

Te Kouma Farm Park: An Economic Analysis

**A Report
Prepared for Environment Waikato**



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

MANAGEMENT SCHOOL
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January 2004

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Executive Summary

The James family in the Coromandel peninsula on the North Island of New Zealand own a 450 hectare piece of property called Te Kouma. The James' would like this piece of land to be preserved indefinitely as a public park called Te Kouma Farm Park.

The establishment of Te Kouma Farm Park is being considered and Environment Waikato requested the Department of Economics at the University of Waikato to conduct an economic analysis of Te Kouma Farm Park as an additional attraction within the Thames-Coromandel District Council Region. Five topics were focussed on: a Meritec Review, Economic Impacts, Costs, Non-Market Values and Benefit Spread.

Meritec Review

In reviewing the Meritec Report, we found a thorough, comprehensive piece of work. Some errors were found, but nothing of material significance.

Economic Impacts

Within economic impacts there are two cases to consider: the case of the current situation and the case of adding the impact of the proposed Subritzky Ferry. Both cases are profitable. Impacts were calculated for the Thames Coromandel District Council Region, Waikato Region, Bay of Plenty Region, and Auckland Region. The gross output ranges from a low of \$290,000 in 2003NZ\$ for the first year of operation to a high of \$12,921,400 in 2003NZ\$ at full capacity.

Costs

Costs were calculated for two options. The first option was to purchase the land straight away while the second option was to lease the land. The leased land option seemed to be the less expensive outlet with an annual cost of \$306,000 compared to \$536,000.

Non-Market Values

Non-Market Values are important to consider as there will not be a fee charged to park visitors. Both use and non-use values were calculated. Annual use values ranged from \$274,100 to \$823,400 in the park's first year, peaking at \$9,469,000 annually at full capacity. Annual non-use values ranged from \$508,536 to \$5,991,911. Ecosystem service values accounted for \$249,916 annually to New Zealand when only considering the land and not the value of the waters surrounding it.

Benefit Spread Summary Tables

Benefit spread tables show the distribution of benefits from Te Kouma Farm Park across various regions. We find that the benefits significantly change if the proposed Subritsky Ferry is accounted for. Without the ferry, the most benefit goes to the Thames Coromandel District Council Region (64.8%) followed by Auckland, Other Waikato, and Bay of Plenty. With the ferry option, Auckland receives the most benefit (50.8%), followed by Thames Coromandel (43.3%), Other Waikato, and Bay of Plenty. Note that Other Waikato is the Waikato Regional Council Region not including the Thames Coromandel District Council Region.

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Te Kouma Farm Park: An Economic Analysis

Acronyms

BOP = Bay of Plenty Region

CS = Consumer Surplus

FTE = Full Time Equivalent

GDP = Gross Domestic Product

GRP = Gross Regional Product

NPV = Net Present Value

NZ = New Zealand

RC = Regional Council

TCDC = Thames-Coromandel District Council Region

TKFP = Te Kouma Farm Park

US = United States

Te Kouma Farm Park: An Economic Analysis

Introduction

Mr. Ian and Mrs. Miranda James own a 450 hectare piece of coastal farmland. This farmland is located on the North Island of New Zealand on the south side of Coromandel harbor. Of the 450 hectares of land, 400 hectares are currently involved in cattle farming (approximately 630 animals) while 50 hectares are fenced off and contain many NZ native species. Mr. and Mrs. James would like to protect this land for the public indefinitely, but they do not wish to donate the land.

The proposal under consideration is:

- Compensating the James family for providing the public amenity.
- Indefinitely managing the land as a public park.

In addition: the Subritzky Company plan to initiate a ferry service that will dock on the edge of the James' property. The Subritzky Company anticipates selling land next to the Te Kouma property for housing.

In this report, the Department of Economics at the University of Waikato was requested to create an economic analysis of the proposed Te Kouma Farm Park. In this analysis we focus on 5 main topics:

- Meritec Review
- Economic Impacts
- Costs
- Non-Market Values
- Benefit Spread Summary Tables

The Meritec Review section consists of a short review of the report entitled "*Te Kouma Regional Park*" written by Meritec Limited in February 2003.

The Economic Impacts section considers all economic market effects to the Thames-Coromandel, Waikato, Bay of Plenty, and Auckland Regions, in addition to the effect to New Zealand.

The Costs section includes the annual costs that will be incurred in taking over operation of Te Kouma Farm Park.

The Non-Market Values section reports on non-market values including both use and non-use values of Te Kouma Farm Park to New Zealand.

Finally, the Benefit Spread Summary Tables gives an overview of the benefit spread received by each region studied due to the opening of Te Kouma Farm Park.

Te Kouma Farm Park: Meritec Review

In reviewing the Te Kouma Regional Park Report completed in February 2003, we find a thorough and comprehensive report. The report is comprehensive in ownership/organization, financial projections, historical background and the park's potential to expand access to many historical sites.

We have no reason to question visitor number projections starting at 8,000 – 10,000 in Year 1 on page 19. However, the report did not consider the potential opening of a ferry transport between Auckland and Te Kouma by the Subritzky Ferry Company. The Subritzky Ferry visitors clearly improve the economic benefits to the region.

We do believe that Meritec could have considered the possibility of a farmer who would lease the land. This may be a more profitable venture as the farmer can concentrate on making a profit and the park manager could concentrate on other activities. Increased profitability of farm operations clearly aids the park's financial viability in the long run.

Overall, we feel that the Meritec Report accurately represents the Te Kouma Farm Park situation.

Te Kouma Farm Park: Economic Impacts

Meritec (page 18) estimates 8,000 – 10,000 visitors to the park in Year 1. Of these, 10% are estimated to be “Locals” and 35% to be “Boaties.” This leaves at least 55% coming from outside the immediate Thames-Coromandel region (TCDC), so we can assume that expenditure by these visitors will be a net gain to the TCDC region. We have made the assumption that “Boaties” are self-sufficient, but if their expenditure should be included, the results below can be scaled up by 64% ($90/55 = 1.64$) to reflect this fact.

Gross expenditure at Te Kouma Farm Park (or in Coromandel town) by each visitor is estimated at \$15 for food and \$5 for other retail expenditure (petrol, souvenirs, etc.). We take 10,000 Year 1 visitors as the base figure since impacts in Years 2, 5, ..., can be easily scaled by 1.5, 2, etc., in accordance with Meritec’s estimates on page 18 of their report.

Aggregate Year 1 expenditure attributable to the park’s operations can therefore be calculated as in Table 1.

