of employees	—	10 230	171 366	7 548	(b)	n.a.	189 143
Consumption of fixed capital	—	769	(d)	—	(b)	(d)	769
Other taxes on production	..	(d)	11 576	172 561	(b)	14 225	198 363
Less other subsidies	—	—	—	—	(b)	1 409	1 409
Environment protection income							
Market output	—	465	505 343	1 337 317	285 574	..	2 128 699
Current transfers	—	92	6 558	..	n.a.	n.a.	6 650
Total	—	557	511 901	1 337 317	285 574	..	2 135 349
Capital transactions							
Gross fixed capital formation	—	29 923	289 101	190 418	(b)	168 318	677 760
Investment grants received	—	—	—	—	(b)	224	224

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Includes compensation of employees.

(d) Not collected.

Note: Output for non-environmental protection output not shown.

2.6 PRODUCTION OF WASTE MANAGEMENT SERVICES, Summary—1996–97

	WASTE MANAGEMENT INDUSTRIES.....				OTHER PRODUCERS.....		Total
	<i>Common-wealth</i>	<i>State</i>	<i>Local</i>	<i>Other</i>	<i>For sale(a)</i>	<i>For internal use</i>	
<i>Transactions</i>	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT							
Waste management output							
Non-market	7 071	53 285	209 030	..	..	..	269 386
Market	2 149	23 928	702 137	1 176 688	317 316	..	2 222 217
Ancillary	(b)	(b)	(b)	(b)	(b)	342 134	342 134
<i>Total</i>	9 220	77 213	911 167	1 176 688	317 316	342 134	2 833 737
INPUTS							
Current uses							
Intermediate consumption	5 563	30 899	688 851	726 906	(b)	(c)373 388	1 825 607
Compensation of employees	1 416	21 169	184 005	357 919	(b)	n.a.	564 509
Consumption of fixed capital	92	1 217	(d)	7 572	(b)	(d)	8 881
Other taxes on production	..	(d)	12 346	172 340	(b)	14 192	198 877
Less other subsidies	—	—	—	—	(b)	552	552
Environment protection income							
Market output	2 149	23 928	702 137	1 176 688	317 316	..	2 222 217
Current transfers	—	11 047	7 878	..	n.a.	n.a.	18 925
<i>Total</i>	2 149	34 975	710 015	1 176 688	317 316	..	2 241 142
Capital transactions							
Gross fixed capital formation	18	10 018	103 115	125 624	(b)	124 675	363 450
Investment grants received	—	—	—	—	(b)	1 346	1 346

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Includes compensation of employees.

(d) Not collected.

Note: Output for non-environmental protection output not shown.

2.7 PRODUCTION OF WASTE MANAGEMENT SERVICES(a), By Industry

Components	FOR SALE	FOR INTERNAL USE.....					Total
	Total(b)	Agriculture	Manufacturing	Mining	Utilities	Service industries	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Output							
Environment protection output							
Market (secondary)	285 574	..	..	..	..	..	..
For internal use	(c)	3 028	23 161	14 437	7 632	271 204	319 461
Inputs							
Current uses(d)							
Intermediate consumption(e)	(c)	3 172	49 900	14 616	9 124	271 204	348 015
Compensation of employees	(c)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Other taxes on production	(c)	53	13 331	420	421	n.a.	14 225
Less other subsidies	(c)	197	1 190	5	17	n.a.	1 409
Capital transactions							
Gross fixed capital formation	(c)	863	75 375	17 515	28 896	45 669	168 318
Investment grants received	(c)	47	156	21	—	(f)	224
1996-97							
Output							
Environment protection output							
Market (secondary)	317 316	..	..	..	..	..	..
For internal use	(c)	2 023	26 767	11 332	10 728	291 285	342 134
Inputs							
Current uses(d)							
Intermediate consumption(e)	(c)	2 012	56 197	11 186	12 709	291 285	373 388
Other taxes on production	(c)	29	13 258	549	355	n.a.	14 192
Less other subsidies	(c)	18	487	—	46	n.a.	552
Capital transactions							
Gross fixed capital formation	(c)	142	83 659	16 965	3 994	19 915	124 675
Investment grants received	(c)	4	1 342	—	—	(f)	1 346

(a) Excludes waste management industry. For production by the waste management industry see tables 2.5 and 2.6.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(d) Consumption of fixed capital not collected.

(e) Includes compensation of employees.

(f) Not collected.

Note: Output for non-environmental protection output not shown.

INTRODUCTION

This chapter provides estimates of the environment protection expenditure undertaken by business, government and households to mitigate adverse impacts arising from the production of waste water, as well as measures intended to prevent the pollution of surface water.

Waste water management includes all activities related to the collection and treatment of waste water, including monitoring and regulation activities. In Australia it is estimated that around 85% of the population is connected to centralised sewerage treatment systems (AWWA 1998), with the majority of this effluent going to ocean outfalls.

Lack of proper management of waste water discharges such as sewage and industrial effluent, and stormwater discharges can result in eutrophication of marine and estuarine ecosystems, the presence of human pathogens in popular swimming areas and contaminants (such as heavy metals and pesticides) concentrating in marine life through the food chain. In many instances, there are well-developed water treatment technologies and systems which if broadly implemented would help to mitigate to a much greater degree the adverse socioeconomic and ecological impacts resulting from waste water discharge.

Waste water management and water protection activities totalled \$2.9b in 1995–96 and \$3.0b in 1996–97, comprising approximately 35% of total environment protection expenditure in both years (table 3.1).

Most of this expenditure was by the household sector (\$1.7b in both years), and these amounts represented about 70% of total environment protection estimates for this sector.

3.1 NATIONAL EXPENDITURE FOR WASTE WATER MANAGEMENT, Summary

	1995–96	1996–97
Components	\$'000	\$'000
Final consumption		
General government	121 334	208 076
Households	1 729 400	1 749 900
Total	1 850 734	1 957 976
Intermediate consumption		
All industries	377 276	431 520
Gross capital formation	690 204	620 666
National expenditure(a)		
Current	2 236 663	2 397 593
Capital	690 204	620 666
Total	2 926 857	3 018 259

(a) Includes subsidies.

NATIONAL EXPENDITURE BY USERS

Total consumption expenditure on waste water management and water protection products and services was \$2.2b in 1995–96 and \$2.4b in 1996–97 (table 3.2). The majority of this was final consumption by the household sector. Households spent \$1.7b on waste water products and services in both years. This amount was comprised of sewerage rates and charges, as well as an estimate of expenditure on septic systems for both years.

Consumption of waste water and water protection services and products by industry (excluding the waste water management industry) during the production process totalled \$377m in 1995–96 and \$432m in 1996–97. The majority of this expenditure was for sewerage rates and services provided by specialised producers of waste water management services (intermediate consumption of market services). About 30% of these totals were for own account production (for internal use) of waste water management and water protection activities (\$112m in 1995–96 and \$132m in 1996–97).

Table 3.3 presents a detailed breakdown of national expenditure by industry. Intermediate consumption of market services (primarily sewerage rates and charges) increased across all industries (total \$265m in 1995–96 and \$300m in 1996–97).

Manufacturing spent the most on waste water and water protection products and services, totalling \$252m in 1995–96 and \$271m in 1996–97. However, manufacturing spent a relatively small proportion of total intermediate consumption on production of waste water and water protection activities for internal use (12% in 1995–96 and 8% in 1996–97).

In contrast to manufacturing, 61% (\$24m) of intermediate consumption of waste water and water protection services by the mining industry was for ancillary production (internal use) in 1995–96. This proportion fell to just under 50% (\$22m) in 1996–97, with increased expenditure on external market services for this year.

3.2 NATIONAL EXPENDITURE, By User of Products and Services

	WASTE WATER OPERATORS...	OTHER PRODUCERS	CONSUMERS.....		Total
	Total(a)	Total industries	General government(b)	Households(c)	
Components	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96					
Final consumption of environment protection services and products					
Market	..	..	..	1 729 400	1 729 400
Non-market	..	..	121 334	n.a.	121 334
Total	..	..	121 334	1 729 400	1 850 734
Intermediate consumption of environment protection services and products					
Market	(d)	265 249	..	..	265 249
For internal use	(d)	112 027	..	..	112 027
Total	(d)	377 276	..	..	377 276
Total consumption of services and products	..	377 276	121 334	1 729 400	2 228 010
Gross capital formation for environment protection activities	418 975	271 229	..	..	690 204
Subsidies on production	(d)	8 653	..	..	8 653
National expenditure for environment protection					
Current	..	385 929	121 334	1 729 400	2 236 663
Capital	418 975	271 229	..	..	690 204
Total	418 975	657 158	121 334	1 729 400	2 926 867
1996-97					
Final consumption of environment protection services and products					
Market	..	..	..	1 749 900	1 749 900
Non-market	..	..	208 076	n.a.	208 076
Total	..	..	208 076	1 749 900	1 957 976
Intermediate consumption of environment protection services and products					
Market	(d)	299 665	..	..	299 665
For internal use	(d)	131 855	..	..	131 855
Total	(d)	431 520	..	..	431 520
Total consumption of services and products	..	431 520	208 076	1 749 900	2 389 496
Gross capital formation for environment protection activities	395 924	224 742	..	..	620 666
Subsidies on production	(d)	8 097	..	..	8 097
National expenditure for environment protection					
Current	..	439 617	208 076	1 749 900	2 397 593
Capital	395 924	224 742	..	..	620 666
Total	395 924	664 359	208 076	1 749 900	3 018 259

(a) General government and corporatised units combined.

(b) Includes the Commonwealth Government and State Governments as collective consumers, i.e. non-market operations of Government. Non-market operations of local government not collected.

(c) Households as actual consumers.

(d) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

3.3 NATIONAL EXPENDITURE ON WASTE WATER AND WATER PROTECTION, By Other Producers

Components	INDUSTRY.....					Total
	Agriculture	Manufacturing	Mining	Utilities	Service industries	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
.....						
1995-96						
Intermediate consumption of environment protection services and products						
Market	3 149	118 409	15 114	11 520	117 057	265 249
For internal use	3 349	16 037	24 040	7 274	61 327	112 027
Total	6 498	134 446	39 154	18 794	178 384	377 276
Gross capital formation for environment protection activities	7 724	116 868	69 550	15 671	61 416	271 229
Subsidies on production	205	835	5	7 608	(a)	8 653
National expenditure for environment protection						
Current	6 703	135 281	39 159	26 402	178 384	385 929
Capital	823	116 868	69 550	15 671	61 416	271 229
Total	7 526	252 149	108 709	42 073	239 800	657 158
.....						
1996-97						
Intermediate consumption of environment protection services and products						
Market	9 083	130 853	22 936	13 668	123 124	299 665
For internal use	2 668	11 751	21 939	14 464	81 033	131 855
Total	11 751	142 604	44 875	28 132	204 157	431 520
Gross capital formation for environment protection activities	8 837	128 123	44 706	21 611	21 465	224 741
Subsidies on production	58	266	3	7 776	(a)	8 097
National expenditure for environment protection						
Current	11 809	142 870	44 878	35 908	204 157	439 617
Capital	8 837	128 123	44 706	21 611	21 465	224 741
Total	20 646	270 993	89 584	57 519	225 622	664 359

(a) Not collected.

FINANCING OF WASTE WATER MANAGEMENT AND WATER PROTECTION

The household sector financed the majority of national expenditure on waste water management and water protection activities (approximately \$1.7b for both years), reflecting the user pays principle in this domain. The bulk of this expenditure was sewerage rates and charges paid to specialised producers, with relatively minor amounts estimated for septic systems and urban stormwater drainage.

The corporate sector financed \$942m (in 1995–96) and \$947m (in 1996–97) of the national cost for these activities. General government financed relatively small amounts of \$256m in 1995–96 and \$321m in 1996–97. A large proportion of these expenditures was investment by local government waste water operators (\$117m in 1995–96 and \$81m in 1996–97).

3.4 FINANCING OF NATIONAL EXPENDITURE FOR WASTE WATER AND WATER PROTECTION SERVICES

Financing units	WASTE WATER OPERATORS...	OTHER PRODUCERS	CONSUMERS.....			Total
	Total	Total industries	Commonwealth(a)	State(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96						
General government						
Commonwealth	—	n.a.	2 594	7 966	n.a.	10 560
State	8 086	n.a.	—	110 774	n.a.	118 860
Local	116 725	n.a.	—	—	n.a.	116 725
Total	124 811	9 397	2 594	118 740	n.a.	255 542
Corporations						
Specialised producers	293 515	—	n.a.	n.a.	n.a.	293 515
Other producers	n.a.	647 761	n.a.	n.a.	n.a.	647 761
Total	294 164	647 761	n.a.	n.a.	n.a.	941 925
Households	..	..	n.a.	n.a.	1 729 400	1 729 400
National expenditure	418 975	657 158	2 594	118 740	1 729 400	2 926 867
1996–97						
General government						
Commonwealth	10	n.a.	4 222	4 476	n.a.	8 708
State	23 827	n.a.	2 596	196 782	n.a.	223 205
Local	80 586	n.a.	—	—	n.a.	80 586
Total	104 424	8 560	6 818	201 258	n.a.	321 060
Corporations						
Specialised producers	288 529	—	n.a.	n.a.	n.a.	288 529
Other producers	n.a.	655 798	n.a.	n.a.	n.a.	655 798
Total	291 500	655 798	n.a.	n.a.	n.a.	947 298
Households	..	..	n.a.	n.a.	1 749 900	1 749 900
National expenditure	395 924	664 359	6 818	201 258	1 749 900	3 018 259

(a) General government as collective consumer. Not collected for local government.

(b) Households as actual consumers.

Note: Sums will not necessarily equal totals as some splits not available.

PRODUCTION OF WASTE WATER AND WATER PROTECTION SERVICES

Specialised production of waste water management services totalled approximately \$3.0b in both years (tables 3.5 and 3.6). Specialised waste water operators are primarily:

- private sewerage operators;
- corporatised State water authorities; and
- local government operators (which may or may not be corporatised).

General government operations have not been separately identified and are included in the total.

Production by other industries comprised the remainder of waste water and water protection output, totalling \$242m in 1995–96 and \$250m in 1996–97. About half of this production was for internal use, and half produced for sale to others. The overwhelming majority of waste water management and water protection services produced for sale to others is by the service industry sector (not shown). Production of waste water and water protection activities for internal use, by industry, is described in table 3.7.

Market production of all waste water management and water protection services for sale to others totalled \$3.0b in both years. Relatively small amounts were produced for either internal use (ancillary production), or non-market services.

3.5 PRODUCTION OF WASTE WATER AND WATER PROTECTION SERVICES—1995–96

	WASTE WATER OPERATORS..	OTHER PRODUCERS.....		Total
	Total(a)	For sale(b)	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000
OUTPUT				
Non-market	121 334	..	..	121 334
Market	2 923 141	129 613	..	3 052 754
For internal use	(c)	(c)	112 027	112 027
Total	3 044 475	129 613	112 027	3 286 115
INPUTS				
Current uses				
Intermediate consumption	2 577 176	(c)	(d)140 732	2 717 907
Compensation of employees	354 095	(c)	n.a.	354 095
Consumption of fixed capital	359 233	(c)	(e)	359 233
Other taxes on production	128 520	(c)	10 621	139 141
Less other subsidies	40 889	(c)	8 637	49 526
Current environment protection income				
Market output	2 923 141	129 613	..	3 052 754
Capital transactions				
Gross fixed capital formation	417 175	(c)	250 439	667 615
Other capital uses	1 800	(c)	n.a.	1 800
Total	418 975	(c)	250 439	669 415
Investment grants received	1 139	(c)	744	1 883

(a) General government and corporatised units combined.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(d) Includes compensation of employees.

