



**Contribution of Taronga and Western Plains Zoos
to the Economy of New South Wales**

**Prepared for the
Zoological Parks Board of NSW**

**Applied Economics
in association with
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Dr. Peter Abelson

Director, Applied Economics

Executive Summary

This report estimates the gross annual output (income) contribution of Taronga Zoo and Western Plains Zoo to the New South Wales economy based on 2004-05 figures.

In 2004-05, recurrent expenses of the two zoos totaled \$51.9 million. Excluding depreciation allowances, which have no effect on currently produced output, the total was \$46.0 million. Capital expenditure totaled another \$26.7 million.

In addition, travel expenditure by visitors to the zoos within NSW totaled an estimated \$19.4 million. Also, international and interstate visitors spent an estimated additional \$9.9 million a year on NSW goods and services as a result of extra time spent in NSW.

As shown below, combining these various expenditures, the two zoos contribute NSW output valued at \$102.0 million. In addition, there are substantial flow-on effects. Drawing on the input-output model developed by the Centre for Agricultural and Regional Economics and used by the NSW Treasury, the flow-on effects total \$146.1 million.

Thus inclusive of flow-on effects and including capital expenditure, the two zoos contributed an estimated \$248.1 million to NSW output and incomes in 2004-05. If capital expenditure is excluded as an irregular occurrence, the two zoos contributed an estimated \$180.8 million to NSW output and incomes in 2004-05.

Estimated gross output (income) effects for NSW economy in 2004-05

Expenditure / output	Initial effect (\$m)	Multiplier	Flow-on effect (\$m)	Total effect (\$m)
Zoo recurrent expenditure	46.0	2.40	64.4	110.4
Visitor travel expenditure	19.4	2.40	27.2	46.6
Additional tourist expenditure ^a	9.9	2.40	13.9	23.8
Total expenditure / output	75.3		105.5	180.8
Zoo capital expenditure	26.7	2.52	40.6	67.3
Total with capital expenditure	102.0		146.1	248.1

(a) Additional overseas and interstate expenditure due to the zoos.

The two zoos directly employ 473 persons. Allowing for travel and tourism effects and capital expenditure, the zoos generate 964 jobs. With flow-on effects, the total jobs generated rises to 1761 jobs. Excluding capital expenditure, the two zoos generate an estimated 748 jobs from first round effects and a total of 1325 jobs.

1. Introduction

This report provides an estimate of the gross annual contribution of Taronga Zoo and Western Plains Zoo to the NSW economy.

The focus of this report is on the value of gross economic output and employment that is generated from the existence and operations of these two zoos and related tourism expenditure. In essence this is an economic impact assessment similar to that used to assess the economic impact of major events such as the Sydney Olympic Games.

The approach is also similar to that used by the Zoological Parks Board in its 1993 report on the contribution of two zoos to the economy of NSW. Many similar studies of the economic impacts of zoos have been conducted for other zoos. Examples include the Economics Research Group (1997) report on economic impacts of the Cincinnati zoo on the Cincinnati economy and the Washington Economics Group (2003) report on the impact of the Miami zoo masterplan on the Florida economy.

This report does not attempt to estimate the value of the zoo to visitors (consumers) or the public good values of the zoo. Consumer values would include not only visitor expenditures but also any consumer surpluses — that is any value of the zoo experience over and above visitor payments to the zoos. Public good values would include education, conservation, environmental and research benefits.

The Zoological Parks Board currently receives in the order of \$11 million per annum from the NSW Government for expenditures on public goods (as a social support payment or consumer service obligation payment). This social support payment reflects assessed expenditures on public goods rather than estimated consumer valuations of the public goods provided. However, as this social support expenditure represents only about \$5 per household in NSW, this is almost certainly a great deal less than NSW households (or Australian households) would be willing to contribute to the public goods provided by the zoos.

Section 2 that follows outlines the evaluation methodology for estimating the output contribution to the NSW economy. The third section provides estimates of the value of the output contribution along with employment estimates.

2. Approach to Estimation of Economic Contribution

There are three sources of direct contributions to the NSW economy. These are expenditures by the zoos in the provision of a variety of services (funded from various revenue sources), expenditures on transport for access to the zoos, and expenditures by international and interstate visitors to NSW that would not otherwise occur. Then in each case there are indirect contributions to economic output as a result of the flow-on effects (expenditure multipliers). Each of these heads of expenditure as well as the concept of the multiplier is explained briefly below.