Table 1: Regional Impact Assumptions

Number of Visitors	Impact Percentage	Net Per Capita Expenditure		Aggregate Expenditure
10,000	0.55	Food:	\$15	\$82,500
		Retail:	\$5	\$27,500
		Total	\$20	\$110,000

The total expenditure of \$110,000 constitutes the direct or first-round impact of the park’s operations and is a net gain to the TCDC region. That is, in the absence of the park, the region would not capture this expenditure. However, this direct expenditure is only the first-round impact. Subsequent flow-on impacts to the region (spending by employees servicing visitors, maintenance of the park, etc.) can be estimated using 114-sector Input-Output models of the TCDC, Waikato and NZ economies. These models are for the year ended June 2003 with all impacts estimated in 2003 NZ dollars.

Impacts for the various regions affected by the park’s operations include:

- Gross revenue, sales or output in dollars (e.g. the \$110,000 direct impact above).
- Net household income (after tax and superannuation) in dollars.
- Employment impact in full-time equivalent employees (FTEs).
- Regional Value Added or GDP/GRP (gross regional product) in dollars.

Note that Gross Revenue includes imports into the region (of interest) of goods and services not produced locally (e.g. electricity for the TCDC) whereas Value Added shows the value of economic activity created within the region by the local workforce. Regions such as the TCDC must import many goods and services, whereas the Waikato RC region is more self-sufficient and the Auckland RC region even more so. Bigger, more self-sufficient regions “leak” less of the value of economic activity to other regions. Regionally then, Value Added is possibly the most important economic impact derived from an event (e.g. America’s Cup) or a facility such as Te Kouma Farm Park.

The economic impact of Te Kouma Farm Park has been estimated in this report across various regions of interest:

- Thames-Coromandel District Council (TCDC), a region in the Waikato RC region, which contains Te Kouma Farm Park.
- Other territorial authorities or regions within the Waikato RC area such as Hamilton City (Other Waikato).
- Bay of Plenty/Auckland or BOP/Auckland – some support services may be based in Tauranga or Auckland as opposed to Hamilton (e.g. Port of Tauranga, Subritzky Ferries).
- NZ being the sum of the impacts in the three regions above.

Table 2: Te Kouma Farm Park Impacts from 10,000 Land Based Visitors in Year 1

Economic Impact	REGION OF INTEREST			NZ
	TCDC	Other Waikato	BOP & Auckland	
Gross Output in \$ '000	188	13	89	290
<i>Percentages</i>	<i>65</i>	<i>4</i>	<i>31</i>	<i>100</i>
Net Household Income in \$ '000	34	4	13	51
<i>Percentages</i>	<i>67</i>	<i>8</i>	<i>25</i>	<i>100</i>
Full-time equivalent employment	2.1	0.2	0.4	0.7
<i>Percentages</i>	<i>80</i>	<i>5</i>	<i>15</i>	<i>100</i>
Value Added in \$ '000	70	11	34	115
<i>Percentages</i>	<i>61</i>	<i>9</i>	<i>30</i>	<i>100</i>

TCDC = Thames-Coromandel D.C. region BOP = Bay of Plenty

Note that the original net impact direct expenditure of \$110,000 by the 10,000 visitors (55% of whom yield the net impact) is part of the \$188,000 for the TCDC region in Table 2. The so-called multiplier effect of this expenditure after accounting for all flow-ons within the region is calculated as $188/110$ or 1.71. However, 4% of flow-ons or \$31,000 can be attributed to Other Waikato regions and the remaining 31% or \$89,000 is estimated to occur in the BOP/Auckland region. Most of this flow-on will probably occur in the Auckland region but logistically (e.g. petrol supplies) Tauranga may also be important, so we include BOP with Auckland. The NZ-wide multiplier is calculated as $290/110$ or 2.64. The BOP percentage is probably not larger than Other Waikato (e.g., in the range of 3%-9%) with the Auckland region realizing the remainder (in the range 10% - 27%).

The percentage impacts for the three regions are similar except for FTE employment where 80% is attributable to the host region. Note that if we believe expenditure per capita at the park to be twice as large as assumed here, then the TCDC employment impact would double to 4.2 FTEs. In turn, this could translate into, say, 8 persons, some of whom would be employed part-time.

In addition to visitors to Te Kouma Farm Park by car, a proposed day trip by Subritzky Ferries is estimated to bring an additional 15,000 visitors annually from Auckland to the park in Year 1. This figure could rise considerably in future years, especially if this destination proves popular with the ever-increasing number of overseas tourists. Again, the resulting impacts can be scaled up or down (e.g. 30,000 visitors per year would imply an impact-multiplying factor of 2) depending on a different estimate of annual ferry visitors. Expenditure per capita for these visitors is assumed to be double that for land based visitors at \$30 for food and \$10 for other retail purchases. Visitors by ferry (possibly from overseas) may stay longer and spend more than those arriving by car. The ferry fare is estimated at \$30 return which compares with \$25 for the Waiheke ferry.

Under these assumptions, aggregate annual expenditures by these ferry visitors' totals \$450,000 for food, \$150,000 for other retail purchases at Te Kouma or Coromandel and \$450,000 for the ferry payable to the Auckland based Subritzky Company. The sum of

these direct and flow-on impacts for the various regions of interest are summarised in Table 3.

Table 3: Subritzky Impacts from 15,000 Ferry Based Visitors in Year 1

Economic Impact	REGION OF INTEREST			
	TCDC	Other Waikato	BOP & Auckland	NZ
Gross Output in \$ '000	1027	70	1422	2519
<i>Percentages</i>	<i>41</i>	<i>3</i>	<i>56</i>	<i>100</i>
Net Household Income in \$ '000	186	21	241	448
<i>Percentages</i>	<i>42</i>	<i>4</i>	<i>54</i>	<i>100</i>
Full-time equivalent employment	11.7	0.7	6.5	18.9
<i>Percentages</i>	<i>62</i>	<i>4</i>	<i>34</i>	<i>100</i>
Value Added in \$ '000	380	60	675	1115
<i>Percentages</i>	<i>34</i>	<i>5</i>	<i>61</i>	<i>100</i>

As one might expect, the percentage impact now shifts in favour of BOP/Auckland (mainly Auckland) due to the ferry expenditure. However, the employment impact distribution still favours the TCDC region.

Aggregating the results for Tables 2 and 3 shows the total economic impact of Te Kouma Farm Park in Year 1 as given in Table 4.

Table 4: Total Economic Impacts of Te Kouma Farm Park in Year 1

Economic Impact	REGION OF INTEREST			
	TCDC	Other Waikato	BOP & Auckland	NZ
Gross Output in \$ '000	1215	83	1511	2809
<i>Percentages</i>	<i>43</i>	<i>3</i>	<i>54</i>	<i>100</i>
Net Household Income in \$ '000	220	25	254	499
<i>Percentages</i>	<i>44</i>	<i>5</i>	<i>51</i>	<i>100</i>
Full-time equivalent employ. #	13.8	0.9	6.9	21.6
<i>Percentages</i>	<i>64</i>	<i>4</i>	<i>32</i>	<i>100</i>
Value Added in \$ '000	450	71	709	1230
<i>Percentages</i>	<i>37</i>	<i>6</i>	<i>57</i>	<i>100</i>

Total direct expenditure is \$110,000 (land based) plus \$1,050,000 (ferry based) or \$1,160,000, which multiplies up to an annual expenditure NZ-wide of \$2,809,000 for a multiplier of 2809/1160 or 2.42. Apart from FTE employment, the economic impacts are evenly divided between the Waikato region and the BOP/Auckland region.