(e) Not collected.

Note: Output for non-environmental protection not shown.

3.6 PRODUCTION OF WASTE WATER AND WATER PROTECTION SERVICES—1996–97

	WASTE WATER OPERATORS.	OTHER PRODUCERS.....		Total
	Total(a)	For sale(b)	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000
OUTPUT				
Non-market	208 076	..	..	208 076
Market	2 850 540	118 082	..	2 968 622
For internal use	(c)	(c)	131 855	131 855
Total	3 058 616	118 082	131 855	3 308 553
INPUTS				
Current uses				
Intermediate consumption	2 406 843	(c)	(d)161 333	2 568 175
Compensation of employees	422 932	(c)	n.a.	422 932
Consumption of fixed capital	406 762	(c)	(e)	406 762
Other taxes on production	134 180	(c)	11 250	145 430
Less other subsidies	10 389	(c)	8 091	18 480
Current environment protection income				
Market output	2 850 540	118 082	..	2 968 622
Capital transactions				
Gross fixed capital formation	408 285	(c)	191 692	599 977
Other capital uses	-12 361	(c)	n.a.	-12 361
Total	395 924	(c)	191 692	587 616
Investment grants received	6 690	(c)	461	7 151

(a) General government and corporatised units combined.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions

(d) Includes compensation of employees.

(e) Not collected.

Note: Output for non-environmental protection not shown.

Production of waste water management and water protection services for internal use was largest for service industries combined, comprising 55% of total production for internal use in 1995–96, and 61% in 1996–97 (table 3.7). The remainder of own account production for internal use was spread across all other industries.

Tables 3.5 to 3.7 also describe the inputs to production of waste water and water protection services and products.

3.7 PRODUCTION OF WASTE WATER AND WATER PROTECTION SERVICES(a), By Industry

Components	FOR SALE	FOR INTERNAL USE.....					Total
	All industries(b)	Agriculture	Manufacturing	Mining	Utilities	Service industries	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Output							
Market	129 613	..	..	..	..	..	..
For internal use	(c)	3 349	16 037	24 040	7 274	61 327	112 027
Inputs							
Current uses(d)							
Intermediate consumption(e)	(c)	3 499	34 337	23 802	17 766	61 327	140 732
Other taxes on production	(c)	55	9 273	427	865	n.a.	10 621
Less other subsidies	(c)	205	819	5	7 608	n.a.	8 637
Capital transactions							
Gross fixed capital formation	(c)	823	115 288	68 247	14 871	51 210	250 439
Investment grants received	(c)	417	172	155	—	(f)	744
1996-97							
Output							
Market	118 082	..	..	..	..	..	..
For internal use	(c)	2 668	11 751	21 939	14 464	81 033	131 855
Inputs							
Current uses(d)							
Intermediate consumption(e)	(c)	2 673	29 057	21 860	26 710	81 033	161 333
Other taxes on production	(c)	41	9 418	1 004	786	n.a.	11 250
Less other subsidies	(c)	46	266	3	7 776	n.a.	8 091
Capital transactions							
Gross fixed capital formation	(c)	1 605	111 016	41 628	21 611	15 038	191 692
Investment grants received	(c)	65	396	—	—	(f)	461

(a) For production by specialised producers of waste water operations see tables 3.4 and 3.5.

(b) Not collected for Agriculture.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(d) Consumption of fixed capital not collected.

(e) Includes compensation of employees.

(f) Not collected.

Note: Output for non-environmental protection not shown.

INTRODUCTION

Australia's air quality as a geographic entity is relatively good, however some regions and local areas experience levels of air pollution that are problematic. Emissions which cause problems at the local or regional scale typically include oxides of nitrogen, sulphur dioxide, carbon monoxide and volatile organic compounds. On a national/global scale emissions of carbon dioxide are the most significant in terms of greenhouse gases, accounting for around 75% of total emissions (SoE 1996).

Some of the factors which contribute in an adverse way to the nature and scale of Australia's air pollution profile include the concentrated nature of urban development; the widespread use of fossil fuels for transport and electricity generation; Australia's role as a major energy exporter; the sprawling nature of Australian cities and the high rate of motor vehicle ownership and use; the large scale of mining and mineral processing; the relatively high incidence of direct sunlight received (contributing to the formation of photochemical smog); and the extensive and widespread clearing of native vegetation (SoE 1996). Factors which tend to mitigate adverse affects on air quality in Australia include a relatively low population; isolation from other countries producing air pollution; and the relatively low sulphur content of Australian coal (SoE 1996).

In 1995–96 national expenditure on ambient air and climate represented around 6% of total national environment protection expenditure in all domains, while in 1996–97 this proportion fell slightly to 5% (expenditure was \$505m and \$440m respectively).

4.1 NATIONAL EXPENDITURE FOR AIR AND CLIMATE PROTECTION, Summary

	1995–96	1996–97
<i>Components</i>	\$'000	\$'000
.....		
Final consumption		
General government	31 702	45 623
Households	87 400	100 000
<i>Total</i>	119 102	145 623
Intermediate consumption		
<i>All industries</i>	105 625	61 455
Gross capital formation		
General government	1 017	3 088
Corporate (public and private)	278 747	229 644
<i>Total</i>	279 764	232 732
National expenditure(a)		
Current	225 001	207 128
Capital	279 764	232 732
Total	504 765	439 860

(a) Includes subsidies.

NATIONAL EXPENDITURE BY USERS

From table 4.2 it is clear that industry, comprising manufacturers, mining companies, utilities and service industries, were the largest users of services and products aimed at mitigating adverse impacts on ambient air and climate in 1995–96 (\$385m). This was also the case in 1996–97, with total industry spending estimated at \$291m. It should be noted that the drop in total industry expenditure between the two financial years was the result of current expenditure not being collected for service industries in 1996–97.

Table 4.3 indicates that the largest contributor toward national expenditure for protection of ambient air and climate for both years, was the manufacturing sector (\$267m in 1995–96 and \$203m in 1996–97). Expressed as a proportion of total expenditure by industry for ambient air and climate protection manufacturing represented approximately 70% of national expenditure by industry in both years presented. Most of the expenditure undertaken by the manufacturing sector in both years was capital expenditure (85% in 1995–96 and 82% in 1996–97), indicating significant investment by this sector in emission control systems and technology for the two financial years covered. Examples of fixed assets which may be acquired to protect ambient air and climate during production include end-of-line technologies such as air scrubbers, which reduce the concentration of harmful gases or particulates in emissions, or change-in-production technologies, such as new software which is used to implement cleaner systems and processes at an earlier stage of a production cycle.

The Commonwealth Government and State Governments' expenditure on ambient air and climate protection represented 6% of total national expenditure in this domain in 1995–96 and 11% in 1996–97. These figures are indicative of the role of Government in relation to protection of ambient air and climate, which is to provide the statutory and policy framework within which industry operates. The cost of mitigation systems and strategies however, appears to be largely borne by industry as part of their production cycles.

Motor vehicles are a major source of emissions in Australia. Figures listed in tables 4.1 and 4.2 under households are estimates of environment expenditure for catalytic converters and charcoal filters which function to mitigate the adverse impacts on air and ambient climate caused by vehicle exhausts. These figures have been derived from unit costs for these pollution abatement control technologies when fitted to new motor vehicles, based on the assumption that these costs are recovered from the consumer as a component of a new vehicles market price. This expenditure also reflected government policies and regulations, as new vehicles were required by law to meet emission standards detailed in Australian Design Rules.

4.2 NATIONAL EXPENDITURE, By Users of Products and Services

Components	SPECIALISED PRODUCERS	OTHER PRODUCERS	CONSUMERS.....				
	General government	Total industries	Common-wealth(a)	State(a)	Local(a)	Households(b)	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	87 400	87 400
Non-market	..	..	16 204	14 929	569	n.a.	31 702
Total	..	..	16 204	14 929	569	87 400	119 102
Intermediate consumption of environment protection services and products							
Market	(c)	73 092	..	..	..	..	73 092
For internal use	(c)	32 533	..	..	..	..	32 533
Total	(c)	105 625	..	..	..	..	105 625
Total consumption of services and products	..	105 625	16 204	14 929	569	87 400	224 727
Gross capital formation for environment protection activities	1 017	278 747	..	..	..	..	279 764
Subsidies on production	..	274	..	..	..	..	274
National expenditure for environment protection							
Current	..	105 899	16 204	14 929	569	87 400	225 001
Capital	1 017	278 747	..	..	..	..	279 764
Total	1 017	384 646	16 204	14 929	569	87 400	504 765
1996-97							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	100 000	100 000
Non-market	..	..	23 639	21 412	572	n.a.	45 623
Total	..	..	23 639	21 412	572	100 000	145 623
Intermediate consumption of environment protection services and products							
Market	(c)	44 097	..	..	..	..	44 097
For internal use	(c)	17 358	..	..	..	..	17 358
Total	(c)	61 455	..	..	..	..	61 455
Total consumption of services and products	..	61 455	23 639	21 412	572	100 000	207 078
Gross capital formation for environment protection purposes	3 088	229 644	..	..	..	..	232 732
Subsidies on production	..	50	..	..	..	..	50
National expenditure for environment protection							
Current	..	61 505	23 639	21 412	572	100 000	207 128
Capital	3 088	229 644	..	..	..	..	232 732
Total	3 088	291 149	23 639	21 412	572	100 000	439 860

(a) General government as collective consumers.

(b) Households as actual consumers.

(c) Transactions may exist but is not recorded here due to SERIEE's accounting conventions.

4.3 NATIONAL EXPENDITURE, Other Producers

INDUSTRY.....					
	<i>Manufacturing</i>	<i>Mining</i>	<i>Utilities</i>	<i>Service industries</i>	<i>Total</i>
<i>Components</i>	\$'000	\$'000	\$'000	\$'000	\$'000
.....					
1995-96					
Intermediate consumption of environment protection services and products					
Market	34 617	3 757	4 908	29 811	73 092
For internal use	6 098	4 964	7 085	14 385	32 532
<i>Total</i>	40 715	8 721	11 993	44 196	105 624
Gross capital formation for environment protection activities	225 963	10 295	22 483	20 007	278 748
Subsidies on production	254	4	16	(a)	274
National expenditure for environment protection					
Current	40 969	8 725	12 009	44 196	105 898
Capital	225 963	10 295	22 483	20 007	278 748
Total	266 932	19 020	34 492	64 203	384 646
.....					
1996-97					
Intermediate consumption of environment protection services and products					
Market	33 156	6 665	4 276	(a)	44 097
For internal use	3 357	5 683	8 318	(a)	17 358
<i>Total</i>	36 513	12 348	12 594	(a)	61 455
Gross capital formation for environment protection activities	166 745	10 085	39 443	13 371	229 644
Subsidies on production	50	..	..	(b)	50
National expenditure for environment protection					
Current	36 563	12 348	12 594	(a)	61 505
Capital	166 745	10 085	39 443	13 371	229 644
Total	203 308	22 433	52 037	13 371	291 149

(a) Not separately collected - included in 'other' (chapter 7).

(b) Not collected.

FINANCING OF EXPENDITURE FOR ENVIRONMENT PROTECTION

Financing for protection of ambient air and climate was largely the province of the corporate sector. Expressed as a proportion of total national expenditure for protection of ambient air and climate, industry provided 76% of financing in this domain in 1995–96 and 66% in 1996–97. The next largest contribution to financing of ambient air and climate protection activities came from the household sector, with an estimated contribution of \$87m for pollution abatement and control technology fitted to new motor vehicles in 1995–96 (17% of financing in this domain) and \$100m for this technology in 1996–97 (23% of financing in this domain).

4.4 FINANCING OF NATIONAL EXPENDITURE FOR ENVIRONMENT PROTECTION

Financing units	SPECIALISED PRODUCERS.	OTHER PRODUCERS.	CONSUMERS.....				Total
	Total	Total industries	Commonwealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96							
General government							
Commonwealth	56	n.a.	16 204	—	—	n.a.	16 260
State	961	n.a.	—	14 929	—	n.a.	15 890
Local	—	n.a.	—	—	569	n.a.	569
Total	1 017	511	16 204	14 929	569	n.a.	33 230
Corporations							
Specialised producers	n.a.	—	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers	n.a.	384 135	n.a.	n.a.	n.a.	n.a.	384 135
Total	n.a.	384 135	n.a.	n.a.	n.a.	n.a.	384 135
Households	..	..	n.a.	n.a.	n.a.	87 400	87 400
National expenditure	1 017	384 646	16 204	14 929	569	87 400	504 765
1996–97							
General government							
Commonwealth	463	n.a.	23 639	1 673	—	n.a.	25 775
State	2 625	n.a.	—	19 739	—	n.a.	22 364
Local	—	n.a.	—	—	572	n.a.	572
Total	3 088	2 289	23 639	21 412	572	n.a.	51 000
Corporations							
Specialised producers	n.a.	—	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers(c)	n.a.	288 860	n.a.	n.a.	n.a.	n.a.	288 860
Total	n.a.	288 860	n.a.	n.a.	n.a.	n.a.	288 860
Households	..	..	n.a.	n.a.	n.a.	100 000	100 000
National expenditure	3 088	291 149	23 639	21 412	572	100 000	439 860

(a) General government as collective consumer.

(b) Households as actual consumers.

(c) Does not include service industries for 1996–97.

PRODUCTION OF ENVIRONMENT PROTECTION SERVICES

In terms of environment protection output, industry produced most of the services and products aimed at mitigating adverse impacts on ambient air and climate in 1995–96 (\$73m or 69% of total output for these products and services). This amount dropped to \$23m (32%) in 1996–97 as production by service industries on these activities was not separately identified.

4.5 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1995–96

Components	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth government	State government	Local government	For sale	For internal use	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Environment protection output						
Non-market	16 204	14 929	569	..	..	31 702
Market	833	837	—	40 664	..	42 334
For internal use	(a)	(a)	(a)	(a)	32 532	32 532
Total	17 037	15 766	569	40 664	32 532	106 568
INPUTS						
Current uses						
Intermediate consumption	14 670	5 222	169	(a)	(b)37 942	58 003
Compensation of employees	1 455	9 017	400	(a)	n.a.	10 872
Consumption of fixed capital	79	690	(c)	(a)	(c)	769
Other taxes on production	..	(c)	—	(a)	4 846	4 846
Less other subsidies	—	—	—	(a)	274	274
Current environment protection income						
Market output	833	837	—	40 664	..	42 334
Capital transactions						
Gross fixed capital formation	56	961	—	(a)	273 375	274 392
Investment grants received	—	—	—	(a)	237	237

(a) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Includes compensation of employees.

(c) Not collected.

Note: Output does not include non-environmental protection output.

PRODUCTION OF ENVIRONMENT PROTECTION SERVICES *continued*

Output by general government increased from \$33m in 1995–96 to \$50m in 1996–97. Most of the output produced by general government was provided at non-market rates (95% of environment protection output in 1995–96 and 91% in 1996–97). Local government expenditure for production of ambient air and climate products and services mainly comprised compensation of employees (approximately \$400 000, or 70% of total local government expenditure in this domain, for each year examined). Most of the payments by local government to employees are likely to represent expenditure for inspection or monitoring services in relation to local emission sources.