Expenditure by the zoos. All operating expenditure by the zoos on resources in NSW, including expenditure on labour, plant and equipment, materials, energy and so on, contributes to output produced by the NSW economy, employment, and income for the owners of the resources that are employed. Moreover, all such expenditure has a flow-on effect as the income received is re-spent by the recipients. In addition borrowing costs are usually included as a direct effect of operations because they provide income to the recipients of the interest payments.

Following conventional procedure for economic impact analyses, superannuation payments and payroll tax are also included as part of the direct (value added) output. Superannuation payments are part of the compensation for work even though most employees will only receive the benefits in later years. Payroll taxes are also part of the cost of employment and they reduce the taxes that other tax payers must pay, thus enabling other tax payers to spend more on other goods. However, these expenses generate little or no immediate flow-on effect.

When capital expenditure is of a replacement nature, it takes on the character of other operating expenses and has a similar year-to-year impact. When capital expenditure is a one-off expense, it would be misleading to count it as a regular contribution. In this report we estimate the gross economic impact of the zoos with and without capital expenditure (based on 2004-05 experience). Depreciation expense is not included in this analysis as providing any contribution to the NSW economy because it does not have any direct effect on output and it would be double counting to include capital expenditure and depreciation expense.

Expenditure on access to the zoos. All expenditure on access to the zoos using NSW resources contributes to output by the NSW economy. In practice some NSW resources may be involved in transporting international and interstate visitors from outside NSW to local accommodation in NSW. On the other hand, some non-NSW resources may be involved in transporting all visitors to the zoos within the NSW borders. In this study we focus on expenditure on transport within NSW and assume that this is provided by NSW resources and so contributes to the NSW economy.

Additional expenditure by international and interstate visitors. Some visitors to the zoos may visit NSW for the prime purpose of visiting a zoo and would not have visited the state otherwise. Other visitors may extend their stay and their non-zoo spending in NSW. In both cases there will be increase in spending on NSW goods and services. However, some allowance has to be made for the proportion of this additional spending within NSW that is not spent on NSW goods and services.

Multiplier impacts. Each of these three forms of expenditure on NSW output is likely to have flow-on (multiplier) effects for income and employment. The income multiplier is a function of the proportion of income generated that is re-spent on NSW economic resources. Thus suppose that direct expenditure on NSW output is \$100 and that two-thirds of this is re-spent on further NSW output and that this pattern is repeated. Then, by a succession of effects, the following additional output to the total value \$191 is generated:

$$\$66 + \$44 + \$29 + \$19 + \$13 + \$8 + \$5 + \$4 + \$2 + \$1 = \$191$$

Including the initial \$100, the total value of output generated is \$291. In this case the multiplier is 2.91. Of course, some of these impacts may be delayed beyond one year.

There is a convenient formula for estimating the multiplier (M):

$$M = 1 / (1 - P)$$

where P is the proportion of expenditure that is re-spent on local goods. For example if P = 66 per cent.

$$M = 1 / (1 - 0.66) = 2.91$$

In practice, P and therefore M are usually lower than in this example. The proportion of income that is re-spent on local goods depends on three forms of leakages. These are tax leakages to the Australian Government, household savings (income that is not re-spent), and income that is re-spent on imports to NSW (including international and interstate imports). Suppose that taxes are 20 per cent of income received, household savings are 5 per cent of income, and that international and interstate imports make up are 20 per cent of the 75 per cent balance left over after taxes and saving. The propensity to re-spend income on local NSW goods (P) would be 0.60. Thus

$$M = 1 / (1 - 0.60) = 2.50$$

Every \$100 of output generated would generate an additional \$150 worth of output in NSW.

Multipliers vary with the tax regime, the size of the local area, the state of the local economy, and the propensity of the recipients of the initial expenditure to re-spend income locally.

In this study we draw on multipliers estimated from the NSW input-output table prepared by the Centre for Agricultural and Regional Economics (CARE) in Armidale. This input-output table is often employed by NSW Treasury. In this input-output table, zoos are treated as part of a larger sector that includes libraries, museums, parks and gardens, arts and services to the arts. However, the following figures indicate that the pattern of expenditure on zoos is similar to the pattern for the wider sector.

Expenditure Category	Zoo	IO Sector
	%	%
Purchases from other industries	21.7	24.0
Employees	53.6	56.4
Other value added (a)	13.9	10.2
Imports	10.8	9.4
Total	100.0	100.0

Given that the expenditure structure shown as a percentage of total expenditure is similar for zoos and for the sector as a whole, it is reasonable to apply the overall sector multipliers to the zoo data (see next section).

Employment multipliers work in a similar way to output multipliers. We again draw on CARE's input-output table for our employment multipliers.