The TCDC region enjoys 64% of the net employment gains as well as most of the Waikato region share of the other impacts. Generally, the retail and food trade is labour intensive, so these results confirm our intuition as to this particular impact. Ferry operations, on the other hand are more capital intensive and this shows up in the percentage distribution of the Value Added impact in favour of BOP/Auckland. For this impact, we might assess BOP's share as the same as Other Waikato (6%) with 51% then attributable to Auckland.

The net gain for annual NZ GDP is estimated at \$1.23 million. This works out to an annual Value Added per FTE of almost \$57,000 which compares favourably with other NZ based attractions. Note that Value Added per FTE must cover the gross salary of an employee, acceptable profitability to the enterprise as well as capital replacement cost and taxation paid by the enterprise.

Full Capacity Impacts for the TCDC Economy

Meritec has estimated full capacity for land based visitors at 40,000 annually. This gives a scale factor of 4 based on our initial visitor estimate of 10,000. Our judgment is that full capacity for ferry visitors yields a higher scale factor of 5 (or 75,000 ferry visitors annually) allowing for the projected significant increasing volume of overseas tourists.

The scale factors of 4 and 5 can be used with the results summarised in Tables 2 and 3 to yield full capacity economic impacts of the park. In the case of Value Added or GRP, the total full capacity annual impact can be calculated as follows:

$$\begin{aligned}\text{Land impact} &= \$70,000 \times 4 = \$280,000 \\ \text{Ferry impact} &= \$380,000 \times 5 = \$1,900,000 \\ \text{Total Value Added impact} &= \$2.18 \text{ million}\end{aligned}$$

This corresponds to 0.3% of TCDC's current GRP.

A similar calculation for FTE employment leads to:

$$\begin{aligned}\text{Land impact} &= 2.1 \times 4 &= 8.4 \text{ FTEs} \\ \text{Ferry impact} &= 11.7 \times 5 &= 58.5 \text{ FTEs} \\ \text{Total employment impact} &= &= 66.9 \text{ FTEs}\end{aligned}$$

This corresponds to 0.7% of TCDC's current employment.

Note that the Value Added or GRP impact would be increased if an entrance fee were included in the above analysis. However, with Te Kouma Farm Park being a free attraction, additions to GRP come only from services of related sectors such as the retail and food sectors. This leads to some disparity in the full capacity GRP and employment percentage impacts which are 0.3% and 0.7% respectively.

The above calculations have assumed that the farm at Te Kouma will continue to operate and that part of the duties of the farm employees will be to assist and instruct visitors to the park. If dedicated park employees are to be added to existing farm employees, then the above impacts will be slightly understated. One option for park operation assumed the appointment of a park manager. However, this is only an option and the impact of this one employee would be minimal.

The above impacts have excluded any motel/camping ground/hotel impacts on the assumption that year 1 land-based and ferry visitors will be day-trippers.

At full capacity, however, Te Kouma Farm Park will be acknowledged as an added attraction to the TCDC region and visitors to the region may spend an extra day at a motel/campground/ hotel as a result. This impact could not be rigorously analyzed in the time available, but some preliminary values can be calculated. The assumption is that an overnight stay attributable to Te Kouma Farm Park would add \$40 per person (food and lodging) to the direct impact of land-based visitors. This could be seen as a high dollar amount for traditional backpackers, but the park should attract higher-spending visitors, both domestic and overseas, at full capacity. We can use the analysis from Table 2 to estimate what this means for the TCDC region (Table 5).

Table 5: Te Kouma Farm Park Output without Considering the Subritzky Ferry

Visitors	Net Impact Percentage	Aggregate Direct Output @ \$40	TCDC Multiplier	NZ Multiplier	Total Annual Output Impact in \$'000	
					TCDC	NZ
10,000	0.55	\$220,000	1.71	2.64	376.2	580.8
40,000	0.55	\$880,000	1.71	2.64	1504.8	2323.2

Using the same Value Added/ Output ratios from Table 2 enables us to roughly estimate the total Value Added (or GRP/GDP) impact for TCDC and NZ for 40,000 annual land-based visitors:

TCDC estimated as $(70/188) \times 1504.8$ or \$560.3

NZ estimated as $(115/290) \times 2323.2$ or \$921.3

Note that an extra \$560.3 thousand in Value Added from 40,000 land-based visitors raises the total GRP impact from the park on the TCDC economy from \$2.18 million to approximately \$2.74 million annually.

Te Kouma Farm Park: Costs

The costs of Te Kouma Farm Park can be considered in the first instance to be: purchase costs, park development costs, ongoing farm operational costs and any additional operational costs associated with running the park. If any additional external costs were identified, these too could be incorporated.

The Council may be interested in both net present values (NPV) of cost streams and annual costs. Annual costs can be converted to NPVs for assumed interest rates and time horizons. In this case, a 6% interest rate has been used.

Two options are considered:

Option 1 (Table 6):

This is based on the property purchased for its market value.

Purchase for \$8,000,000

Net farm income, say \$50,000 per annum

Park establishment costs, say \$100,000

Park operational costs, say \$100,000 per annum

Table 6: Costs Based on Purchase at Market Price

	NPV costs	Annual Costs
Park Purchase	\$8,000,000	\$480,000
Park Setup	\$ 100,000	\$ 6,000
Farm operations	-\$ 833,333	-\$ 50,000
<u>Park operations</u>	<u>\$1,666,667</u>	<u>\$100,000</u>
Totals:	\$8,933,333	\$536,000

Option 2 (Table 7):

This is based on the property leased in perpetuity for \$250,000 per annum.

Purchase for \$8,000,000

Net farm income, say \$50,000 per annum

Park establishment costs, say \$100,000

Park operational costs, say \$100,000 per annum

Table 7: Costs Based on Lease Option

	NPV costs	Annual Costs
Lease Purchase	\$ 4,166,667	\$ 250,000
Park Setup	\$ 100,000	\$ 6,000
Farm operations	-\$ 833,333	-\$ 50,000
<u>Park operations</u>	<u>\$ 1,666,667</u>	<u>\$ 100,000</u>
Totals:	\$ 5,100,000	\$ 306,000

Discussion

Park costs are dependent principally on the terms in which the property becomes available and the amount of investment the participating agencies wish to make in the park.