4.6 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1996–97

Components	SPECIALISED PRODUCERS.....			OTHER PRODUCERS(a)....		
	Commonwealth government	State government	Local government	For sale	For internal use	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Environment protection output						
Non-market	23 639	21 412	572	..	..	45 623
Market	1 110	3 499	—	6 105	..	10 714
For internal use	(b)	(b)	(b)	(b)	17 358	17 358
Total	24 749	24 911	572	6 105	17 358	73 695
INPUTS						
Current uses						
Intermediate consumption	13 525	10 094	170	(b)	(c)24 929	48 718
Compensation of employees	8 838	10 711	402	(b)	n.a.	19 951
Consumption of fixed capital	1 276	607	(d)	(b)	(d)	1 883
Other taxes on production	..	(d)	—	(b)	2 926	2 926
Less other subsidies	—	—	—	(b)	50	50
Current environment protection income						
Market output	1 110	3 499	—	6 105	..	12 971
Current transfers	—	1 673	—	—	—	1 673
Total	1 110	5 172	—	6 105	—	14 644
Capital transactions						
Gross fixed capital formation	463	2 625	—	(b)	216 403	219 491
Investment grants received	—	—	—	(b)	2 239	2 239

(a) Does not include service industries.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Includes compensation of employees.

(d) Not collected.

Note: Output does not include non-environmental protection output.

4.7 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, By Industry

Components	FOR SALE..		FOR INTERNAL USE.....				Total
	Total	Manufacturing	Mining	Utilities	Service industries		
	\$000	\$000	\$000	\$000	\$000	\$000	
1995-96							
Output							
Market	40 664	..	..	..	..	..
For internal use	(a)	6 098	4 964	7 085	14 385	32 532	
Inputs							
Current uses							
Intermediate consumption	(a)	10 664	4 769	8 124	14 385	37 942	
Other taxes on production	(a)	3 998	234	614	n.a.	4 846	
Less other subsidies	(a)	254	4	16	n.a.	274	
Capital transactions							
Gross fixed capital formation	(a)	221 041	9 844	22 483	20 007	273 375	
Investment grants received	(a)	186	52	—	(b)	237	
1996-97							
Output							
Market	6 105	..	..	..	..	..
For internal use	(a)	3 357	5 683	8 318	(c)	17 358	
Inputs							
Current uses							
Intermediate consumption	(a)	9 340	5 670	9 919	(c)	24 929	
Other taxes on production	(a)	2 385	244	298	(c)	2 927	
Less other subsidies	(a)	50	—	—	(c)	50	
Capital transactions							
Gross fixed capital formation	(a)	160 437	7 170	39 443	9 352	216 403	
Investment grants received	(a)	2 239	—	—	(b)	2 239	

(a) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Not collected.

(c) Not separately collected - included in 'other' (chapter 7).

Note: Output does not include non-environmental protection output.

CHAPTER 5

PROTECTION OF BIODIVERSITY AND LANDSCAPE

INTRODUCTION

Australia's biodiversity is exceptional for its species richness and for the very high proportion of taxa (species and families) that are endemic. Over the last 200 years biodiversity in Australia has undergone severe declines, as evidenced by the relatively large number of plants and animals that became extinct in this period or are now threatened or endangered.

This chapter provides estimates of the environment protection expenditure undertaken by government, the household sector and industry to address the national problem of declining biodiversity. It is important to note that the figures presented here are likely to underestimate overall expenditure on biodiversity and landscape. This is because a significant amount of expenditure on biodiversity and landscape was collected as 'other environment protection expenditure'.

Overall, national expenditure on protection of biodiversity and landscape in Australia represented approximately 19% of national environment protection expenditure in all domains in 1995–96 and approximately 18% of national environment protection expenditure in 1996–97. Table 5.1 indicates that in 1995–96 and 1996–97 government was the largest user of services and products aimed at protecting Australia's biodiversity and landscape, spending a total of \$1.2b in each of the financial years covered.

5.1 NATIONAL EXPENDITURE FOR BIODIVERSITY AND LANDSCAPE, Summary

	1995–96	1996–97
<i>Components</i>	\$'000	\$'000
.....		
Final consumption		
General government	928 643	1 056 942
Households	143 800	168 700
<i>Total</i>	1 072 443	1 225 642
Intermediate consumption		
<i>All industries</i>	131 331	153 010
Gross capital formation		
General government	305 808	115 201
Corporate (public and private)	34 097	19 008
<i>Total</i>	339 905	134 209
National expenditure(a)		
Current	1 205 994	1 379 194
Capital	339 905	134 209
Total	1 545 899	1 513 403

(a) Includes subsidies.

NATIONAL EXPENDITURE BY USERS

National expenditure by the household sector toward the protection of biodiversity in 1995–96 and 1996–97 (\$144m and \$169m, respectively) are estimates derived from the annual service costs of maintaining a garden with native plants. An assumption inherent in the use of these estimates is that native gardens facilitate the protection of native flora and fauna and therefore contribute toward protection of biodiversity. It is likely that the Australian community contributes in other ways toward the protection of biodiversity and landscape, for instance by providing money (such as donations and membership fees) to organisations which are active in the conservation of biodiversity.

Industry expenditure for protection of biodiversity and landscape totalled \$168m in 1995–96 and \$173m in 1996–97 (table 5.2). Data for national expenditure by industry groups for protection of biodiversity and landscape are limited to agriculture and mining. The decision to limit collection of data to these industries is based on testing which indicated that levels of spending by other industries for this domain was relatively low. National expenditure by the agriculture industry for activities related to biodiversity and landscape protection was \$79m in 1995–96 and \$73m in 1996–97. National expenditure by agriculture accounted for approximately 32% of total national expenditure by the agricultural sector for environment protection purposes in 1995–96 and 36% of its national environment protection expenditure in 1996–97. For the mining sector, expenditure on protection of biodiversity and landscape totalled \$89m (or approximately 27% of total national environment protection expenditure undertaken by mining in 1995–96) and \$99m (28%) in 1996–97.

5.2 NATIONAL EXPENDITURE, By Users of Products and Services

Components	SPECIALISED PRODUCERS	OTHER PRODUCERS	CONSUMERS.....				Total
	General government	Total industries	Common- wealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	143 800	143 800
Non-market	..	..	213 097	621 577	93 969	n.a.	928 643
Total	..	..	213 097	621 577	93 969	143 800	1 072 443
Intermediate consumption of environment protection services and products							
Market	(c)	57 423	..	..	..	..	57 423
For internal use	(c)	73 908	..	..	..	..	73 908
Total	(c)	131 331	..	..	..	..	131 331
Total consumption of services and products	..	131 331	213 097	621 577	93 969	143 800	1 203 774
Gross capital formation for environment protection activities	305 808	34 097	..	..	..	..	339 905
Subsidies on production	(c)	2 220	..	..	..	..	2 220
National expenditure for environment protection							
Current	..	133 551	213 097	621 577	93 969	143 800	1 205 994
Capital	305 808	34 097	..	..	..	..	339 905
Total	305 808	167 648	213 097	621 577	93 969	143 800	1 545 899
1996-97							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	168 700	168 700
Non-market	..	..	220 793	741 577	94 572	n.a.	1 056 942
Total	..	..	220 793	741 577	94 572	168 700	1 225 642
Intermediate consumption of environment protection services and products							
Market	(c)	73 611	..	..	..	..	73 611
For internal use	(c)	79 399	..	..	..	..	79 399
Total	(c)	153 010	..	..	..	..	153 010
Total consumption of services and products	..	153 010	220 793	741 577	94 572	168 700	1 378 652
Gross capital formation for environment protection activities	115 201	19 008	..	..	..	..	134 209
Subsidies on production	(c)	542	..	..	..	..	542
National expenditure for environment protection							
Current	..	153 552	220 793	741 577	94 572	168 700	1 379 194
Capital	115 201	19 008	..	..	..	..	134 209
Total	115 201	172 560	220 793	741 577	94 572	168 700	1 513 403

(a) General government as collective consumer.

(b) Households as actual consumers.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

5.3 NATIONAL EXPENDITURE, Other Producers

Components	INDUSTRY.....		
	Agriculture \$'000	Mining \$'000	Total \$'000
.....			
1995-96			
Intermediate consumption of environment protection services and products			
Market	29 216	28 207	57 423
For internal use	40 521	33 387	73 908
Total	69 737	61 594	131 331
Gross capital formation for environment protection activities	7 045	27 052	34 097
Subsidies on production	2 198	22	2 220
National expenditure for environment protection			
Current	71 935	61 616	133 551
Capital	7 045	27 052	34 097
Total	78 980	88 668	167 648
.....			
1996-97			
Intermediate consumption of environment protection services and products			
Market	27 531	46 080	73 611
For internal use	40 248	39 151	79 399
Total	67 779	85 231	153 010
Gross capital formation for environment protection activities	4 949	14 059	19 008
Subsidies on production	539	3	542
National expenditure for environment protection			
Current	68 318	85 234	153 552
Capital	4 949	14 059	19 008
Total	73 267	99 293	172 560
.....			

FINANCING OF ENVIRONMENT PROTECTION

Table 5.4 indicates that protection of biodiversity and landscape in Australia over the two years covered was largely financed from the budgets of State and Territory Governments (\$722m in 1995–96 and \$765m in 1996–97). This represented 47% of financing in 1995–96 and 51% of financing in 1996–97. The next largest overall contributor in terms of direct financing of conservation programs and activities for the two years covered was the Commonwealth Government, with expenditure of \$246m in 1995–96 and \$275m in 1996–97 (16% and 18% of financing of expenditure in this domain, respectively). Local government also financed significant levels of expenditure for protection of biodiversity and landscape, with expenditure of \$267m in 1995–96 (17% of financing). Expenditure by local governments fell to \$133m in 1996–97 (9% of financing), the large difference between years the result of extraordinary levels of capital investment in 1995–96.

5.4 FINANCING OF NATIONAL EXPENDITURE FOR ENVIRONMENT PROTECTION

Financing units	SPECIALISED PRODUCERS		OTHER PRODUCERS		CONSUMERS.....		Total
	General government	Total industries	Commonwealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96							
General government							
Commonwealth	11 221	n.a.	208 299	26 102	403	n.a.	246 025
State	113 725	n.a.	4 798	595 475	7 666	n.a.	721 664
Local	180 861	n.a.	—	—	85 900	n.a.	266 761
Total	305 808	2 621	213 097	621 577	93 969	n.a.	1 237 072
Corporations							
Specialised producers	n.a.	—	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers	n.a.	165 027	n.a.	n.a.	n.a.	n.a.	165 027
Total	n.a.	165 027	n.a.	n.a.	n.a.	n.a.	165 027
Households	..	..	n.a.	n.a.	n.a.	143 800	143 800
National expenditure	305 808	167 648	213 097	621 577	93 969	143 800	1 545 899
1996–97							
General government							
Commonwealth	7 157	n.a.	206 296	60 785	465	n.a.	274 703
State	60 542	n.a.	14 497	680 792	8 836	n.a.	764 667
Local	47 503	n.a.	—	—	85 271	n.a.	132 774
Total	115 201	804	220 793	741 577	94 572	n.a.	1 172 947
Corporations							
Specialised producers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers	n.a.	171 756	n.a.	n.a.	n.a.	n.a.	171 756
Total	n.a.	171 756	n.a.	n.a.	n.a.	n.a.	171 756
Households	..	..	n.a.	n.a.	n.a.	168 700	168 700
National expenditure	115 201	172 560	220 793	741 577	94 572	168 700	1 513 403

(a) General government as collective consumer.

(b) Households as actual consumers.

FINANCING OF ENVIRONMENT PROTECTION *continued*

In essence, most of the biodiversity and landscape services produced in Australia are provided to the Australian community at non-market rates by a variety of government departments and agencies. Thus, Australia's expenditure on protection of its biodiversity values over the last two financial years was heavily influenced by the levels of funding provided to these agencies and departments and the legislative framework and or policies that guided their spending. The significance of this is that Australia's national expenditure on the protection of biodiversity and landscape is closely linked with its political processes and institutions.

It should also be noted that environment protection activities in other domains undertaken by industry and government may directly or indirectly contribute to conservation of biodiversity, by mitigating adverse impacts caused by pollution and or environmental degradation.

PRODUCTION OF ENVIRONMENT PROTECTION SERVICES

Tables 5.5 and 5.6 indicate that Commonwealth Government and State Governments were also the largest providers of biodiversity and landscape protection services, producing a total of \$935m worth of biodiversity protection services in 1995–96 and \$1105m worth in 1996–97. Over the same period industry groups produced approximately \$74m and \$80m worth of biodiversity and landscape protection services, respectively. Most of the environment protection services produced by industry was undertaken for own use, using internal resources and capabilities. Of the \$74m worth of services produced by industry for sale and internal use in 1995–96, approximately 54% was produced by agriculture, the remaining 46% by mining. The breakdown of industry expenditure was similar in 1996–97, with total expenditure split fairly evenly between agriculture and mining (51% and 49%, respectively) .

5.5 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1995–96

Components	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth government	State government	Local government	For sale(a)	For internal use	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Environment protection						
Non-market	213 097	621 577	93 969	..	..	928 643
Market	40 029	60 094	—	564	..	100 687
For internal use	(b)	(b)	(b)	(b)	73 908	73 908
Total	253 126	681 671	93 969	564	73 908	1 103 238
INPUTS						
Current uses						
Intermediate consumption	130 750	341 867	66 070	(b)	(c)74 433	613 120
Compensation of employees	66 561	259 861	27 899	(b)	n.a.	354 321
Consumption of fixed capital	15 786	19 849	(d)	(b)	(d)	35 635
Other taxes on production	..	(d)	—	(b)	2 221	2 221
Less other subsidies	—	—	—	(b)	2 220	2 220
Current environment protection income						
Market output	40 029	60 094	—	564	..	100 687
Current transfers	4 798	26 102	8 069	n.a.	n.a.	38 969
Total	44 827	86 196	8 069	564	—	139 656
Capital transactions						
Gross fixed capital formation	11 221	110 504	184 083	(b)	28 766	334 574
Investment grants received	—	—	3 221	(b)	401	3 622

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Includes compensation of employees.

(d) Not collected.

Note: Output does not include non-environmental protection output.

5.6 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1996–97

Components	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth government	State government	Local government	For sale(a)	For internal use	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Environment protection						
Non-market	220 793	741 577	94 572	..	..	1 056 942
Market	15 821	127 111	—	353	..	143 285
For internal use	(b)	(b)	(b)	(b)	79 399	79 399
Total	236 614	868 688	94 572	353	79 399	1 279 626
INPUTS						
Current uses						
Intermediate consumption	141 918	394 303	66 494	(b)	(c)78 983	681 698
Compensation of employees	60 917	311 539	28 078	(b)	n.a.	400 534
Consumption of fixed capital	17 958	35 735	(d)	(b)	(d)	53 693
Other taxes on production	..	(d)	—	(b)	2 333	2 333
Less other subsidies	—	—	—	(b)	526	526
Current environment protection income						
Market output	15 821	127 111	—	353	..	143 285
Current transfers	14 497	60 785	9 302	n.a.	n.a.	84 584
Total	30 318	187 896	9 302	353	..	227 869
Capital transactions						
Gross fixed capital formation	7 157	56 828	51 217	(b)	15 033	130 235
Investment grants received	—	—	3 714	(b)	262	3 976

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Includes compensation of employees.