3. Estimates of the Economic Contribution

Expenditures by the zoos on NSW output

Recurrent expenses of Taronga Zoo and Western Plains Zoo amounted to \$51.9 million in 2004-05. As shown in Table 1, this included three categories of recurrent expenditure.

- Expenditure of \$41.9 million on services with regular multiplier effects;
- Expenditure of \$4.1 million on services with little or no multiplier effects;
- Depreciation expense of \$5.9 million with no output effect separate from capital expenditure.

Table 1 Expenditures by zoos in 2004-05

Expense	\$m
Ordinary activities	
Salaries and wages ^a	23.6
Trading costs of sales ^b	2.1
Marketing expenses ^c	1.2
Insurance	0.7
Maintenance	4.2
Animal welfare/research	1.5
Contract services	1.0
Other activity expenses ^d	6.0
Borrowing costs	1.6
Total	41.9
Other recurrent expenses	
Superannuation	1.1
Long service leave	0.5
Payroll tax	1.4
Workers compensation / other	1.1
Total other expenses	4.1
Depreciation	5.9
Total all recurrent expenses	51.9
Capital expenditure	26.7
Total	78.6

(a) Excluding superannuation, long service leave and payroll tax.

(b) Cost of sales for catering, souvenirs and book shops.

(c) Includes advertising, promotions, and other marketing expenses.

(d) Includes energy costs, printing, travel, communications, computing expenses etc.

Source: Zoological Parks Board of NSW

In addition, capital expenditure totaled \$26.7 million in 2004-05. This was only slightly higher than average annual capital expenditure, and so is used as the indicator in this report.

Total employment was 473 employees at the two zoos in 2004-05.

Expenditures within NSW on access to the zoos

Table 2 shows the number of visitors to Taronga and Western Plains Zoos in 2004-05 by major origin sources and estimated expenditure per two-way trip per person in NSW. The expenditure could be private vehicle (fuel) costs or public transport fares, mainly bus and ferry. About half the visitors to Taronga Zoo arrive by ferry, including most overseas visitors.

Estimates of trip expenditure are approximations because they allow for multi-occupancy vehicles (and occupancy rates are not known) and multi-purpose trips. Most children are in multi-occupancy vehicles. Where people visiting a zoo are undertaking a multi-purpose trip, only part of the trip expenses should be allocated to the zoo. Most overseas and interstate visitors are visiting NSW for several purposes. For example, many people who drive from Melbourne to Queensland choose to stop at Dubbo partly to see the Western Plains Zoo.

Based on actual visitor numbers in 2004-05 and estimated trip costs per capita, estimated access costs within NSW total \$19.4 million per annum, including \$14.6 million for visits to Taronga Zoo and \$4.8 million for visits to Western Plains Zoo.

Table 2 Zoo visitor travel expenditure in New South Wales in 2004-05

Origin	Visitors to Taronga Zoo			Visitors to Western Plains Zoo		
	No.	Avr. \$/visit ^a	\$ million	No.	Avr. \$/visit ^a	\$ million
Sydney region	435,375	8	3.5	50,401	40	2.0
Dubbo area	-	-	-	20,000	8	0.2
Other NSW	117,642	20	2.3	42,321	20	0.8
Interstate	104,571	20	2.1	49,084	20	1.0
Overseas	340,860	15	5.1	2,301	80	0.2
Not defined	7,038	10	0.1	2,618	40	0.1
Total above ^b	1,005,486		13.1	166,724		4.3
Other visitors ^c	184,280	8	1.5	68,916	8	0.5
All visitors	1,189,766		14.6	235,644		4.8

(a) Trip to and from the zoo for one person.

(b) These visitors include paid visitors to both zoos and zoo friends for Taronga Zoo.

(c) Other visitors include free visits to both zoos and zoo friends for Western Plains Zoo.

Sources: Zoological Parks Board of NSW provided visitor origins. Average cost of access estimated as described in the text.

Additional expenditure by international and interstate visitors

As shown in Table 2, overseas visitors account for about 343,000 visits to the two zoos and interstate visitors account for some 154,000 visits to the zoos.

In so far as these visitors to the zoos spend time at the zoos instead of other activities, there will be no increase in time or expenditure spent in NSW. However, some visitors would increase their length of stay as a result of their visits to the zoos and accordingly spend more in NSW. Information on the Australian Department of Industry Tourism and Resources website (see www.industry.gov.au, *Tourism Impact Model – Frequently Asked Questions 5*) indicates that domestic and international holiday visitors spend an average of \$70 to \$76 per day plus \$43 to \$51 on overnight accommodation per capita.

For this assessment, we allow that one-quarter of all overseas and interstate visitors spend most of an extra half-day in Sydney as a result of their visit to a zoo and that they spend on average an extra \$80 on board, lodging and incidental expenses on NSW goods and services as a result of this extra stay.