Cost of land

This initial analysis assumes land cost in the range of \$4-\$8million, depending upon flexibility of the vendor. This cost is substantially more than the land is worth in agricultural production, but is within the range at which a willing buyer could be found if the Council did not purchase the property.

Park development costs

These have been assumed to be minimal in the order of \$100,000. They could probably be reduced to \$20,000 if the farm became a park as is. Alternatively, they could be increased to range between \$500,000 and \$1,000,000 if the Council were to invest significantly in visitor facilities or park staff accommodations.

Farm operational costs

It is assumed that the farm makes a financial contribution of \$50,000 per annum. The Meritec proposal assumes a cash surplus from farming of \$100,000 per annum, which may be overly optimistic. It should be noted that farm incomes fluctuate significantly. It is also noteworthy that the farm has the potential to be run more profitably than generating \$50,000 per annum. However, this would be unlikely to occur with a farm manager employed by one of the participating agencies such as the Thames Coromandel District or Environment Waikato. If the council were seriously to pursue increasing the income, it would want to consider leasing the farm land subject to an appropriate performance agreement with agricultural, environmental, and social goals and minimum requirements.

Additional operational costs associated with the park

Park operational costs can vary greatly depending on which scenario actually takes place. At \$100,000 per annum, this may cover one staff member at \$50,000 plus \$50,000 of operational expenses. Without staffing, these costs could be reduced to \$50,000. With more staff and a different park model, these costs could increase by several hundred thousand dollars per year.

Administration costs

It is appropriate to note that the park could impose additional organisational costs on the participating agencies or a Farm Park Trust. It would not be difficult for the governance of the park costing \$50,000 per annum. However, if the park governance was efficiently managed, these costs should be minimal.

External Costs

No external costs have been estimated in this analysis. However, it should be noted that there is the potential for the park to impose some congestion costs in the vicinity or other problems associated with waste, pollution control and the provision of emergency services to visitors. These should be estimated if there is any evidence that they are likely to be significant.

Other Costs

Establishment of the park may constrain other productive activities in the near vicinity. Noxious smells from industrial plants in the Thames Coromandel District Council Region may not be compatible with a park of this nature.

Conclusion

The proposed park is likely to have a total cost of between \$300,000 and \$500,000 per annum. At best it would cost \$200,000 per annum and at worst \$1,000,000 per annum.

Te Kouma Farm Park: Non-Market Values

This section of the paper reports on non-market values for the proposed Te Kouma Farm Park. Non-market values are important to consider in this proposal as there will not be a fee charged to visitors of the park. We find that even though there will be no fee, there is still value and these values are non-market values.

Non-Market values for Te Kouma Farm Park include both use values and non-use values. Use values, simply put, are the values derived from activities that people will participate in at the park. For this particular park, potential use values come from activities such as: tramping, picnicking, camping, environmental education, adventure racing, orienteering, mountain biking, water activities, swimming, non-motorized boating, bird watching, photography, and botany (Meritec Limited, 2003). Non-use values are the values obtained from something even if you never actually see it.

Non-use values typically include existence and bequest values. Existence value is the value one gets from knowing something exists, while bequest value is the value received from knowing that something will be around for future generations. In addition to existence and bequest values, ecosystem service values are reported. Ecosystem services are the indirect services brought about by the ecosystem – such as clean air and nutrient cycling. Again, there is no exchange of money for these, but they are important.

Use Values

As stated previously, the use values for Te Kouma Farm Park come from the activities people participate in. Te Kouma activities may potentially consist of:

Tramping	Picnicking	Camping
Orienteering	Mountain biking	Bird Watching
Photography	Visiting Historical Sites	Environmental Education (Includes Botany)
Swimming	Going to the Beach	Non-Motorized Boating
Windsurfing	Relaxing	Motorized Boating

The benefit transfer method¹ is a valuation tool that can be used to gather existing value information and transfer it to a new area. This paper gathers existing activity value data and transfers it to the new area of focus, Te Kouma Farm Park. A benefit transfer table for recreation activities in New Zealand has been compiled from a review of the New Zealand recreation literature. The table reports consumer surplus (CS)² values. CS means and standard deviations by activity are presented in Table 8.

In Table 8, we see that one day of rock climbing has a mean CS value of NZ\$37.16/day/person. If in the first year of operation, 1,000 people came to rock climb in Te Kouma for 1 day each; this would yield a CS value of \$37,160 per year. This value would only be the value for rock climbing at Te Kouma. However, we know that not all visitors will be interested in rock climbing. Some people may be interested in a variety of activities such as tramping, fishing, and mountain biking,³ while others may only be interested in one activity such as tramping or rock climbing.

The activities that may be participated in at Te Kouma Farm Park are highlighted (Table 8). Since each person will participate in different activities, instead of trying to guess what each person will do, the average CS values are used for the estimations. The average CS values for the Te Kouma Farm Park activities are \$28.05 per person per day in 2003 NZ\$. It has been estimated that in its first year of operation, Te Kouma Farm Park will have 10,000 visitors (Meritec, 2003).⁴ Therefore, a 10,000 visitor day visitation range would yield a CS value of NZ\$280,500. However, there has been a proposal by the Subritzky Ferry Company to start a ferry service from Auckland to Te Kouma. If the Subritzky Ferry is in operation during the opening year of Te Kouma Farm Park, it is predicted that there will be 15,000 additional visitors to the park, for a total of 25,000 visitors. The 25,000 person visitation rate results in a CS value of \$701,250.

¹ For a more complete description of the benefit transfer method including its validity, reliability, and limitations, please refer to Kaval and Loomis, 2003.

² Consumer surplus refers to the difference between the (marginal) benefit a person receives from a particular activity or good and the price they pay. Typically with recreation, there is no price charged to the activity participant. Therefore, the value this person receives is the entire benefit.

³ If a person participates in 3 activities such as 3 hours of tramping, 3 hours of fishing and 4 hours swimming, their average value for one day at Te Kouma Farm Park would be $\$25.35 = ((3*\$26.41 + 3*\$28.27 + 4*\$22.37)/10)$.

⁴ We will be assuming that 10,000 visitors equal 10,000 visitor days. A visitor day is the number of people multiplied by the number of visits they make to the park. For example, 10,000 people may come for one day each; this would result in 10,000 visitor days. In addition, if 5,000 people come for 2 days each; this would also result in 10,000 visitor days. Therefore, there may be variations in the number of people that come and the number of days they stay, but the final result yields 10,000 visitor days.

It has been estimated that at full capacity, Te Kouma Farm Park will receive 40,000 visitors that arrive by land and, if the ferry is used, 75,000 visitors that arrive by ferry, for a total of 115,000 visitors. These numbers result in an annual consumer surplus of \$1,122,000 for the land visitors only and \$3,225,750 for the total number of visitors.