(d) Not collected.

Note: Output does not include non-environmental protection output.

5.7 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, By Industry

Components	FOR SALE(a).		FOR INTERNAL USE.....		Total
	Mining	Agriculture	Mining		
	\$'000	\$'000	\$'000		\$'000
.....					
1995-96					
Output					
Market	564	..	..	..	..
For internal use	(b)	40 521	33 387		73 908
Inputs					
Current uses(c)					
Intermediate consumption(d)	(b)	42 128	32 304		74 433
Other taxes on production	(b)	591	1 631		2 221
Less other subsidies	(b)	2 198	22		2 220
Capital transactions					
Gross fixed capital formation	(b)	1 884	26 882		28 766
Investment grants received	(b)	380	21		401
.....					
1996-97					
Output					
Market	353	..	..	..	..
For internal use	(b)	40 248	39 151		79 399
Inputs					
Current uses(c)					
Intermediate consumption(d)	(b)	40 235	38 748		78 983
Other taxes on production	(b)	536	1 798		2 333
Less other subsidies	(b)	523	3		526
Capital transactions					
Gross fixed capital formation	(b)	3 667	11 366		15 033
Investment grants received	(b)	262	—		262

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Consumption of fixed capital not collected.

(d) Includes compensation of employees.

Note: Output does not include non-environmental protection output.

INTRODUCTION

Australian soil structure is often poorly developed. Agriculture, pastoralism, forestry, mining and human habitation are pressures that affect aspects of our land-use and hence the state of our land resource. However, the impact of these land-uses on Australia's soils is not easy to characterise. To date the extent, severity and cost of soil degradation have not been well documented (SoE 1996).

Groundwater occurs naturally and in a widespread region across Australia, though of varying quality and useful quantities. Groundwater is a highly important resource to much of the pastoral and mining industries in Australia. The pressure on groundwater has seen a large number of bores run dry and an increase in the search for more viable bores into this resource (SoE 1996).

National expenditure on protection of soil and groundwater activities amounted to \$296m (4% of total environment protection expenditure) in 1995–96 and \$347m (4% of total environment protection expenditure) in 1996–97 (table 6.1). Expenditure on protection of soil and groundwater includes expenditure on such activities as: soil remediation; costs to halt or slow soil degradation; and protection of groundwater from contaminating pollutants such as oil or diesel.

Current expenditure, or expenditure on final and intermediate consumption of goods and services for soil and groundwater protection by households, government (all levels) and industries, accounted for \$206m (1995–96) and \$285m (1996–97). Capital formation, or expenditure on the purchase of plant, machinery and land for soil and groundwater protection, accounted for \$90m (1995–96) and \$62m (1996–97).

6.1 NATIONAL EXPENDITURE ON SOIL AND GROUNDWATER PROTECTION

	1995–96	1996–97
<i>Components</i>	\$'000	\$'000
.....		
Final consumption		
General government	114 697	200 539
Households	300	300
<i>Total</i>	114 997	200 839
Intermediate consumption		
<i>All industries</i>	88 302	82 084
Gross capital formation		
General government	5 701	2 969
Corporate (public and private)	84 064	58 705
<i>Total</i>	89 765	61 674
National expenditure(a)		
Current	205 783	285 398
Capital	89 765	61 674
Total	295 548	347 072
.....		

(a) Includes subsidies.

NATIONAL EXPENDITURE BY USERS

Final consumption of soil and groundwater services include monitoring, and remediation activities of general government, and environmental levies paid by households. Table 6.2 shows that in 1995–96, Commonwealth Government's final consumption expenditure was \$88m (30% of total national expenditure on soil and groundwater protection measures). In 1996–97, final consumption expenditure by the Commonwealth Government increased to \$159m (46% of total national expenditure on soil and groundwater protection measures).

The industry contribution to protection of soil and groundwater measures given in table 6.3 is limited to agricultural (Australian and New Zealand Standard Industrial Classification (ANZSIC) 01) and the mining (ANZSICs 11, 12, 13, 14 and 15) industries. This restriction is based on previous testing which found that expenditure in other industries (manufacturing, service industries etc.) was limited.

Agriculture was the main contributor by the private sector to national expenditure on soil and groundwater, spending \$146m (49% of total national expenditure on soil and groundwater protection measures) in 1995–96 and \$102m (29% of total national expenditure on soil and groundwater protection measures) in 1996–97 (table 6.3). These types of expenditures are related to activities aimed at the prevention and rehabilitation of soil degradation due to agricultural practices. Their activities have been split between capital (44% in 1995–96 and 33% in 1996–97) and current (56% in 1995–96 and 67% in 1996–97) expenditure on protection of soil and groundwater.

The other major contributor to soil and groundwater protection was the mining industry, spending 10% of total expenditure on soil and groundwater protection in 1995–96 (\$29m), and 12% in 1996–97 (\$42m) (table 6.3).

6.2 NATIONAL EXPENDITURE, By Users of Products and Services

Components	SPECIALISED PRODUCERS...	OTHER PRODUCERS	CONSUMERS(a).....				Total
	General government	Total industries	Commonwealth	State	Local	Households	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	300	300
Non-market	..	..	88 377	21 004	5 316	n.a.	114 697
Total	..	..	88 377	21 004	5 316	300	114 997
Intermediate consumption of environment protection services and products							
Market	(c)	42 055	..	..	..	..	42 055
For internal use	(c)	46 247	..	..	..	..	46 247
Total	(c)	88 302	..	..	..	..	88 302
Total consumption of services and products	..	88 302	88 377	21 004	5 316	300	203 299
Gross capital formation for environment protection activities	5 701	84 064	..	..	..	..	89 765
Subsidies on production	(c)	2 484	..	..	..	..	2 484
National expenditure for environment protection							
Current	..	90 786	88 377	21 004	5 316	300	205 783
Capital	5 701	84 064	..	..	..	..	89 765
Total	5 701	174 850	88 377	21 004	5 316	300	295 548
1996-97							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	300	300
Non-market	..	..	158 675	36 214	5 350	n.a.	200 539
Total	..	..	158 675	36 214	5 350	300	200 839
Intermediate consumption of environment protection services and products							
Market	(a)	40 636	..	..	..	..	40 666
Ancillary	(a)	41 448	..	..	..	..	41 448
Total	(a)	82 084	..	..	..	..	82 084
Total consumption of services and products	(a)	82 084	158 675	36 214	5 350	300	282 623
Gross capital formation for environment protection activities	2 969	58 705	..	..	..	..	61 674
Subsidies on production	(a)	2 775	..	..	..	..	2 775
National expenditure for environment protection							
Current	..	84 859	158 675	36 214	5 350	300	285 398
Capital	2 969	58 705	..	..	..	..	61 674
Total	2 969	143 564	158 675	36 214	5 350	300	347 072

(a) Local government as a consumer information not collected in 1995-96.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Not collected.

6.3 NATIONAL EXPENDITURE, By Other Producers

Components	INDUSTRY.....		
	Agriculture	Mining	Total
	\$'000	\$'000	\$'000
.....			
1995-96			
Intermediate consumption of environment protection services and products			
Market	36 904	5 151	42 055
For internal use	41 881	4 365	46 246
Total	78 785	9 516	88 301
Gross capital formation for environment protection activities	64 841	19 223	84 064
Subsidies on production	2 482	2	2 484
National expenditure for environment protection			
Current	81 267	9 518	90 785
Capital	64 841	19 223	84 064
Total	146 108	28 741	174 849
.....			
1996-97			
Intermediate consumption of environment protection services and products			
Market	31 273	9 363	40 636
For internal use	34 167	7 281	41 448
Total	65 440	16 644	82 084
Gross capital formation for environment protection activities	33 755	24 950	58 705
Subsidies on production	2 774	1	2 775
National expenditure for environment protection			
Current	68 214	16 645	84 859
Capital	33 755	24 950	58 705
Total	101 969	41 595	143 564
.....			

FINANCING OF SOIL AND GROUNDWATER PROTECTION SERVICES

As financers of products and services to protect soil and groundwater, the Commonwealth Government accounted for 31% of total national expenditure on this domain in 1995–96. This rose to 47% in 1996–97. This increase corresponds with the establishment of the Natural Heritage Trust by the Commonwealth government.

Industries financed the majority of soil and groundwater protection in 1995–96, accounting for 58% (or \$170m) of total national expenditure, most of which was the agriculture industry. In 1996–97, this decreased to \$140m worth of soil and groundwater protection, mainly due to a fall in capital expenditure by the agriculture industry in this year.

6.4 FINANCING OF NATIONAL EXPENDITURE FOR ENVIRONMENT PROTECTION

Financing units	SPECIALISED PRODUCERS...	OTHER PRODUCERS	CONSUMERS.....				Total
	General government	Total industries	Commonwealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96							
General government							
Commonwealth	590	n.a.	88 377	3 233	246	n.a.	92 446
State	2 609	n.a.	—	17 771	47	n.a.	20 427
Local	2 501	n.a.	—	—	5 023	n.a.	7 524
Total	5 701	4 536	88 377	21 004	5 316	n.a.	(c)124 934
Corporations							
Specialised producers	n.a.	—	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers	n.a.	170 314	n.a.	n.a.	n.a.	n.a.	170 314
Total	n.a.	170 314	n.a.	n.a.	n.a.	n.a.	170 314
Households	..	..	n.a.	n.a.	n.a.	300	300
National expenditure	5 701	174 850	88 377	21 004	5 316	300	295 548
1996–97							
General government							
Commonwealth	679	n.a.	158 521	4 200	284	n.a.	163 684
State	1 605	n.a.	154	32 014	54	n.a.	33 827
Local	685	n.a.	—	—	5 013	n.a.	5 698
Total	2 969	3 937	158 675	36 214	5 350	n.a.	(c)207 145
Corporations							
Specialised producers	n.a.	—	n.a.	n.a.	n.a.	n.a.	n.a.
Other producers	n.a.	139 628	n.a.	n.a.	n.a.	n.a.	139 628
Total	n.a.	139 628	n.a.	n.a.	n.a.	n.a.	139 628
Households	..	..	n.a.	n.a.	n.a.	300	300
National expenditure	2 969	143 565	158 675	36 214	5 350	300	347 073

(a) General government as collective consumer.

(b) Households as actual consumers.

(c) Sum will not equal totals as some splits not available.

PRODUCTION OF SOIL AND GROUNDWATER PROTECTION SERVICES

Total environment protection output for soil and groundwater protection measures was \$172m in 1995–96 and \$266m in 1996–97 (tables 6.5 and 6.6). The majority of environment protection output was generated by the general government sector, accounting for \$126m in 1995–96 and \$224m in 1996–97. This increase in output is mainly due to an \$80m increase in production by the Commonwealth Government in 1996–97. This is most likely due to the establishment of the Natural Heritage Trust.

Industry accounted for \$46m of environment protection output on soil and groundwater protection measures in 1995–96 (table 6.5). In 1996–97, soil and groundwater protection output by industry decreased to \$43m (table 6.6). The majority of soil and groundwater protection output by industry is for internal use. Table 6.7 shows that agriculture produced the bulk of this soil and groundwater protection output (\$42m in 1995–96 and \$34m in 1996–97). Output produced for sale to others was not collected for agriculture.

National production of soil and groundwater protection services were partially funded from market output, \$11m in 1995–96 and \$24m in 1996–97. Other forms of funding, for State and local governments in particular, were in the form of current transfers from another level of government (\$4m in 1995–96 and \$5m in 1996–97).

Capital investment by the mining industry in soil and groundwater protection activities was relatively large (\$19m in 1995–96 and \$24m in 1996–97).

6.5 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1995–96

	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth	State	Local	For sale	For internal use	
	\$'000	\$'000	\$'000	\$'000	\$'000	
OUTPUT						
Non-market	88 377	21 004	5 316	..	..	114 697
Market	8 721	2 084	—	115	..	10 920
For internal use	(a)	(a)	(a)	(a)	46 247	46 247
<i>Total</i>	97 098	23 088	5 316	115	46 247	171 864
INPUTS						
Current uses						
Intermediate consumption	76 519	15 405	3 109	(a)	(b)48 002	133 035
Compensation of employees	11 027	5 599	2 208	(a)	n.a.	18 834
Consumption of fixed capital	831	—	(c)	(a)	(c)	831
Other taxes on production	..	(c)	—	(a)	810	810
Less other subsidies	—	—	—	(a)	2 485	2 485
Current environmental protection income						
Market output	8 721	2 084	—	115	..	10 920
Current transfers	—	3 233	293	n.a.	n.a.	3 526
<i>Total</i>	8 721	5 317	293	115	..	14 446
Capital transactions						
Gross fixed capital formation	590	2 596	2 515	(a)	29 316	35 017
Investment grants received	..	..	13	(a)	2 052	2 065

(a) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Includes compensation of employees.

(c) Not collected.

(c) Note: Output does not include non-environmental protection output.

6.6 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1996–97

	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth	State	Local	For sale	For internal use	
	\$'000	\$'000	\$'000	\$'000	\$'000	
OUTPUT						
Non-market	158 675	36 214	5 350	..	..	200 239
Market	18 703	4 734	—	82	..	23 519
For internal use	(a)	(a)	(a)	(a)	42 434	42 434
<i>Total</i>	<i>177 378</i>	<i>40 948</i>	<i>5 350</i>	<i>82</i>	<i>42 434</i>	<i>266 192</i>
INPUTS						
Current uses						
Intermediate consumption	154 716	17 345	3 129	(a)	(b)41 622	216 812
Compensation of employees	3 817	18 488	2 222	(a)	n.a.	24 527
Consumption of fixed capital	142	381	(c)	(a)	(c)	523
Other taxes on production	..	(c)	—	(a)	1 558	1 558
Less other subsidies	—	—	—	(a)	907	907
Current environmental protection income						
Market output	18 703	4 734	—	82	..	23 519
Current transfers	154	4 200	338	n.a.	n.a.	4 692
<i>Total</i>	<i>18 857</i>	<i>8 934</i>	<i>338</i>	<i>82</i>	<i>..</i>	<i>28 211</i>
Capital transactions						
Gross fixed capital formation	679	1 590	700	(a)	44 984	47 953
Investment grants received	..	..	15	(a)	1 162	1 177

(a) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Includes compensation of employees.

(c) Not collected.

Note: Output does not include non-environmental protection output.

6.7 ENVIRONMENT PROTECTION SERVICES, By Industry

	FOR	FOR INTERNAL USE.....			
	SALE(a)	Mining	Agriculture	Mining	Total
	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96					
Output					
Market	115	..	..	..	..
For internal use	(b)	41 882	4 365		46 247
Inputs					
Current uses(c)					
Intermediate consumption(d)	(b)	43 697	4 306		48 002
Other taxes on production	(b)	667	142		810
Less other subsidies	(b)	2 483	2		2 485
Capital transactions					
Gross fixed capital formation	(b)	10 317	18 999		29 316
Investment grants received	(b)	2 028	24		2 052
1996-97					
Output					
Market	82	..	..	..	..
For internal use	(b)	34 167	7 361		41 528
Inputs					
Current uses(c)					
Intermediate consumption(d)	(b)	34 388	7 234		41 622
Other taxes on production	(b)	686	872		1 558
Less other subsidies	(b)	906	—		906
Capital transactions					
Gross fixed capital formation	(b)	20 718	24 266		44 984
Investment grants received	(b)	1 162	—		1 162

(a) Not collected for Agriculture.

