Who Should Pay For Managing WA's Waterway Resources?: A Swan-Canning Waterway Case Study

IAN BRIGGS

Natural Resource Management

Agricultural and Resource Economics Group

Faculty of Agriculture

The University of Western Australia

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ABSTRACT

The use of waterways for public and private purposes generates income to commercial users of the resource and pleasure to the public and government agencies have been required to invest in management to maintain the resources in a condition that permits continued resource use. The principal management agency, the Waterways Commission, relies totally on State Consolidated Funds allocations for management and these have steadily decreased. This has resulted in declining waterway quality throughout WA.

It is estimated that about $15million per annum is required to maintain WA's waterways and although it is shown that at least this amount is collected directly and indirectly from specific and general users, the waterways management budget was only a fraction of this. This paper examines the current revenue system, how much is actually reinvested in waterway management and mechanisms for raising additional funds. The Swan-Canning waterway is used as a case study to examine aspects and shows that the a true economic value of the Swan-Canning waterway resources exceeds government's current contributions towards waterway management.

1.0 INTRODUCTION

Many of WA's waterways have been adversely affected by inappropriate management, misjudgments and uninformed decisions about the effects of land and water use and natural events. As a consequence some economic, social and environmental values have been compromised. Waterways are now under closer scrutiny by management agencies and the community. Successful resolution of waterway problems is necessary for social and economic advancement and is not just an environmental issue. But, community desire for good waterway resource condition is threatened by the inadequate and declining government funding arrangements for waterway management.

The WA Waterways Commission Act, defines waterways as including rivers, inlets, tidal waters, artificial waterways and the portion of the sea adjacent to any river, inlet or estuary and their catchments. They also include the surface and ground water catchment areas and the discharge zone in the near shore marine waters.

Economic, social and environmental values of waterway resources include, for example:

- Private and commercial recreation and business opportunities, for example, boating, swimming, tourism and foreshore property values.
- Wildlife including recreational and commercial fin and shell fish species habitats.
- A receptacle for natural and constructed drainage water from the catchment.
- Value of maintaining good waterway condition for future generations (Pen, 1983 and Thurlow, Chambers and Klemm, 1986)

Thus the use of waterway resources is firstly a traditional right of the community which has expectations that these resources will be maintained in good condition. Secondly, the community's use of the resources for commercial and recreational benefits raises a large sum of revenue for the State's Consolidated Fund system. At present, many of WA's waterways are showing symptoms of deteriorating condition. The cause is attributed to a number of uses: drainage discharge from residential, commercial, industrial and agricultural areas; and, from direct use within the water body itself such as commercial and recreational boating. Effective management in the form of both policy and on ground controls has been hampered because government investment in management is insufficient to ensure good waterway condition.

In view of this, if government is to fulfil the community's expectations and sustain or increase the value of the resources then it should increase its investment in management to a level which is at least commensurate to ensuring these resources are ecologically sustained.

1.1 Community Support for Improved Waterway Quality

Bawden and Sriskandarajah (1993) using a land and water resource example contend that in more recent times the Australian community paradigm is that resource management should be principally based ecologically sustainable development principles listed by the World Commission on Environment and Development (1989). That is the principal of the decision making process incorporating appropriate aspects of economic and environmental conditions affecting the develo,' nent of management programs and resolution of conflicts. This is supported by Barker's (1987) description of the evolution of legislation referring to natural resource use and speculates a change from the current separate environmental and economic development legislation to legislation that specifically amalgamates them. In addition, Markandya and Pearce (1988) and Barbier (1994) contend that resource decision making processes that are based primarily on traditional economic analysis of environmental quality alone require change to include moral issues and community values towards achieving ecologically sustainable development.

Although natural resource legislation refers to environmental or resource protection these provisions are not always interpreted by government and its agencies towards providing appropriate management of these to ensure ecologically sustainable development (Murray and Swaffield, 1994). This reflects the case in WA where, although legislation gives guidelines for resource protection in the past, resource quality has continued to decline (WA Legislative Assembly, 1992 and Minister for the Environment, 1992). This is shown for the case of waterways management in WA where resource quality has declined to such an extent (Deely, 1993) and yet management funds are insufficient to implement management programs.

There is little literature referring to the economic value of WA waterways. However, McLeod (1983) using a hedonic pricing determined that property values with views of and access to the Swan-Canning estuary were about 23 per cent higher than those without. Godfrey (1988) states that buyers will always pay a premium for land and housing with views of a lake river or estuary.

Thus, the principal objective that underpins the waterways management is to ensure that waterways are maintained in a condition that will support environmental, commercial and social beneficial uses. Waterways management is predicated also on the ability to secure a funding base to overcome the current shortfall for the existing operations of agencies such as the Waterways Commission, the principal management agency, and to provide support for new statewide responsibilities.

1.2 Current Waterway Management Funding Status

The present funding system for waterway management is inadequate to meet the WA community's high expectation that waterway resources will be managed in perpetuity for both private and public use. That is, there is a large gap between what is required for waterway management and what is invested by government in agencies such as the Waterways Commission. The total amount required by the Waterways Commission for ecologically sustainable management of WA's waterways is estimated $15 million or three times the amount present $6million allocated by government from the Consolidated Fund each year (Briggs, 1994).

Government generates revenue from its charges to waterway resources users such as boat registrations and fuel levies, fisheries, foreshore and riverbed leases and licences. But there are direct charges to activities such as swimming, moorings and tourism are not directly charged even though all depend on good waterway resource quality. In addition, the allocation of funds for waterway management such as from the State's Consolidated Fund is difficult because there is no one agency that has jurisdiction for all waterways. The principal agency is the Waterways Commission but under current legislation its jurisdiction is restricted to the lower reaches of only five waterways all located in WA's extreme south west. This together with its inadequate funding prevents comprehensive management of waterways to support the community's economic, social and environmental needs (Olsen and Skitmore, 1991 and Minister for the Environment, 1992).