Table 8: New Zealand Consumer Surplus Values (2003 \$NZ)

Activity	N	Mean	Std. Dev.
Camping	5	\$55.95	\$48.04
Cross Country or Back Country Skiing	1	\$101.10	
Environmental Education	6	\$22.11	\$7.98
Fishing	7	\$28.27	\$13.97
Horseback Riding	4	\$14.48	\$9.05
Hot Springs	1	\$57.26	
Hunting	7	\$40.03	\$30.05
Mountain Biking (and Other Non-Motorized Biking)	8	\$19.60	\$16.51
Non Motorized Boating	7	\$40.60	\$35.79
Photography	4	\$23.62	\$7.15
Picnicking	5	\$16.00	\$8.15
Relax Outdoors	4	\$23.62	\$7.15
Rockclimbing (includes Abseiling and Mountaineering)	6	\$37.16	\$31.84
Sightseeing	5	\$39.11	\$35.20
Swimming	2	\$22.37	\$7.12
Tramping (Hiking, Bushwalking and Walking)	14	\$26.41	\$25.00
Visiting Historic Sites	4	\$15.25	\$8.19
Grand Total	90	\$30.12	\$26.19
Total of Only Highlighted Activities	81	\$28.05	\$24.70

Researching CS values showed one of the studies to have been conducted in an area close to the proposed Te Kouma Farm Park. This study focused on the value of Kauaeranga Valley in Coromandel Forest Park (Everitt, 1983). In this study, it was estimated that values of recreation were \$27.41 per person per day (2003 NZ\$). This value is lower than the overall recreation value average for New Zealand, but it is close. We feel that this value was underestimated due to the question wording. However, if we consider this as the low range, if 10,000 visitors come to Te Kouma in its first year, the recreation value will be \$274,100. If 25,000 visitors come in the first year (with the addition of the Subritzky Ferry) then the CS value will be \$685,250. At full capacity, this would represent \$1,096,400 for the land visitors (40,000 visitors) and \$3,152,150 for the total visitation (115,000 visitors including 75,000 visitors by ferry).

As the number of non-market recreation valuation studies in New Zealand does not encompass all possible activities at Te Kouma Park and many of the New Zealand studies may not have been conducted in the manner used most commonly in non-market valuation studies, we have also included a benefit transfer study table for recreation valuation in the United States (Kaval and Loomis, 2003) for comparison (Table 9).

Table 9: US Recreation Consumer Surplus Values in 2003 US\$ unless otherwise indicated⁵⁶

Activity	N	2003 US\$ CS Avg	2003 NZ\$ CS Avg	2003 US\$ Std Dev
Backpacking	6	\$50.89	\$88.29	\$22.24
Birdwatching	8	\$28.92	\$50.17	\$23.08
Camping	48	\$36.32	\$63.01	\$39.04
Cross Country Skiing	12	\$30.65	\$53.17	\$11.52
Downhill Skiing	5	\$32.72	\$56.76	\$18.53
Fishing	177	\$46.06	\$79.91	\$62.57
Floatboating/ Rafting/ Canoeing	81	\$98.56	\$170.99	\$84.09
General Recreation	39	\$34.28	\$59.47	\$53.02
Going to the Beach	33	\$38.52	\$66.83	\$28.44
Tramping	68	\$30.12	\$52.26	\$34.90
Horseback Riding	1	\$17.70	\$30.70	
Hunting	277	\$45.82	\$79.50	\$35.78
Motorboating	32	\$45.19	\$78.40	\$41.05
Mountain Biking	32	\$72.06	\$125.01	\$66.87
Off Road Vehicle Driving	10	\$22.39	\$38.85	\$12.18
Other Recreation	16	\$47.56	\$82.51	\$45.17
Picnicking	13	\$40.50	\$70.26	\$37.67
Pleasure Driving (which may include sightseeing)	11	\$57.85	\$100.37	\$61.04
Rockclimbing (which includes abseiling)	27	\$54.94	\$95.32	\$34.84
Scuba Diving	24	\$31.61	\$54.84	\$53.62
Sightseeing	28	\$35.98	\$62.42	\$45.45
Snorkeling	9	\$29.61	\$51.37	\$44.99
Snowmobiling	8	\$35.44	\$61.48	\$36.58
Swimming	26	\$41.69	\$72.33	\$30.58
Visit Environmental Education Center	1	\$5.87	\$10.18	
Visiting an Arboretum	1	\$13.22	\$22.94	
Visiting Aquariums	1	\$27.65	\$47.98	
Waterskiing	4	\$47.87	\$83.06	\$24.84
Wildlife Viewing	240	\$41.37	\$71.78	\$39.95
Windsurfing	1	\$386.26	\$670.13	
Grand Total	1239	\$46.53	\$80.73	\$50.78
Total of Highlighted Activities	918	\$47.46	\$82.34	\$55.33

⁵ References to this table are located in a separate reference section at the end of this report.

⁶ US Dollar Values were converted to NZ Dollars based on the average 2003 exchange rate which encompassed January 2003 through November 2003.

If we assume that the values for recreation activities are similar in the US and NZ and that in the first year of Te Kouma's operation, it is estimated that 10,000 visitors will come to the park, on average, this will yield \$82.34/ per person/per day of CS. This will result in a total CS of \$823,400 for the first year increasing annually as visitation increases. If we are also to consider visitation from the Subritzky ferry (25,000 visitors in the first year), this value would increase to \$2,058,500. At full capacity, this would result in an annual consumer surplus of \$3,293,600 for land visitors only (40,000) and \$9,469,100 for total visitors (115,000 = 40,000 by land and 75,000 by ferry).

Non-Use Values

Existence and Bequest Values

As stated previously, existence value is the value one gets from knowing something exists, while bequest value is the value received from knowing that something will be around for future generations. In a recent study by Environment Waikato (2003), it was found that people of the Waikato Area are in favor of protecting natural heritage lands in the Waikato Region, such as Te Kouma Farm Park, for the future. This shows that Waikato residents value both existence and bequest. When asked whether they would be willing to pay, it was found that, on average, people were willing to pay \$4 annually to preserve heritage lands in the Waikato. This \$4 represents the total of existence and bequest values.