(b) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(c) Consumption of fixed capital not collected.

(d) Includes compensation of employees.

Note: Output does not include non-environmental protection output.

INTRODUCTION

Other environment protection activities are classified as those activities that are either not covered by the other domains, or those expenditures that cross over two or more domains and cannot be split. Included are: noise and vibration abatement; research and development (R&D) of environment protection; and all other environment protection activities by industry and government that have not been separately identified and allocated to a specific domain.

Detailed data for the abatement of noise and vibration are available separately on request. Activities for noise and vibration abatement typically include measures to reduce noise from industry; measures to reduce noise and vibration from aircraft; and measures to reduce noise and vibration in public/personal transport.

Expenditure on other environment protection was \$716m (9% of total environment protection expenditure) in 1995–96 and \$848m (10% of total environment protection expenditure) in 1996–97 (table 7.1).

Noise and vibration abatement accounted for 6% of expenditure on other environment protection activities in 1995–96 and 21% in 1996–97 (table 7.2). Government expenditure on noise and vibration abatement was not separately identified in 1995–96 but is included in 'other' total (see table 7.1).

R&D contributed 8% (\$56m) and 7% (\$59m) in 1995–96 and 1996–97, respectively (table 7.2). These amounts refer only to expenditure by business on R&D. Government R&D on environment protection was not separately identified.

7.1 NATIONAL EXPENDITURE ON OTHER ENVIRONMENT PROTECTION
.....

	1995–96	1996–97(a)
<i>Components</i>	\$'000	\$'000
.....		
Final consumption		
General government	410 492	389 431
Households	1 300	1 400
<i>Total</i>	411 792	390 831
Intermediate consumption		
<i>All industries</i>	166 232	308 283
Gross capital formation		
General government	78 343	40 465
Corporate (public and private)	59 101	108 160
<i>Total</i>	137 444	148 625
National expenditure(b)		
Current	578 216	699 162
Capital	137 444	148 625
Total	715 660	847 787

(a) Figure for 1996–97 is not directly comparable with 1995–96.

(b) Includes subsidies.

7.2 SELECTED COMPONENTS OF NATIONAL EXPENDITURE, By Sub-account

	RESEARCH & DEVELOPMENT...		NOISE & VIBRATION ABATEMENT.....	
	1995-96	1996-97	1995-96	1996-97
	\$'000	\$'000	\$'000	\$'000
Final consumption of environment protection services and products	n.a.	n.a.	n.a.	146 528
Intermediate consumption of environment protection services and products	56 097	59 116	11 686	6 990
Gross fixed capital formation for environment protection activities	n.a.	n.a.	31 271	25 173
Total(a)	56 097	59 116	43 008	178 704

(a) Includes subsidies.

NATIONAL EXPENDITURE BY USERS

Other producers (namely industries that do not specialise in providing environment protection services) accounted for \$226m (32% of national expenditure on other environment protection) in 1995-96 and \$416m (49% of national expenditure on other environment protection) in 1996-97. Final consumption by general government contributed 57% (\$410m) of national expenditure in 1995-96 and 46% (\$389m) in 1996-97 (table 7.3).

It is worth noting that in 1996-97, general government expenditure on all environment protection activities were better identified and attributed to their respective domain. For service industries, the reverse is true as all environment protection transactions not relating to waste management, waste water management and water pollution abatement have been allocated to other environment protection in 1996-97 (see table 7.4).

7.3 NATIONAL EXPENDITURE, By Users of Products and Services

Components	SPECIALISED PRODUCERS	OTHER PRODUCERS	CONSUMERS.....				Total
	General government	Total industries	Commonwealth(a)	State(a)	Local(a) Households(b)		
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995-96							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	1 300	1 300
Non-market	..	..	117 499	272 026	20 967	n.a.	410 492
Total	..	..	117 499	272 026	20 967	1 300	411 792
Intermediate consumption of environment protection services and products							
Market	(c)	93 582	..	..	..	..	93 582
For internal use	(c)	72 650	..	..	..	..	72 650
Total	(c)	166 232	..	..	..	..	166 232
Total consumption of services and products	..	166 232	117 499	272 026	20 967	1 300	578 024
Gross capital formation for environment protection activities	78 343	59 101	..	..	..	..	137 444
Subsidies on production	(c)	192	..	..	..	..	192
National expenditure for environment protection							
Current	..	166 424	117 499	272 026	20 967	1 300	578 216
Capital	78 343	59 101	..	..	..	..	137 444
Total	78 343	225 525	117 499	272 026	20 967	1 300	715 660
1996-97							
Final consumption of environment protection services and products							
Market	..	..	..	..	..	1 400	1 400
Non-market	..	..	180 568	187 762	21 101	n.a.	389 431
Total	..	..	180 568	187 762	21 101	1 400	390 831
Intermediate consumption of environment protection services and products							
Market	(c)	173 098	..	..	..	..	173 098
For internal use	(c)	135 185	..	..	..	..	135 185
Total	(c)	308 283	..	..	..	..	308 283
Total consumption of services and products	(c)	308 283	180 568	187 762	21 101	1 400	699 114
Gross capital formation for environment protection activities	40 465	108 160	..	..	..	..	148 625
Subsidies on production	(c)	48	..	..	..	..	48
National expenditure for environment protection							
Current	..	308 331	180 568	187 762	21 101	1 400	699 162
Capital	40 465	108 160	..	..	..	..	148 625
Total	40 465	416 491	180 568	187 762	21 101	1 400	847 787

(a) General government as collective consumers.

(b) Households as actual consumers.

(c) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

7.4 NATIONAL EXPENDITURE, Other Producers

Components	INDUSTRY.....				
	Manufacturing	Mining	Utilities	Service industries	Total
	\$'000	\$'000	\$'000	\$'000	\$'000
.....					
1995-96					
Intermediate consumption of environment protection services and products					
Market	24 510	18 223	17 482	33 367	93 582
For internal use	29 559	17 493	8 431	17 167	72 650
Total	54 069	35 716	25 913	50 534	166 232
Gross capital formation for environment protection activities	33 280	5 249	10 185	10 388	59 102
Subsidies on production	178	—	15	..	192
National expenditure for environment protection					
Current	54 247	35 715	25 928	50 534	166 424
Capital	33 280	5 249	10 185	10 388	59 102
Total	87 527	40 964	36 113	60 922	225 526
.....					
1996-97					
Intermediate consumption of environment protection services and products					
Market	51 454	20 693	5 344	95 607	173 098
For internal use	31 725	13 516	8 516	81 428	135 185
Total	83 179	34 209	13 860	(a)177 035	308 283
Gross capital formation for environment protection activities	36 389	25 725	8 369	37 677	108 160
Subsidies on production	46	2	—	..	48
National expenditure for environment protection					
Current	83 225	34 211	13 860	177 035	308 331
Capital	36 389	25 725	8 369	37 677	108 160
Total	119 614	59 936	22 229	214 712	416 491

(a) Includes expenditure for ambient air and climate protection. This expenditure was separately identified and allocated to chapter 4 (ambient air and climate) in 1995-96.

FINANCING OF OTHER ENVIRONMENT PROTECTION

As financiers of products and services for other environment protection measures, State Governments accounted for 40% of total national expenditure on this domain in 1995–96. This fell to 25% in 1996–97 with an overall increase in national expenditure and an increase in Commonwealth financing from \$135m in 1995–96 to \$191m in 1996–97.

In 1995–96, industry accounted for 31% of total national expenditure on this domain. In 1996–97 this financing of other environment protection activities increased to 49%. This was mainly due to the allocation of service industries expenditures on environment protection, other than waste management, waste water and water protection, to this domain.

7.5 FINANCING OF NATIONAL EXPENDITURE FOR ENVIRONMENT PROTECTION

Financing units	SPECIALISED PRODUCERS...	OTHER PRODUCERS	CONSUMERS.....				Total
	General government	Total industries	Common- wealth(a)	State(a)	Local(a)	Households(b)	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1995–96							
General government							
Commonwealth	10 567	n.a.	117 499	6 892	56	n.a.	135 014
State	20 851	n.a.	—	265 134	2 737	n.a.	288 722
Local	46 925	n.a.	—	—	18 173	n.a.	65 098
Total	78 343	259	117 499	272 026	20 967	n.a.	489 094
Corporations							
Environment protection industries	n.a.	—	n.a.	n.a.	n.a.	n.a.	..
Other producers	n.a.	225 266	n.a.	n.a.	n.a.	n.a.	225 266
Total	n.a.	225 266	n.a.	n.a.	n.a.	n.a.	225 266
Households	..	..	n.a.	n.a.	n.a.	1 300	1 300
National expenditure	78 343	225 525	117 499	272 026	20 967	1 300	715 660
1996–97							
General government							
Commonwealth	3 081	n.a.	180 568	7 672	64	n.a.	191 385
State	28 342	n.a.	—	180 090	3 155	n.a.	211 587
Local	9 042	n.a.	—	—	17 881	n.a.	26 923
Total	40 465	159	180 568	187 762	21 101	n.a.	430 054
Corporations							
Environment protection industries	n.a.	—	n.a.	n.a.	n.a.	n.a.	..
Other producers	n.a.	416 331	n.a.	n.a.	n.a.	n.a.	416 331
Total	n.a.	416 331	n.a.	n.a.	n.a.	n.a.	416 331
Households	..	..	n.a.	n.a.	n.a.	1 400	1 400
National expenditure	40 465	416 490	180 568	187 762	21 101	1 400	847 785

(a) General government as collective consumer.

(b) Households as actual consumers.

PRODUCTION OF OTHER ENVIRONMENT PROTECTION SERVICES

Total environment protection output for the other environment protection measures was \$568m in 1995–96 and \$698m in 1996–97 (tables 7.6 and 7.7). The majority of environment protection output was generated by the general government sector, amounting to \$456m in 1995–96 and \$455m in 1996–97.

Industry provided other environment protection output to the value of \$112m (20% of total environment output) in 1995–96 (table 7.6). In 1996–97, this output increased to 35% (\$244m) of total other environment protection output. The majority of other environment protection output by industry is for internal use.

Table 7.8 shows that output for internal use by service industries increased from 24% of other environment protection output to 60% in 1996–97. Due to changes in collection methodology, all environment protection output for protection of ambient air and climate was allocated to the 'other' environment protection domain in 1996–97.

These activities were partially funded by market output, \$85m in 1995–96 and \$174m in 1996–97. Other forms of funding, for State and local governments in particular, were in the form of current transfers from another level of government (\$10m in 1995–96 and \$11m in 1996–97).

7.6 PRODUCTION OF OTHER ENVIRONMENT PROTECTION SERVICES, Summary—1995–96

	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth	State	Local	For sale	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Non-market	117 499	272 026	20 967	..	..	410 492
Market	3 879	41 834	—	39 165	..	84 878
For internal use	(a)	(a)	(a)	(a)	72 650	72 650
<i>Total</i>	<i>121 378</i>	<i>313 860</i>	<i>20 967</i>	<i>39 165</i>	<i>72 650</i>	<i>568 020</i>
INPUTS						
Current uses						
Intermediate consumption	53 886	121 481	6 110	(a)	(b)78 052	259 529
Compensation of employees	53 151	136 335	14 856	(a)	n.a.	204 342
Consumption of fixed capital	10 462	14 210	(c)	(a)	(c)	24 672
Other taxes on production	..	(c)	—	(a)	2 533	2 533
Less other subsidies	—	—	—	(a)	196	196
Current environment protection income						
Market output	3 879	41 834	—	39 165	..	84 878
Current transfers	—	6 892	2 793	n.a.	n.a.	9 685
<i>Total</i>	<i>3 879</i>	<i>48 726</i>	<i>2 793</i>	<i>39 165</i>	<i>..</i>	<i>94 563</i>
Capital transactions						
Gross fixed capital formation	8 502	18 327	51 514	(a)	56 277	134 620
Investment grants received	—	—	4 590	(a)	67	4 657

(a) Transaction may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Includes compensation of employees.

(c) Not collected.

Note: Output does not include non-environmental protection output.

7.7 PRODUCTION OF ENVIRONMENT PROTECTION SERVICES, Summary—1996–97

	SPECIALISED PRODUCERS.....			OTHER PRODUCERS.....		Total
	Commonwealth	State	Local	For sale	For internal use	
Transactions	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
OUTPUT						
Non-market	180 568	187 762	21 101	..	..	389 431
Market	33 175	32 061	—	108 394	..	173 630
For internal use	(a)	(a)	(a)	(a)	135 184	135 184
Total	213 743	219 823	21 101	108 394	135 184	698 245
INPUTS						
Current uses						
Intermediate consumption	157 369	90 123	6 150	(a)	(b)142 185	395 827
Compensation of employees	21 964	85 039	14 952	(a)	n.a.	121 955
Consumption of fixed capital	1 235	12 600	(c)	(a)	(c)	13 835
Other taxes on production	..	(c)	—	(a)	3 902	3 902
Less other subsidies	—	—	—	(a)	48	48
Current environment protection income						
Market output	33 175	32 061	—	108 394	..	173 630
Current transfers	—	7 672	3 220	n.a.	n.a.	10 892
Total	33 175	39 733	3 220	108 394	..	184 522
Capital transactions						
Gross fixed capital formation	700	25 432	14 333	(a)	88 645	129 110
Investment grants received	..	..	5 291	(a)	112	5 403

(a) Transactions may exist but are not recorded due to SERIEE's accounting conventions.

(b) Includes compensation of employees.

(c) Not collected.

Note: Output does not include non-environmental protection output.

7.8 PRODUCTION OF OTHER ENVIRONMENT PROTECTION SERVICES, By Industry

	FOR SALE..		FOR INTERNAL USE.....				Total
	Total industries	Manufacturing	Mining	Utilities	Service industries		
	\$'000	\$'000	\$'000	\$'000	\$'000		
1995-96							
Output							
Market	39 165	..	..	..	..	..
For internal use	(a)	29 559	17 493	8 431	17 167	72 650	
Inputs							
Current uses(b)							
Intermediate consumption(c)	(a)	33 603	17 356	9 927	17 167	78 053	
Other taxes on production	(a)	1 940	241	352	n.a.	2 533	
Less other subsidies	(a)	178	3	15	n.a.	196	
Capital transactions							
Gross fixed capital formation	(a)	32 646	5 228	8 015	10 388	56 277	
Investment grants received	(a)	27	40	—	(d)	67	
1996-97							
Output							
Market	108 394	..	..	..	..	..
For internal use	(a)	31 725	13 517	8 516	(e)81 428	135 186	
Inputs							
Current uses(b)							
Intermediate consumption(c)	(a)	37 638	13 418	9 702	81 428	142 186	
Other taxes on production	(a)	3 277	404	219	n.a.	3 900	
Less other subsidies	(a)	45	1	3	n.a.	48	
Capital transactions							
Gross fixed capital formation	(a)	34 534	25 142	8 119	20 850	88 645	
Investment grants received	(a)	110	2	—	(d)	112	

(a) Transactions may exist but is not recorded here due to SERIEE's accounting conventions.

(b) Consumption of fixed capital not collected.

(c) Includes compensation of employees.

(d) Not collected.

(e) Includes protection of ambient air and climate also.

Note: Output does not include non-environmental protection output.