Drawing on these assumptions, (497,000 interstate and international visitors \times 0.25 \times \$80), the zoos create an additional \$9.9 million of expenditures on NSW goods and services.

Income multipliers

The income multipliers used below are derived from the NSW input-output table for 2000-01. This was prepared by the Centre for Agricultural and Regional Economic using the Generation of Regional Input-Output Tables (GRIT) method developed at the University of Queensland. The tables are compiled each five years coinciding with population census years. The tables are compiled to be broadly consistent with those prepared by the ABS in terms of sector definitions and valuations.¹

Table 3 Relevant Multipliers for this Analysis

Sector	Multiplier	Application
Recreational activities	2.40	Zoo expenditure
Other construction	2.52	Capital expenditure
Transport road	2.38	Access expenditure
Transport rail	2.47	Access expenditure

¹ In the CARE tables, unlike the ABS, the consumption-induced impacts are estimated on the basis that all self-employed people receive a wage equal to the average earnings of employees in the sector where they work.

Transport water	2.34	Access expenditure
Retail trade	2.59	Additional visitors
Accommodation/ restaurants	2.30	Additional visitors

Source: Centre for Agricultural and Regional Economics.

This set of tables is the first set compiled with the revised tax system associated with the introduction of the GST. The NSW table is consistent with the ABS estimates of Gross State Product as published in the State Accounts (ABS Cat No. 5220.0). A large amount of additional data from official and other sources (including those of CARE) have been used in compiling and validating the tables.

The relevant income multiplier values for this impact analysis are shown in Table 3. They are final demand multipliers for gross output. Note that the zoo income multiplier of 2.4 is an overall average multiplier, which allows for ordinary expenditures on labour etc. as well as expenditure on superannuation and long service leave that has no multiplier. This is quite a high multiplier and reflects the low leakage for the expenditure on labour and materials employed by the zoos.

Income summary

Combining the estimated expenditures and multipliers above, Table 4 provides a summary of the gross output (income) results. Excluding capital expenditure, recurrent expenditures by the two zoos, visitor travel expenditure, and additional tourist expenditure create an initial effect of \$75.9 million of output (income) for the NSW economy. Allowing for the flow-on effect, the total contribution to the NSW economy is an estimated \$182.2 million per annum.

Including capital expenditure, the first round income effect is \$102.6 million and the full effect, inclusive of flow-on effects, is \$249.5 million.

Table 4 Estimated gross output (income) effects for NSW economy in 2004-05

Expenditure / output	Initial effect (\$m)	Multiplier	Flow-on effect (\$m)	Total effect (\$m)
Zoo recurrent expenditure	46.0	2.40	64.4	110.4
Visitor travel expenditure	19.4	2.40	27.2	46.6
Additional tourist expenditure ^a	9.9	2.40	13.9	23.8
Total expenditure / output	75.3		105.5	180.8
Zoo capital expenditure	26.7	2.52	40.6	67.3
Total with capital expenditure	102.0		146.1	248.1

(a) Additional overseas and interstate expenditure due to the zoos.

Employment Impacts

The two zoos directly employ 473 persons. To estimate direct employment in the other sectors that is generated by travel and tourism as a result of the zoos, we draw on the numbers employed per \$ million of expenditure in these sectors, as estimated in the CARE input-output model. These ratios are shown in the second column in Table 5. The third column shows the jobs generated initially as a result of the relevant expenditures shown in Table 4.

We then apply CARE's flow-on multipliers for employment in each sector to estimate the total employment generated by the zoos inclusive of flow-on effects (see the last column in Table 5).

In summary, the regular operations of the zoos inclusive of travel and tourism effects generate an estimated 1325 jobs, inclusive of 748 jobs from first round effects and 577 flow-on jobs. Allowing for capital expenditure in 2004-05, there is a total of 1761 jobs, inclusive of 964 jobs from first round effects and 797 flow-on jobs.

Table 5 Estimated employment effects for NSW economy in 2004-05

Expenditure	No. employed per \$m	Initial jobs	Multiplier	Total jobs
Zoo recurrent expenditure	Na	473	1.67	790
Visitor travel expenditure ^a	7.0	136	2.30	313
Additional tourist expenditure ^b	14.0	139	1.60	222
Total		748		1325
Zoo capital expenditure	8.1	216	2.02	436
Total with capital expenditure		964		1761

(a) The employment ratios and multipliers for travel expenditure are averages for road and water transport.

(b) The employment ratios and multipliers for tourism are averages for retailing and accommodation.

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