According to the 2001 Census (NZ Government, 2002), the Waikato Region was comprised of 127,134 households and 357,726 people. If this \$4 is distributed across all people, this would yield an annual value of \$1,430,904. If the \$4 was distributed only across all households, it would yield an annual value of \$508,536. Since funds for these monies would come via annual rates on properties, the household value may be the more logical base. In addition, three other New Zealand Studies have looked at preservation of parks, where the public would place an annual amount of money into a preservation fund to either create a new park, such as in the case of Aorangi Awarua in the Manawatu-Wanganui Region, or to preserve what is already there, such as Kauaeranga Valley in Coromandel Forest Park or Little Barrier Island off of Auckland. Respondents were found to be willing to pay between \$10.24 and \$16.75 annually to preserve these areas (Beanland, 1992; Riley and Scrimgeour, 1991; Mortimer, et al., 1996). For the Waikato Region, if considering the population of 357,726 people, this would result in a range of

\$3,663,114 to \$5,991,911 annually. If you consider this value only for households, the values would range from \$1,301,852 to \$2,129,495. We feel these numbers may represent what would be available from the Waikato public to preserve all lands in New Zealand, not just Te Kouma Farm Park.

Ecosystem Services

According to Daily (1997), ecosystem services are “the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life.” They are the functions of nature necessary to sustain ecosystems. Without ecosystem services, humans and the rest of the creatures on the planet would not exist.

Costanza (1997) lists 17 major categories of ecosystem services. These categories include both goods and services that humans derive from ecosystems. The major ecosystem service categories include: cultural, recreational, genetic resources, raw materials, food production, habitat refugia, biological control, pollination, waste treatment, nutrient cycling, soil formation, erosion control and sediment retention, water supply, water regulation, disturbance regulation, climate regulation and gas regulation. This list does not include non-renewable services or the atmosphere (see Costanza 1997 for more detail).

Even though these services are dependent for life on earth, humans have a profound impact on them. We have caused unprecedented extinction rates, altered terrestrial systems, altered marine systems, and strained resources. (Daily, 1997; Daily, 1997; Costanza, 1997; Ekins, 2003; Tilman, 1999). Some examples of human impacts on ecosystem services include the fog that killed thousands of people in London England in 1952. The level of coal smoke in the air produced by a London industry was so concentrated, nature's normal services of absorbing pollution and keeping the air clean could no longer be accomplished (Neilson, 2002). Another example is the water that caused blood cancer in 29 people. The level of toxic chemicals that entered the groundwater from industrial industries in Rutherford, New Jersey was so concentrated, that the ecosystem services were no longer able to clean the water (Cooper, 2002).

In January of 1999, Environment Waikato estimated the values of the ecosystem services in the Waikato Region (Patterson and Cole, 1999). In this study, direct and indirect values per hectare of several ecosystem services were valued. The services relevant to Te Kouma include climate regulation, disturbance regulation, water regulation, water supply, erosion control, nutrient cycling, food production, raw materials, waste treatment, gas regulation, recreation, climate regulation, biological control, pollination, genetic resources, habitat refugia, and soil formation.

According to Patterson (1999), ecosystem services can be measured by the type of ecosystem they come from. These ecosystem types have both a direct value and an indirect value. The direct value is typically the money made from the land, such as the value of timber cut or crops harvested. The indirect value represents the ecosystem service value. Indirect values for Waikato lands are as follows (Table 10):

**Table 10: Waikato Region Ecosystem Type Values
(Numbers Provided by Patterson, 1999)**

Waikato Region Ecosystem Types	Direct Annual Value in \$NZ 2003/ha	Indirect Annual Value in \$NZ 2003/ha	Total Annual Value in \$NZ 2003/ha
Estuarine	\$2,155.62	\$49,327.34	\$51,482.96
Wetland	\$5,294.71	\$38,857.81	\$44,152.51
Seagrass/ Agal-bed	\$4.44	\$43,142.41	\$43,146.85
Lake	\$3,977.13	\$18,550.34	\$22,527.47
Mangrove	\$1,484.07	\$19,625.93	\$21,110.00
River	\$785.88	\$18,550.34	\$19,336.22
Horticultural	\$19,049.84	\$85.47	\$19,135.31
Coastal Zone	\$334.11	\$8,593.63	\$8,927.74
Forest	\$1,133.31	\$1,499.61	\$2,632.92
Agricultural	\$691.53	\$437.34	\$1,128.87
Scrub/ Shrubland/ Tussock	\$155.40	\$437.34	\$592.74
Coastal Marine Area	\$205.35	\$362.97	\$568.32
Cropland	\$58.83	\$94.35	\$153.18

Te Kouma Farm Park encompasses 450 hectares of land, 50 hectares of which are indigenous forest, while the rest is mostly agricultural land for cattle. If we only look at the indirect values of the land (as direct values are calculated in another section of this report), we find that:

400 hectares are agricultural: $\$437.34 \times 400 = \$174,936$

50 hectares are indigenous forest: $\$1,499.61 \times 50 = \$74,980$

If we ignore the value of the surrounding waters in the Hauraki Gulf, we find the annual value of the ecosystem services provided by Te Kouma Farm Park to be worth \$249,916.

Non-Market Value Summary

While it is difficult to determine the exact estimates of non-market value for Te Kouma Farm Park, it is definitely a positive value. If we assume that the studies we have reviewed have conducted their measures in the best way possible, then we find that the non-market valuation of Te Kouma Farm Park can be summarized in the following table (Table 11):

Table 11: Non-Market Values for Te Kouma Farm Park

<u>Non-Market Value Estimation</u>				
<u>(Annual Value in 2003 \$NZ)</u>				
Recreation Use Value				
	For first year with 10,000 visitors	For first year with 25,000 visitors (includes Subritzky Ferry)	At full capacity with only land visitors (40,000 visitors)	At full capacity with land and ferry visitors (115,000)
Lower Range	\$274,100	\$685,250	\$1,096,400	\$3,152,150
Mid Range	\$280,500	\$701,250	\$1,122,000	\$3,225,750
Higher Range	\$823,400	\$2,058,500	\$3,293,600	\$9,469,100
Preservation Value				
		For 127,134 Waikato Households	For 357,726 Waikato People	
	For Te Kouma	\$508,536	\$1,430,904	
	For all Public Lands			
	Low Range	\$1,301,852	\$3,663,114	
	High Range	\$2,129,495	\$5,991,911	
Ecosystem Services				
			For the 450 hectares	
	Only for the Land and Not the Water Surrounding the Land			\$249,916

As can be seen from Table 11, the non-market values from Te Kouma Farm Park in its first year and at full capacity are positive and high.

Te Kouma Farm Park: Benefit Spread Summary Tables

While a more detailed description of the benefit spread can be found in the Economic Impact and Non-Market Value Sections, the following is a more general summary.

There are two scenarios we will be reporting on:

- Te Kouma Farm Park without the impact of the proposed Subritzky Ferry; and
- Te Kouma Farm Park with the impact of the proposed Subritzky Ferry.