CHAPTER 8

ENVIRONMENT PROTECTION EXPENDITURE BY INDUSTRY AND STATE.

INTRODUCTION

Environment protection expenditure estimates for industries were compiled from a survey of businesses for the 1996–97 financial year (data for the mining industry were obtained from a census). This chapter presents capital and current expenditure estimates for detailed industry groups not separately identified in the previous chapters. Information is presented in a format consistent with information published previously to allow comparisons between years.

AGRICULTURE INDUSTRY

Table 8.1 provides an overview of environment protection expenditure by State for the agricultural sector. Overall Queensland spent the most on environmental protection (\$72m). When expressed as a percentage of farm business turnover by State for 1996–97 (ABS 1998a) environment protection expenditure in Queensland was also proportionally higher than other States (approximately 1.2% of farm business turnover). The two States nearest to this level of proportional expenditure were New South Wales and Victoria, where environment protection expenditure represented approximately 0.7% of farm business turnover. South Australia spent the least on environment protection expenditure when expressed as a percentage of farm business turnover (0.3%).

8.1 ENVIRONMENT PROTECTION EXPENDITURE, Agriculture Industry—1996–97

	NSW	Vic.	Qld	SA	WA	Tas.	Aust. (a)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Control/prevention of soil and land degradation, protection of waterways from contamination, protection of native plants, animals and habitat	25.9	19.6	25.8	3.7	20.1	1.2	96.4
Eradication of plant growth, animals or insects affecting sustainable land use	13.2	9.8	42.0	0.8	3.2	0.5	69.5
Waste water management	10.9	3.4	2.8	1.8	1.5	0.1	20.4
Removal/disposal of wastes (e.g. animal manures, herbicides and pesticides)	1.2	1.5	1.7	0.2	0.2	0.4	5.4
Total	51.2	34.3	72.3	6.5	25.0	2.3	191.7

(a) Includes Northern Territory and Australian Capital Territory.

Table 8.2 shows expenditure on environment protection by industry class. The highest level of expenditure on environment protection was reported by the grain growing industry (\$44m or 23% of total). Other major contributors to environment protection expenditure were the grain-sheep, grain-beef cattle farming industry (\$36m or 19% of total) and beef cattle farming (\$28m or 14% of total).

AGRICULTURE INDUSTRY *continued*

Overall the highest proportion of expenditure on environment protection to total industry turnover was in beef cattle farming (1.0% of total turnover), followed by grain growing, grain-sheep, grain-beef cattle farming, dairy cattle farming and sugar cane growing, all reporting expenditure representing 0.9% of total turnover. Beef cattle farming also spent the most of all agricultural industries on eradication of pests and weeds (\$20m). This figure represented approximately 29% of total industry expenditure on eradication of pests and weeds.

8.2 ENVIRONMENT PROTECTION EXPENDITURE, Agriculture Industry—1996–97

ANZSIC code	Industry	Eradication of pests and weeds \$m	Land degradation, protection or prevention \$m	Waste water management \$m	Waste \$m	Totals \$m	Proportion of total industry turnover %
0114–0119	Fruit growing	2.8	2.0	0.2	0.1	5.1	0.3
0113	Vegetable growing	0.9	2.7	4.2	0.2	8.0	0.5
0121	Grain growing	12.0	27.2	4.9	0.1	44.3	0.9
0122	Grain-sheep, grain-beef cattle farming	15.8	19.2	1.0	0.1	36.0	0.9
0123	Sheep-beef cattle farming	3.3	4.4	—	—	7.7	0.6
0124	Sheep farming	3.9	5.7	0.2	—	9.7	0.7
0125	Beef cattle farming	20.2	6.5	0.1	0.9	27.6	1.0
0130	Dairy cattle farming	2.5	17.1	4.3	1.9	25.8	0.9
0151	Pig farming	0.5	0.9	1.6	1.3	4.3	0.6
0161	Sugar cane growing	4.3	6.9	0.2	—	11.4	0.9
0162	Cotton growing	1.9	2.9	3.3	0.1	8.2	0.7
0141–2, 0151–3, 0159, 0169	Other agriculture	1.4	0.8	0.4	0.9	3.5	0.2
	Total	69.5	96.4	20.4	5.4	191.7	0.7

MINING INDUSTRY

For the 1996–97 financial year, mining businesses were asked questions on their total expenditure on waste management and environment protection measures. These included capital and current expenditure on environment protection, and research and development expenditure on environment protection. With the exception of 'other mining' and 'services to mining', data for each industry class were collected as part of a census. Numbers listed under totals therefore represent the entire population for that industry class at the time the data were collected.

Table 8.3 shows environment protection by the different mining industries. Metal ore mining recorded the highest level of expenditure on environment protection (\$173m or 47% of all environment protection expenditure within the mining sector). The next highest contribution to environment protection expenditure within the mining sector for the 1996–97 financial year was coal mining (\$103m or 28% of total environment protection expenditure). The breakdown of total environment protection expenditure between current and capital expenditure was 62% for current expenditure and 38% for capital expenditure (\$228m and \$141m, respectively). Total environment protection expenditure for 1996–97 was \$369m, representing 1% of total industry turnover for all mining industries.

8.3 ENVIRONMENT PROTECTION EXPENDITURE, Mining Industry—1996–97

ANZSIC code	Industry	Capital expenditure		Current expenditure		Total expenditure	
		no.	\$m	no.	\$m	no.	\$m
110	Coal mining	30	44.4	57	58.5	118	102.9
120	Oil and gas extraction	8	10.4	14	21.9	46	32.3
131	Metal ore mining						
1311	Iron ore mining (ferrous metals)	4	2.5	6	5.3	15	7.8
1312	Bauxite mining	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
1313	Copper ore mining	9	4.5	9	12.7	14	17.2
1314	Gold ore mining	28	14.4	77	35.6	126	50.0
1315	Mineral sand mining	5	8.8	7	14.9	10	23.7
1316	Nickel ore mining	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
1317	Silver-lead-zinc ore mining	6	7.8	9	8.2	10	16.0
1319	Metal ore mining n.e.c.	3	14.6	7	11.0	13	25.6
	<i>Total</i>	58	69.2	119	103.9	193	173.0
141	Other mining						
1411	Gravel and sand quarrying	n.a.	0.1	n.a.	10.5	n.a.	10.6
1419	Construction material mining n.e.c.	n.a.	7.2	n.a.	17.4	n.a.	24.6
1420	Mining n.e.c.	n.a.	8.4	n.a.	3.3	n.a.	11.7
	<i>Total</i>	n.a.	15.7	n.a.	31.2	n.a.	46.9
151	Services to mining						
1511	Petroleum exploration (own account)	n.a.	—	n.a.	—	n.a.	—
1512	Petroleum exploration services	n.a.	—	n.a.	—	n.a.	—
1513	Mineral exploration (own account)	n.a.	0.6	n.a.	11.6	n.a.	12.2
1514	Mineral exploration services	n.a.	—	n.a.	0.6	n.a.	0.6
1520	Other mining services	n.a.	0.5	n.a.	0.5	n.a.	1.0
	<i>Total</i>	n.a.	1.1	n.a.	12.7	n.a.	13.7
	Total	154	140.8	190	228.1	357	368.8

Capital expenditure on environment protection measures can be divided into end-of-line, or connected products, and change-in-production, or adapted products. End-of-line technologies accounted for 93% (\$130m) of total capital expenditure on environment protection measures (table 8.4).

The majority of capital expenditure on end-of-line technologies was spent by the metal ore mining industries (\$63m or 49% of total end-of-line expenditure) and by the coal mining industry (\$41m or 32% of total end-of-line expenditure).

The mining industry spent 2% of total capital expenditure on environment protection measures. The highest proportion of environment protection capital expenditure was spent by other mining activities (9% of their total capital expenditure). Other major contributors to environment protection measures were metal ore mining (3% of their total capital expenditure) and coal mining (3% of their total capital expenditure).

Graph 8.5 charts current and capital expenditure for coal mining, oil and gas extraction, and metal ore mining combined, since 1991–92. This shows a continuing steady increase in both capital and current expenditure by the mining industry on environment protection measures.

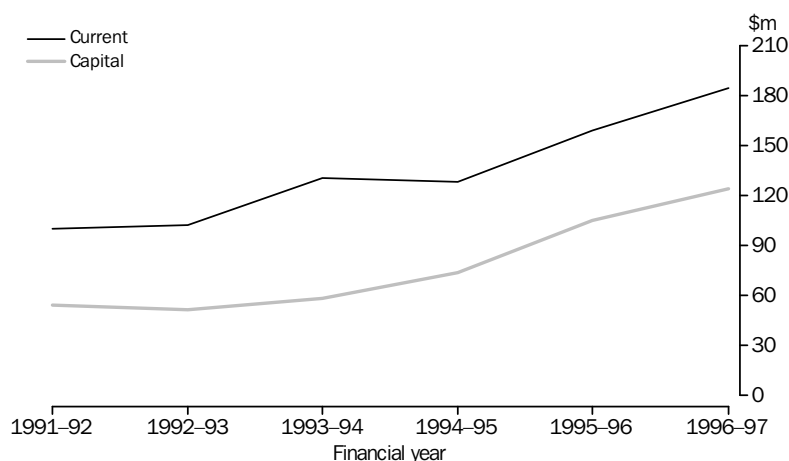
8.4 CAPITAL EXPENDITURE(a), Mining Industry—1996–97

ANZSIC code	Industry	End-of-line \$m	Change-in- production \$m	Total \$m	Proportion of total investment %
11	Coal mining	41.2	3.2	44.4	2.9
12	Oil and gas extraction	10.2	0.2	10.4	0.8
13	Metal ore mining	63.4	5.8	69.2	3.2
14	Other mining	14.7	1.1	15.7	(b)9.2
15	Services to mining	0.9	0.2	1.1	(b)0.1
	Total	130.4	10.5	140.8	2.1

(a) Total acquisitions, (ABS 1998b) .

(b) Total capital expenditure for ANZSIC 14 and 15 have been combined, (ABS 1998d).

8.5 ENVIRONMENT PROTECTION EXPENDITURE, Mining Industry(a)



(a) 1996-97 chain volume measures.

UTILITIES

The information presented here is a part of the utilities census which was collected in respect of the financial year 1996–97. Utilities, namely the electricity production and gas extraction industries, were asked questions on their expenditure on waste management and environment protection. These questions covered current or operating expenses on environment protection and capital expenditure on end-of-line and change-in-production technologies. Numbers listed near totals represent the total number of utilities appearing in the census.

Table 8.6 shows that the electricity production industry spent \$157m (92% of total expenditure on environment protection by utilities) on environment protection measures. Electricity production consistently had the highest capital (99% of total environment protection capital expenditure by utilities) and current expenditure (86% of total environment protection current expenditure by utilities) on environment protection measures.

UTILITIES *continued*

Table 8.7 shows the proportion of capital expenditure on environment protection measures to total capital expenditure by utilities was 0.3%.

8.6 ENVIRONMENT PROTECTION EXPENDITURE, Utilities—1996–97

ANZSIC code	Industry	Capital expenditure		Current expenditure		Total expenditure	
		no.	\$m	no.	\$m	no.	\$m
361	Electricity production	28	72.4	14	84.1	58	156.5
362	Gas production	12	1.1	5	13.2	13	14.3
	Total	40	73.5	19	97.3	71	170.8

8.7 CAPITAL EXPENDITURE(a), Utilities—1996–97

ANZSIC code	Industry	End-of-line	Change-in- production	Total	Proportion of total investment
		\$m	\$m	\$m	%
361	Electricity production	68.6	3.7	71.3	0.1
362	Gas production	1.1	—	1.1	0.1
	Total	69.7	3.7	72.4	0.3

(a) Total acquisitions (ABS 1998e).

MANUFACTURING INDUSTRY

For the financial year 1996–97, manufacturing businesses were asked questions on their total expenditures on waste management and environment protection measures. Table 8.8 shows that the metal product industry spent the most on environment protection (\$244m or 27% of total environment protection expenditure by all manufacturing industries). Other major contributors to total environment protection expenditure came from the food, beverage and tobacco industry (\$205m or 23% of total expenditure) and the petroleum, coal, chemical and associated product industry (\$151m or 17% of total expenditure).

8.8 ENVIRONMENT PROTECTION EXPENDITURE, Manufacturing Industry—1996–97

ANZSIC code	Industry	Capital expenditure \$m	Current expenditure \$m	Total \$m
21	Food, beverage and tobacco	77.8	127.0	204.9
22	Textile, clothing, footwear and leather	21.8	32.4	54.2
23	Wood and paper product	31.5	45.3	76.8
24	Printing, publishing and recorded media	3.8	15.3	19.0
25	Petroleum, coal, chemical and associated product	70.1	81.1	151.1
26	Non-metallic mineral product	29.4	28.6	58.0
27	Metal product	146.7	97.3	244.0
28	Machinery and equipment	30.3	41.1	71.4
29	Other manufacturing	4.5	12.5	17.0
21–29	Total manufacturing	415.8	480.5	896.3

Table 8.9 shows manufacturers expenditure on end-of-line and change-in-production technologies to hold waste materials from the environment. End-of-line, or connected technologies, accounted for \$261m (63%) of total capital expenditure on environment protection by the manufacturing sector. Change-in-production, or adapted technologies, accounted for \$155m (37%) of total capital expenditure on environment protection.

The major contributors to the consumption of end-of-line products were metal product (\$92m or 35% of total end-of-line expenditure) and food, beverage and tobacco manufacturers (\$54m or 21% of total end-of-line expenditure).

Metal product manufacturers spent the most on change-in-production technology, accounting for 35% (\$55m) of total change-in-production expenditure. Food, beverage and tobacco manufacturers contributed 16% (\$24m) of total change-in-production expenditure.

As a percentage of total capital expenditure, manufacturers spent 4% on environment protection measures. Capital expenditure on environment protection by metal products manufacturers accounted for 10% of their total capital expenditure. Textile, clothing, footwear and leather manufacturing industry spent 9% of their capital expenditure on environment protection measures.

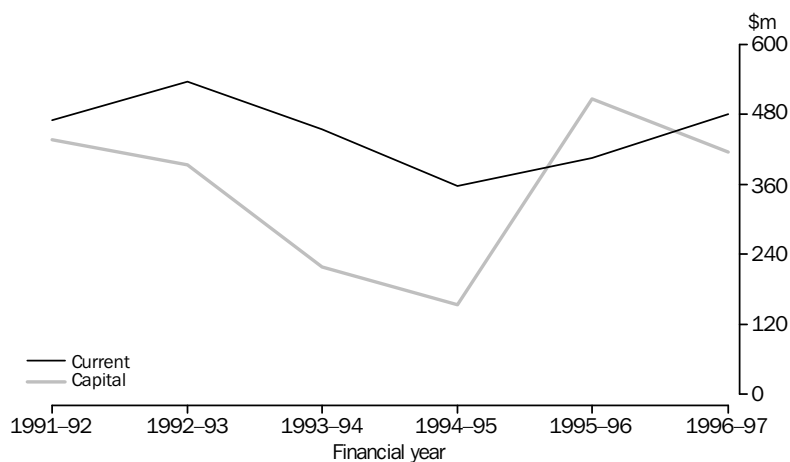
Graph 8.10 demonstrates the constant price (1996–97 prices) estimates of comparable current and capital expenditures between 1991–92 and 1996–97. The graph shows the volatile nature of capital expenditure on environment protection measures for manufacturing. Current expenditure on waste management and environment protection activities shows an increase in 1995–96 and 1996–97 after a trend downward between 1992–93 through to 1994–95.