There are 6 general populations that will receive benefits from Te Kouma Farm Park:

- Thames Coromandel District Council (TCDC) Region
- Waikato Region not including TCDC
- Bay of Plenty (BOP) Region
- Auckland Region
- All of New Zealand
- Visitors to New Zealand from other countries
- The Rest of the World

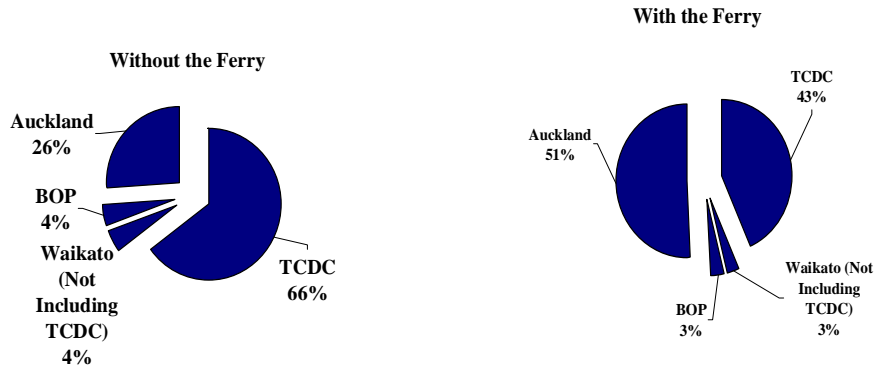
Since it is not as relevant for this report to consider visitors to New Zealand and the rest of the world within the benefit analysis, we will not be reporting the Non-New Zealand visitor division here.

Four scenarios are important to consider:

- Year 1 visitors (without Subritzky Ferry): 10,000 visitors
- Year 1 visitors with Subritzky Ferry: 25,000 visitors (10,000 by land, 15,000 by ferry)
- Full Capacity Visitors (without Subritzky Ferry): 40,000 visitors
- Full Capacity visitors with Subritzky Ferry: 115,000 visitors (40,000 by land, 75,000 by ferry)

After thorough analysis, we have decided that most of the benefits will go to TCDC, Waikato (not including TCDC), BOP, and Auckland. We have calculated the percentages of benefits with and without the Subritzky Ferry. Percentage benefits are found in Figure 1.

Figure 1: Benefit Spread of Te Kouma Farm Park

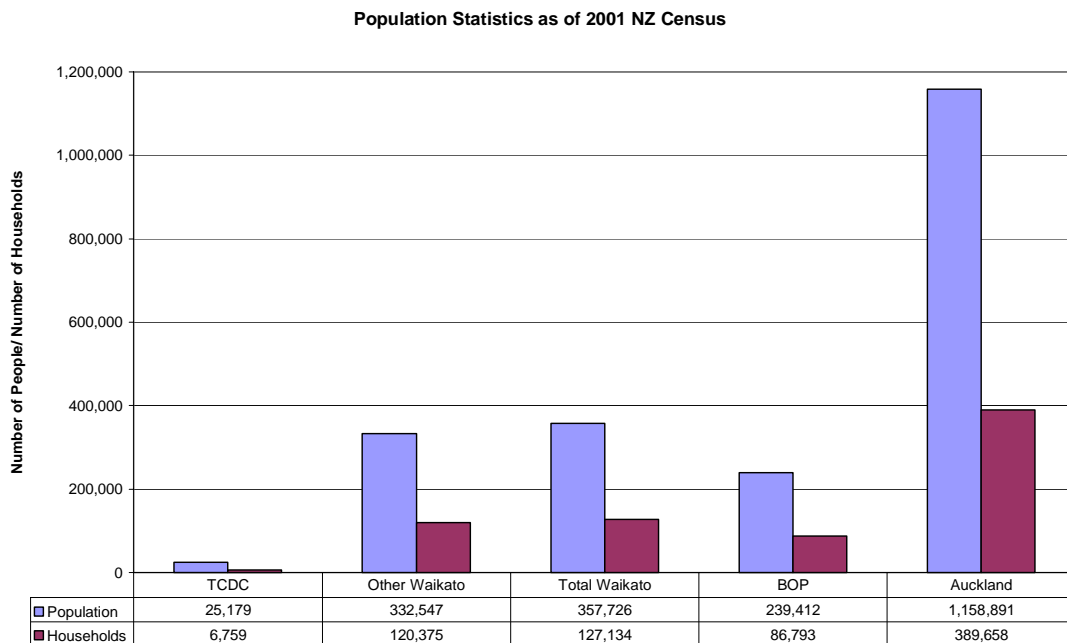


*Note, we are assuming that the effect to BOP will be similar to the effect to the Waikato Region (not including TCDC)

As can be seen, TCDC benefits most without the Subritzky Ferry, while Auckland benefits the most with the ferry.

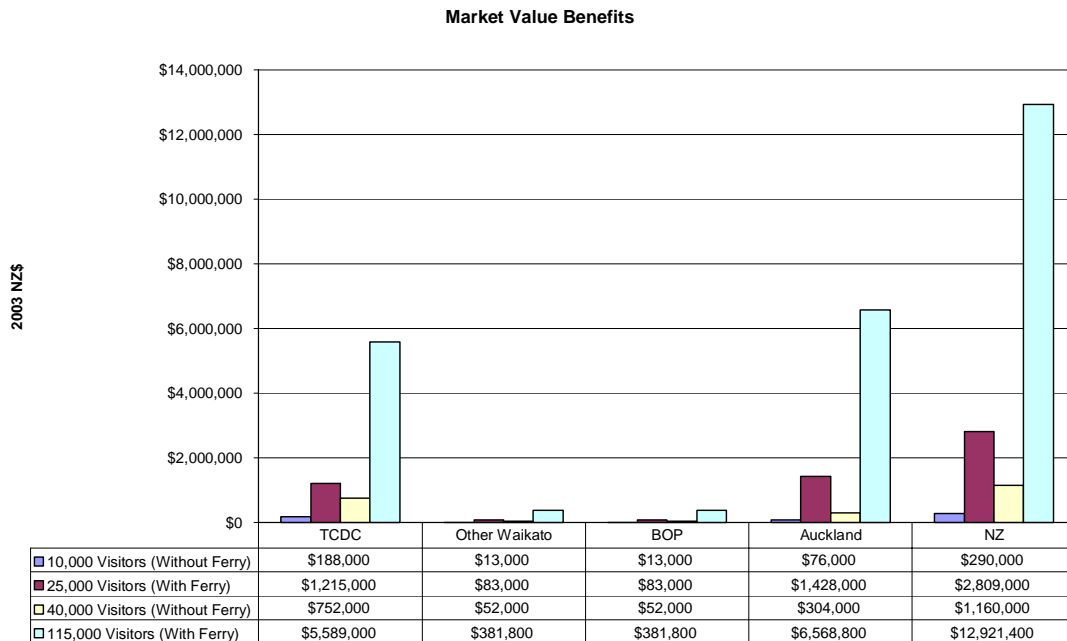
For reference, we see that Auckland has a much higher population than Waikato and the Bay of Plenty combined (Figure 2).

Figure 2: Population Statistics as of the 2001 NZ Census



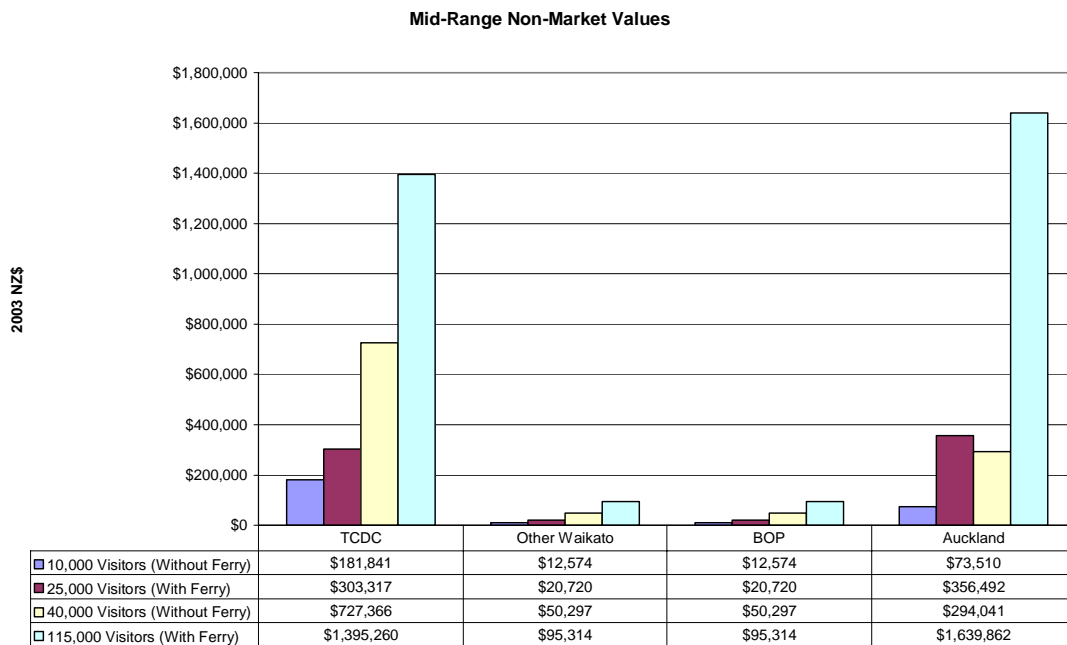
This benefit spread yields market benefits of (Figure 3):

Figure 3: Market Value Benefits



Non-Market Benefits are presented in Figure 4.

Figure 4: Mid-Range Non-Market Values



And willingness to pay estimates for Public Park Preservation for one park is presented in Figure 5.

Figure 5: Preservation Value Willingness to Pay for One Park

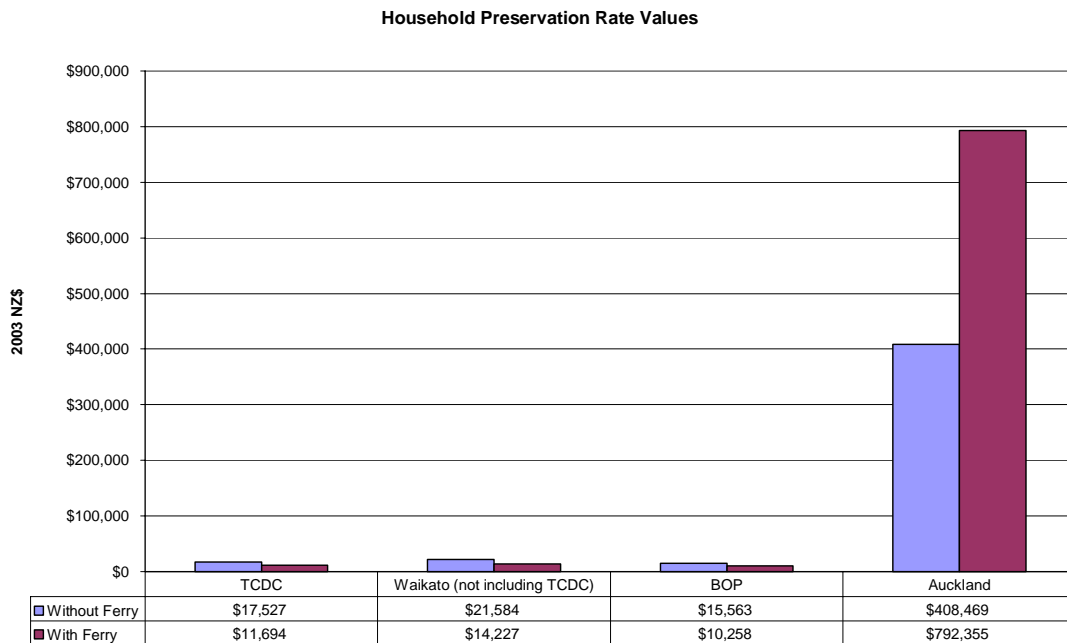
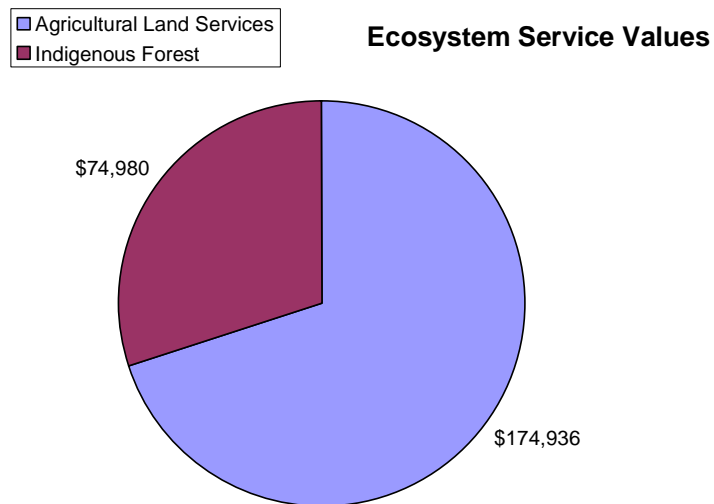


Figure 5 uses the \$4 per household calculation of who should pay for Te Kouma Farm Park and allocates it according to who will benefit from Te Kouma Farm Park. As can be seen, the numbers differ significantly with and without the ferry system.

It is also important to consider the ecosystem services value of Te Kouma Farm Park to New Zealand. This yields a \$249,916 annual value to New Zealand (Figure 6).

Figure 6: Ecosystem Service Values



As can be seen from the figures, the benefit spread significantly differs with and without consideration of the proposed Subritzky Ferry operation.

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