8.9 CAPITAL EXPENDITURE(a), Manufacturing—1996–97

ANZSIC code	Industry	End-of-line	Change-in- production	Proportion of total	
		\$m	\$m	Total	investment
21	Food, beverage and tobacco	53.7	24.2	77.8	3.9
22	Textile, clothing, footwear and leather	3.9	17.9	21.8	8.7
23	Wood and paper product	26.8	4.6	31.5	3.4
24	Printing, publishing and recorded media	2.7	1.1	3.8	0.1
25	Petroleum, coal, chemical and associated product	47.3	22.7	70.1	4.2
26	Non-metallic mineral product	17.2	12.2	29.4	2.7
27	Metal product	92.0	54.7	146.7	9.8
28	Machinery and equipment	15.1	15.1	30.3	1.5
29	Other manufacturing	1.9	2.6	4.5	2.3
21–29	Total manufacturing	260.6	155.2	415.8	4.1

(a) Total acquisitions (ABS 1998h).

8.10 ENVIRONMENT PROTECTION EXPENDITURE, Manufacturing Industry(a)



(a) 1996–97 chain volume measures.

SERVICE AND OTHER INDUSTRIES

Data on environment protection expenditure within service and other industries for the financial years 1995–96 and 1996–97 were collected as part of the Australian Bureau of Statistics Economic Activity Survey. In previous years, figures have been reported for 'other services' (Australian and New Zealand Standard Industry Classification (ANZSIC) 96). However, due to the fact a large component of this subdivision was separately surveyed and has been reported in detail in chapter 2 (the Waste Industry Survey), results for this industry class have been excluded here.

Total expenditure for environment protection by service industries was \$775m in 1995–96 and \$1 020m in 1996–97. Overall, current expenditure on environment protection activities for both years was largest in the construction industry, retail trade and wholesale trade sectors. Together this group of industries accounted for over one half of current expenditure on waste management and environment protection by the service industries sector (55% in 1995–96 and 60% in 1996–97).

8.11 ENVIRONMENT PROTECTION EXPENDITURE, Service Industries—1995–96(a)

		<i>Capital</i>	<i>Current</i>	<i>Total</i>
<i>ANZSIC</i>				
<i>code</i>	<i>Industry</i>	\$m	\$m	\$m
<i>Agriculture, forestry and fishing</i>				
2	Services to agriculture	1.2	1.0	2.2
3	Forestry and logging	1.1	0.2	1.3
4	Commercial fishing	0.1	0.7	0.8
<i>Construction</i>				
41	General construction	30.9	66.0	96.9
42	Construction trade services	13.4	62.9	76.3
<i>Wholesale trade</i>				
45	Basic material wholesaling	5.7	41.5	47.1
46	Machinery and motor vehicle wholesaling	4.9	55.1	60.0
47	Personal and household good wholesaling	0.9	20.8	21.7
<i>Retail trade</i>				
51	Food retailing	2.3	34.6	37.0
52	Personal and household good retailing	0.3	21.0	21.2
53	Motor vehicle retailing and services	14.8	36.6	51.4
57	Accommodation, cafes and restaurants	1.5	37.6	39.1
<i>Transport and storage</i>				
61	Road transport	3.4	38.6	41.9
62	Rail transport	4.6	3.7	8.3
63	Water transport	13.6	6.4	20.0
64, 65	Air, space and other transport	1.2	9.6	10.8
66	Services to transport	25.8	9.0	34.8
67	Storage	0.7	10.0	10.7
71	Communication services	—	1.3	1.3
<i>Finance and insurance</i>				
73	Finance	1.9	4.9	6.8
74	Insurance	—	9.4	9.4
75	Services to finance and insurance	—	1.9	1.9
<i>Property and business services</i>				
77	Property services	4.4	22.6	27.1
78	Business services	18.4	63.5	71.7
84	Education	1.0	16.6	17.6
<i>Health and community services</i>				
86	Health services	4.0	22.1	26.1
87	Community services	—	1.7	1.7
<i>Cultural and recreational services</i>				
91	Motion picture, radio and television	—	1.1	1.2
92	Libraries, museums and the arts	—	0.1	0.1
93	Sport and recreation	1.0	9.1	9.2
<i>Personal and other services</i>				
95	Personal services	0.4	7.9	8.3
Total		157.5	617.5	775.0

(a) Revised figures.

8.12 ENVIRONMENT PROTECTION EXPENDITURE, Service Industries—1996–97

ANZSIC code	Industry	Capital \$m	Current \$m	Total \$m
Agriculture, forestry and fishing				
2	Services to agriculture	1.0	2.3	3.3
3	Forestry and logging	0.7	0.9	1.6
4	Commercial fishing	0.3	0.9	1.2
Construction				
41	General construction	3.5	54.1	57.6
42	Construction trade services	13.2	142.0	155.2
Wholesale trade				
45	Basic material wholesaling	7.2	71.1	78.3
46	Machinery and motor vehicle wholesaling	3.6	110.1	113.7
47	Personal and household good wholesaling	6.4	40.8	47.2
Retail trade				
51	Food retailing	3.7	42.1	45.8
52	Personal and household good retailing	6.3	36.3	42.6
53	Motor vehicle retailing and services	20.8	55.7	76.5
57	Accommodation, cafes and restaurants	1.0	92.3	93.3
Transport and storage				
61	Road transport	0.5	13.3	13.8
62	Rail transport	10.4	16.9	27.3
63	Water transport	0.6	2.2	2.8
64, 65	Air, space and other transport	0.2	4.5	4.7
66	Services to transport	2.3	9.4	11.7
67	Storage	4.6	5.9	10.5
71	Communication services	—	0.1	0.1
Finance and insurance				
73	Finance	1.5	38.8	40.3
74	Insurance	—	1.0	1.0
75	Services to finance and insurance	—	5.1	5.1
Property and business services				
77	Property services	3.6	35.2	38.8
78	Business services	7.6	50.5	58.1
84	Education	0.8	9.3	10.1
Health and community services				
86	Health services	0.7	32.1	32.8
87	Community services	0.4	17.1	17.5
Cultural and recreational services				
91	Motion picture, radio and television	—	3.5	3.5
92	Libraries, museums and the arts	—	4.4	4.4
93	Sport and recreation	0.2	11.0	11.2
Personal and other services				
95	Personal services	0.6	9.3	9.9
Total		101.7	918.2	1 019.9

EXPLANATORY NOTES

INTERNATIONAL FRAMEWORKS

1 Early work on estimating environment protection expenditures was guided by the Organisation for Economic Co-operation and Development (OECD) Pollution Abatement and Control (PAC) framework. This framework was discussed in detail in the first two editions of this publication, titled *Cost of Environment Protection, Australia, Selected Industries, 1990–91* and *1991–92*.

2 Since 1995–96, the Australian Bureau of Statistics (ABS) has moved towards collecting and presenting environment protection estimates in accord with the United Nations' System for Integrated Environmental and Economic Accounting. The environment protection account is the furthest developed of a series of environmental satellite accounts being developed by the European Statistical Office (Eurostat) known as the European System for the Collection of Economic Information on the Environment (SERIEE). SERIEE provides a conceptual framework which aims at producing aggregated data that are comparable among countries and also with the macro-economic aggregates produced by national accounts.

3 The focal point of SERIEE are those economic activities and transactions that are aimed at reducing and preventing pressures on the environment, or monitoring and restoring the environment. Specifically, SERIEE defines environment protection as '...all actions and activities that are aimed at the prevention, reduction and elimination of pollution as well as any other degradation of the environment' (Eurostat 1994). As such, SERIEE has a broader scope than the OECD PAC framework, since it covers all environment protection expenditures, not just those relating to pollution abatement and control. This includes expenditures on activities such as protection of landscapes, biodiversity, soil and groundwater, in addition to the traditional environment protection activities such as waste management and air and water pollution abatement. Hence, it is better suited to the Australian experience where soil and landscape degradation are important environmental concerns. It should be noted that to fit the definition above, environment protection must be the prime objective of the expenditure. That is, actions and activities which have a favourable impact on the environment but which primarily serve other goals do not come under environment protection.

SERIEE FRAMEWORK

4 The SERIEE framework, which underpins the environment protection account, allows for the presentation and analysis of three major questions:

- how much a nation spends on environment protection and what form this expenditure takes;
- how and by which units the expenditure is financed; and
- the value of the production of environment protection services.

This is achieved by the construction of three separate tables, each of which is described in paragraphs 5 through 18.

National expenditure on environment protection by users

5 The overall aggregate—national expenditure for environment protection—is a useful indicator of the relative economic importance of environment protection in general and of specific environmental domains in particular. It provides information on the resources the various economic units are devoting to environment protection.

6 National expenditure describes final and intermediate consumption of products and services, gross capital formation for environment protection activities, and transfers for environment protection activities.

7 In the tables presenting national expenditure by user, the columns represent expenditure by the different economic units which use and/or benefit from environment protection activities. These are units which:

- use environment protection products or services under the heading of final or intermediate consumption;
- make investments in order to produce environment protection services;
- make investments in environment protection products; and
- benefit from specific subsidies and taxes for environment protection.

8 This description, within a framework consistent with the system of national accounts, facilitates the breakdown of the national expenditure and makes it possible to distribute it among the different categories of units:

- general government and households as final consumers; and
- general government and corporate producers of environment protection services as users of services and products for their intermediate consumption or gross capital formation.

Financing of environment protection

9 SERIEE makes it possible to identify those units which actually bear the cost of environment protection measures (enterprises, households or general government) and to ascertain the amount of transfers (subsidies, taxes etc.) occurring at the national level.

10 The users/beneficiaries categories used to describe national expenditure are used again here, and the financing units are regrouped according to institutional sectors.

11 Financing by general government takes the form of:

- capital expenditure by specialised producers;
- transfers and subsidies paid to the corporate sector; and
- financing of activities on behalf of the community i.e. non-market activity of government.

12 Financing by the corporate sector would take the form of:

- capital uses by specialised producers;
- capital and current transactions by other producers for both ancillary activities and purchasing of services provided by specialised and other producers; and
- taxes, fees etc. ear-marked for environment protection purposes.

Production of environment protection services

13 The value of the total production of environment protection activities and services is termed 'environment protection output'. The 'production boundary' for environment protection goods and services includes:

- all production actually destined for the market;
- all goods and services provided free (or at minimal cost) to individual households or collectively to the community by government units; and
- production of services for internal use in environment protection activities. These activities ('ancillary' activities) are not isolated in the System of National Accounts (SNA) and are valued at cost of production.

14 Analysis of production is based on the distinction between specialised environment protection industries, and other producers.

15 Specialised producers are those units whose principal activity is one of environment protection and, for the most part, are units primarily engaged in waste water and waste management activities. Specialised producers belonging to the general government sector are distinguished from specialised producers belonging to other sectors.

16 Producers whose principal activity is unrelated to environment protection may execute an environment protection activity as either secondary (for sale to others) or ancillary (for internal use). These producers are regrouped by industry, referring to their principal activity (e.g. mining, manufacturing etc.).

17 Market output is output sold at economically significant prices i.e. at a price that covers at least 50% of the cost of production. Non-market output is output provided free or at prices that are not economically significant.

18 For both specialised producers of environment protection services, and ancillary activities for environment protection by other producers, resources consumed in this production are separately identified and reported as 'current uses'. Capital transactions of these units are also identified and presented.

19 It is important to note that a unit may execute several functions simultaneously:

- By convention, producers of environment protection services are always the users of their gross capital formation.
- A specialised producer which produces non-market activity, is at the same time user of its output (collective consumption); it may also be the financier of the corresponding national expenditure.
- Other producers executing environment protection activities as ancillary are the users of their own output, and also the financier (even if partially) of that expenditure.

INSTITUTIONAL SECTORS

20 The environment protection expenditure account is viewed as a satellite account, and its description of activities is as consistent as possible with the concepts and methods used by the SNA.

INSTITUTIONAL SECTORS *continued*

21 The sectoral splits provided in the environment protection expenditure accounts are broadly consistent with the SNA. That is, transactions of general government, the corporate sector and the household sector are separately identified and described where possible.

22 Institutional sectors in the 1993 SNA group together similar types of institutional units. The revised 1995 Standard Institutional Sector Classification of Australia (SISCA) classifies institutional sectors broadly into corporations, non-profit institutions (NPI) (not identified here), government units and households. These institutional units are intrinsically different from each other and their economic objectives, functions and behaviour are also different.

General government

23 General government units organise and finance the provision of non-market goods and services to households and the community. They consist of the Commonwealth, State or local governments, and all non-market NPIs controlled and mainly financed by government units. They also include unincorporated enterprises owned by government units, provided they are not recognised as quasi-corporations.

Corporations

24 These are institutional units created for the purpose of producing goods and services for the market. They may be a source of profit for the units that own them. Examples include public limited companies, public corporations, quasi-corporations that are subject to control by government units, private companies, limited liability companies and partnerships. In addition, for the purposes of presenting the environment protection expenditure account in accord with SERIEE, this sector also includes businesses normally belonging to the 'households' institutional sector (e.g. sole proprietorships, partnerships) where they are producers of environment protection services.

Households

25 According to the SNA, units of the households institutional sector may be producers, provided that the corresponding activities are not those of separated entities treated as quasi-corporations. The definition includes sole proprietorships and partnerships. However, for the purposes of presenting the environment protection expenditure account, SERIEE specifically states that households do not appear as producers of environment protection services. Households only come into national expenditure on environment protection as final consumers. Therefore, the transactions of sole proprietorships and partnerships which engage in the production of environment protection activities are included under the 'corporations/other' category.

INDUSTRY CLASSIFICATION

26 The industry classification is primarily designed to classify establishment units by kind of economic activity (industry) although it may also be used in classifying institutional units. The industry classification employed throughout the Australian SNA, and hence used here, is the Australian and New Zealand Standard Industrial Classification.

METHODOLOGIES FOR ESTIMATING ENVIRONMENT PROTECTION EXPENDITURES

Other producers

27 For manufacturing, mining, agriculture, utilities and service industries specific inquiries were made of the various industries via existing ABS collections. Supplementary questions relating to expenditure and income for waste management and environmental protection were used to compile the industry estimates.

28 Caution should be taken in comparing service industries estimates with other industries, as some income and expenditure splits were not available and hence should be considered overestimates.

Final consumption by households

29 A variety of non-ABS sources such as annual reports and local councils, as well as ABS sources, were utilised for compilation of final consumption expenditure by the household sector.

Commonwealth Government and State Governments

30 Extraction of government transactions were obtained from Commonwealth and State budget papers and annual reports. However, due to the data intensive demands of the SERIEE tables, aggregated ABS public finance statistics relating to sanitation and protection of the environment—used previously as a data source for the public sector—were not used in this edition.

31 Instead, a more comprehensive extraction of information from Commonwealth and State financial documents was undertaken whereas previously this exercise was performed to supplement the public finance statistics.

Local government

32 Local government environment protection expenditures not relating to waste management and waste water management have been derived from the results of the 1996–97 and 1997–98 ABS Environment and Natural Resources Survey. It should be noted that, in 1995–96, the transfer of roads from the State government sector to the local government sector resulted in a large overall increase in capital expenditure by local government for this year. As a consequence, relatively large capital expenditure for environment protection activities have been estimated for local government in 1995–96 also.

Waste water operators

33 Estimation of the transactions, and sources of information, relating to specialised production of waste water management were as follows:

- ABS Water and Sewerage Survey;
- annual reports;
- Water Services Association of Australia (WSAA) data; and
- ABS Environment and Natural Resources Survey of local government.

34 Where a business has been identified as a sewerage operator, the water supply transactions (if any) have not been separately identified and hence inputs to production may be overstated. For businesses identified as primarily a water supply operator, significant production of waste water management operations have been identified and included where possible.

Waste water operators *continued*

35 Where the sewerage component of a business could not be extracted from other sources (e.g. annual reports, WSAA data), the sewerage component has been estimated based on income from sewerage reported on the ABS Water and Sewerage Survey.

36 *The Australian Urban Water Industry WSAA Facts '96* and *WSAA Facts '97* published reports have been used where business units have not been included in the survey. Some reconciliation of the ABS survey data and WSAA data has been done.

37 General government and corporate have been combined and published in aggregate. The ABS Water and Sewerage sample was not large enough to be able to publish SISCAs splits. In addition, these splits may have been misleading to the reader as many 'local government' sewerage operations are classified as 'Other', i.e. they belong in the 'Corporate' sector. For the purpose of this publication, local government activities have been included under general government.

Waste management industry

38 In 1996–97 the ABS undertook a comprehensive waste industry survey, surveying both private waste management units and local government waste management units. Data from this survey were used for 1996–97 estimates, and also to backcast estimates for 1995–96. More information for the waste management industry is available in ABS 1998i.

DATA COMPARABILITY

39 As this is the first attempt to present comprehensive environment protection expenditures in accord with SERIEE, this publication also presents 1995–96 estimates, published previously, in the SERIEE format for comparability.

40 Estimates for manufacturing and service industries are not directly comparable with previous estimates compiled and presented for these industries in previous editions of *Environment Protection Expenditure, Australia*. This is the first year to estimate 'own account' expenditures for these industries.

41 Comparisons between service industries estimates should be treated with caution due to changes in collection methodologies in 1996–97. In particular, detailed estimates by domain (except for waste management and waste water management and water protection) were not collected in 1996–97 resulting in all other expenditures being allocated to the 'other' domain. Also, a comprehensive survey of the construction industry in 1996–97 and the improved methodology is likely to have led to an increase in environment protection expenditure when compared with 1995–96.

DATA COMPARABILITY *continued*

42 Figures for agriculture need to be interpreted with caution, as the expenditure presented in tables 5.3 and 5.4 are mainly concerned with landscape and sustainable land-use. In strict terms, this places the expenditure presented for agriculture outside the SERIEE framework, as a component of the spending is likely to be linked to economic management. However the SERIEE concept has been extended in this instance to include this aspect of environmental protection, which is considered particularly important in the Australian context. As such, expenditure for the eradication of plants, animals and insects affecting sustainable land use are included here. Some expenditure on protection of biodiversity and landscape by the agricultural sector is also subsumed within the figures for 'protection of soil and groundwater'. The data presented for biodiversity and landscape for the agricultural sector are therefore partial estimates.

FUTURE DIRECTIONS AND ADDITIONAL INFORMATION

43 A major strength of SERIEE is its functioning as a bridge between physical and economic data. The effectiveness and efficiency of environment protection measures can be made by linking monetary and physical data. The integration of physical data also makes it possible to link the cost of environmental protection measures to actual pollution. It is hoped that this important role of the environment protection expenditure account as a bridge to physical data will be extended and strengthened in the future.

44 Disaggregated data for noise and vibration abatement; hazardous and non-hazardous waste management; and some State data splits are available as a special data service. Inquiries about the special data service should be directed to Bob Harrison, Director, Environment and Energy Statistics Section, telephone Canberra 02 6252 7369.

GLOSSARY

Ancillary activities	Environmental protection activities which are implemented by a company or organisation on its own and for its own use, in order to mitigate adverse impacts resulting from its production. An example is a car manufacturer which treats waste water arising from its production processes on site for re-use in its manufacturing process.
Biodiversity	The variety of life forms on earth: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at four levels: <ul style="list-style-type: none"> ▪ genetic diversity; ▪ species diversity; ▪ ecosystem diversity; and ▪ community diversity.
Chain volume measures	Indexes referenced to the current price values in a chosen reference year. Readers seeking a more detailed explanation of this term are referred to an information paper entitled <i>Introduction of Chain Volume Measures in the Australian National Accounts</i> (ABS Cat. No. 5248.0).
Change-in-production measures	New technologies in which waste management and environmental protection aspects are integrated within a changed production process.
Compensation of employees	The total remuneration, in cash or in kind, payable by an employer to an employee in return for work done during the accounting period. This includes wages, salaries, superannuation and costs related to workers compensation.
Consumption of fixed capital	The amount of fixed assets used up in production processes as a result of wear and tear (usually estimated as depreciation of fixed assets over a financial year).
Corporate sector	Institutional units created for the purpose of producing goods and services for the market. They may be a source of profit for the units that own them. Examples include public limited companies, public corporations, quasi-corporations that are subject to control by government units, private companies, limited liability companies and partnerships.
Current uses	The inputs to the production of environmental protection services (essentially the costs of production).
Domain	The environmental media or type of pollution-nuisance-degradation used to classify environment protection expenditures. The six domains used in this publication are: <ul style="list-style-type: none"> ▪ ambient air and climate protection; ▪ waste water management; ▪ waste management; ▪ protection of soil and groundwater; and ▪ protection of biodiversity and landscape.
End-of-line techniques	'Add-on' equipment or modifications which are designed to reduce the level of emissions to the environment or to treat wastes prior to release but do not irreversibly affect the original production process.

Environment protection output	The sum of market, non-market and ancillary outputs produced for environmental protection (see this Glossary for definition of market, non-market and ancillary output).
Final consumption	The total value of all expenditures on consumption of environmental protection goods and services by the non-producing sectors of the economy (i.e. consumption of goods and services for utility, not as a step in a production process—see Intermediate consumption).
General government	A term for the three tiers of Australian Government (Commonwealth Government, State and Territory Governments and local governments). May also include non-profit institutions controlled and mainly financed by government units and unincorporated enterprises owned by government units, provided they are not recognised as quasi-corporations.
Gross fixed capital formation	The value of a units acquisitions less disposal of fixed assets during a given time period.
Household sector	In general terms, private households or the Australian community. Some definitions include sole proprietorships and partnerships, however, for the purposes of presenting the environment protection expenditure account, the transactions of sole proprietorships and partnerships which engage in the production of environment protection activities are included under the 'corporations/other' category. The household sector as applied here only includes national expenditure on environment protection as final consumers.
Intermediate consumption	The value of goods and services consumed as inputs by a process of production, excluding fixed assets.
Investment grants	Unrequited capital payments received (usually from government) and intended to finance acquisition of fixed assets for an environmental protection purpose.
Market output	Goods and services sold at economically significant prices (defined as being greater than 50% of the costs of production).
Non-environmental output	Outputs which arise from environmental protection activities but which do not directly serve an environmental protection purpose or function. For example, the sale of waste by-products which have no utility in respect of environmental protection.
Non-market output	Goods and services which are provided free or at non-economically significant prices (defined as being less than 50% of the costs of production).
Principal output	The main or primary output of a producer, resulting from its core business or activity.
Secondary output	Environment protection activities which are produced by a business or organisation for sale at economically significant prices but which are not its primary business activity.
Specialised producers	Businesses or organisations whose primary or principal activity is the production of environmental protection services. Examples include environment protection agencies and waste disposal businesses.

Specific transfers	Unrequited payments received by businesses or organisations which contribute to the financing of characteristic activities and uses of specific products or which constitute a compensation for income of capital losses related with environmental protection.
Subsidies on production	Government grants to a business or organisation which relates to their production of a characteristic activity and which is intended to allow the provision of goods and services at reduced cost to the consumer.
Taxes on production	Payments made to government for taxes on the production of environmental protection services. Examples include pollution control licence fees, levies for waste disposal and penalties for illegal emissions to the environment.
Transfers	A transaction in which one business or organisation provides a good, service or asset to another business or organisation without receiving from the latter any good, service or asset in return as counterpart.

BIBLIOGRAPHY

ABS Australian Bureau of Statistics

AWWA Australian Water and Wastewater Association

SoE Australia, State of the Environment

Australian Bureau of Statistics 1998a, *Agriculture, Australia, 1996–97*,
Cat. no. 7113.0, ABS, Canberra.

Australian Bureau of Statistics 1998b, *Australian Mining Industry, 1996–97*,
Cat. no. 8414.0, ABS, Canberra.

Australian Bureau of Statistics 1998c, *Building Approvals, Australia*,
Cat. no. 8731.0, ABS, Canberra.

Australian Bureau of Statistics 1998d, *Business Operations and Industry
Performance, Australia, 1996–97*, Cat. no. 8140.0, ABS, Canberra.

Australian Bureau of Statistics 1998e, *Electricity, Gas, Waste and Sewerage
Operations, Australia, 1996–97*, Cat. no. 8226.0, ABS, Canberra.

Australian Bureau of Statistics 1998f, *Environmental Issues, People's views and
practices, March 1998*, Cat. no. 4602.0, ABS, Canberra.

Australian Bureau of Statistics 1998g, *Environment Protection Expenditure,
Australia, 1994–95 and 1995–96*, Cat. no. 4603.0, ABS, Canberra.

Australian Bureau of Statistics 1998h, *Manufacturing, Australia, 1997*,
Cat. no. 8225.0, ABS, Canberra.

Australian Bureau of Statistics 1998i, *Waste Management Industry, Australia*,
Cat. no. 8698.0, ABS, Canberra.

Australian Bureau of Statistics 1997a, *Environmental Issues, People's views and
practices, 1996*, Cat. no. 4602.0, ABS, Canberra.

Australian Bureau of Statistics 1997b, *New Motor Vehicle Registrations, Australia,
1996*, Cat. no. 9301.0, ABS, Canberra.

Australian Bureau of Statistics 1996a, *Australians and the Environment*,
Cat. no. 4601.0, ABS, Canberra.

Australian Bureau of Statistics 1996b, *Household Expenditure Survey, Detailed
Expenditure Items, 1993–94*, Cat. no. 6535.0, ABS, Canberra.

Australian Capital Territory Government 1998, *Budget Estimates 1997–98 Vols. 1
& 2*, Budget Paper No. 4, Government Printer, Australian Capital Territory.

Australian Water and Wastewater Association 1998, *Capital Expenditure on
Water and Wastewater Treatment Plants in Australia 1996–1999*, AWWA,
Sydney.

Commonwealth of Australia 1996a, *The Commonwealth Public Account 1996–97*,
Budget Paper No. 2, Australian Government Publishing Service, Australian
Capital Territory.

Commonwealth of Australia 1996b, *Industry, Science and Tourism Portfolio
1996–97*, Budget Related Paper No. 11, Australian Government Publishing
Service

- Commonwealth of Australia 1997, *Primary Industries and Energy Portfolio 1997–98*, Budget Related Paper No. 1.12, Australian Government Publishing Service, Canberra.
- Conservation and Land Management 1997, *Annual Report 1996–97*, Government Printer, Western Australia.
- CSIRO Australia 1996, *Annual Report 1995–96*, CSIRO, Melbourne.
- CSIRO Australia 1997, *Annual Report 1996–97*, CSIRO, Melbourne.
- Department of Environment 1997, *Annual Report 1995–97*, Government Printer, Queensland.
- Department of Environment and Natural Resources 1998, *Annual Report 1996–97*, Government Printer, South Australia.
- Department of Environment, Sport and Territories 1997, *Annual Report 1996–97*, Australian Government Publishing Service, Canberra.
- Department of Primary Industries and Energy 1997, *Annual Report 1996–97*, Australian Government Publishing Service, Canberra.
- Environment Protection Authority 1997, *Annual Report 1996–97*, Mockridge Bulmer, New South Wales.
- Eurostat 1994, *SERIEE 1994 Version*, Luxembourg, Office for Official Publications of the European Communities.
- Great Barrier Reef Marine Park Authority 1997, *Annual Report 1996–97*, Government Printer, Queensland.
- Land & Water Resources Research & Development Corporation, 1997, *Annual Report 1996–97*, Pirie Printers, Canberra.
- New South Wales Government 1996a, *Budget Estimates 1996–97*, Budget Paper No. 3, Vol. 1, Government Printer, New South Wales.
- New South Wales Government 1996b, *State Capital Program 1996–97*, Budget Paper No. 4, Government Printer, New South Wales.
- New South Wales Government 1997a, *Budget Estimates Vols. 1 & 2, 1997–98*, Budget Paper No. 3, Government Printer, New South Wales.
- New South Wales Government 1997b, *State Capital Program 1997–98*, Budget Paper No. 4, Government Printer, New South Wales.
- Northern Territory Government 1996, *1996–97 The Budget*, Budget Paper No. 2, Part 1, Government Printer of the Northern Territory.
- Northern Territory Government 1997a, *1997–98 Capital Works Program*, Budget Paper No. 4, Government Printer of the Northern Territory.
- Northern Territory Government 1997b, *1997–98 Sources of Funds*, Budget Paper No. 3, Government Printer of the Northern Territory.
- Parks and Wildlife Commission of the Northern Territory 1997, *Annual Report 1996–97*, Government Printer of the Northern Territory.
- Queensland Government 1996a, *State Budget 1996–97 Budget Overview*, Budget Paper No. 2, Government Printer, Queensland.
- Queensland Government 1996b, *State Budget 1996–97 Capital Outlays*, Budget Paper No. 3, Government Printer, Queensland.
- Queensland Government 1997, *Capital Outlays 1997–98*, Budget Paper No. 3, Government Printer, Queensland.

- South Australian Government 1996a, *Estimates of Receipts and Payments 1996–97*, Financial Paper No. 2, Government Printer, South Australia.
- South Australian Government 1996b, *Program Estimates and Information 1996–97*, Financial Information Paper No. 1, Government Printer, South Australia.
- South Australia Government 1997, *Estimates of Receipts and Payments 1997–98*, Financial Paper No. 2, Government Printer, South Australia.
- State of the Environment (SoE) Advisory Council 1996, *Australia—State of the Environment Report 1996*, CSIRO Publishing, Melbourne.
- Tasmanian Government 1996, *Operation of Government Departments, 1996–97*, Budget Paper No. 2, Government Printer, Tasmania.
- Tasmania Government 1997, *Operations of Government Departments 1997–98, Vols 1 & 2*, Government Printer, Tasmania.
- Victorian Government 1996, *Budget Estimates 1996–97*, Budget Paper No. 3, Government Printer, Victoria.
- Victoria Government 1997, *1997–98 Budget Estimates*, Budget Paper No. 3, Australian Government Printing Service, Victoria.
- Water Services Association of Australia 1997, *The Australian Urban Water Industry*, Water Services Association of Australia Incorporated, Victoria.
- Western Australia Government 1996a, *1996–97 Capital Works Program*, Budget Paper No. 3, Government Printer, Western Australia.
- Western Australia Government 1996b, *1996–97 Program Statements Vol. 1*, Budget Paper No. 6, Government Printer, Western Australia.
- Western Australia Government 1997, *1997–98 Budget Statements Vols 1–2*, Budget Paper No. 2, Government Printer, Western Australia.