The Waterways Commission at present is inappropriately funded to meet the basic waterways management requirements expected by WA's community. The funds that it receives from Consolidated Fund allocations are mainly utilised for day to day 'on-ground' waterways planning and management with some additional funds allocated for crisis management (pers. comm., Waterways Commission). But these from my empirical evidence are insufficient to achieve the basics of good waterway quality let alone proactive planning and management to prevent the likelihood of further waterway quality decline. In addition, there is no security for guaranteed funds to prepare and implement management plans such as a five year clean up program for the Swan-Canning estuary.

1.3 Study Aim and Purpose

The purpose of this study is to examine current waterway management funding arrangements and potential additional funding sources. Because of the vast extent of WA's waterways, the Swan-Canning system is used as a case study to first estimate the current economic value of a waterway. This is compared with the principal waterway management agency's (ie Waterways Commission) current management budget and the estimated $15million funding required for all

WA waterways to determine the amount of additional funding. Secondly, identifying sources of and arrangements for additional funds for waterway management.

2.0 CURRENT WATERWAY RESOURCE MANAGEMENT FUNDING

2.1 Natural Resources Management Funding Arrangements

In contrast to traditional and recognised natural resource management agencies the Waterways Commission not strongly supported in terms of allocations from the Consolidated Fund. For example, in Table 1 it is shown that the Department of Minerals and Energy in 1993/94 is supported by a $70million allocation to support a revenue of $412million. In contrast the Department of Agriculture is allocated $93million to raise $30million revenue - a subsidy of $63million (WA Legislative Assembly, 1993). From this it could be concluded that waterways are not recognised by government as an important economic, social and environmental resource and this is no doubt due to waterway resource values never being quantified.

TABLE 1: Revenue and Expenditure for the Year Ending 30 June 1993. Consolidated Fund Actual Figures.

Government Agency	REVENUE ($million)		EXPENDITURE ($million)	
	1993	1992	1993	1992
Agriculture	30.69	32.00	93.52	95.40
Fisheries	2.97[a]	4.10	11.39	11.97
Minerals and Energy	412.36	405.03	69.88[b]	45.27
Dept of Transport	21.54	21.18	51.51[c]	31.88
CALM	94.01	84.49	135.35	132.10
SRT	0	0.	1.02	0.99
WWC	0	0	5.25	3.77
WAWA	478.87	496.54	414.00[d]	422.83

a Revenue decrease in 93: Govt ceased funding the Commonwealth Specific Purpose Grants.

b Expenditure increase in 93: Govt ceased funding the Special Acts Expenditure Petroleum (Submerged Lands) in 91/92.

c Expenditure increase in 93: Dawesville Channel construction.

d Expenditure decrease in 93: Govt ceased funding the interest expense on advances for Country Services; and statutory contribution raised to 4 cents in the dollar.

SOURCE: WA Legislative Assembly, (1993)

In addition, the Waterways Commission has little opportunity under legislation to raise revenue (see Table 1). Again in contrast, the Department of Conservation and Land Management which

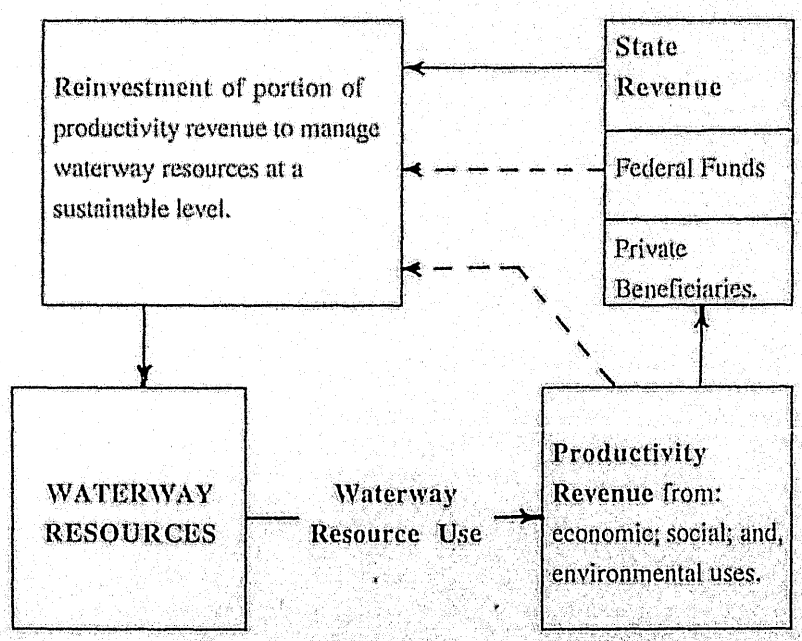
manages forests and nature conservation in areas other than waterways is expected to generated income, other than from the Consolidated Fund, of nearly $100m in 1992/1993 period (WA Legislative Assembly, 1993 and Dept of CALM, 1994).

It is clear that funding for waterway management is well short of other agencies that are supported by government as well as through their ability to raise other funds.

2.2 Waterway Resource Management

A simple explanation of the relationship between economic benefits and sustainable waterway resource quality is shown in Figure 1. Figure 1 indicates the link between natural resource quality and economic productivity. One of the main determinants for ensuring sustainable economic productivity is the amount or level of monetary investment in the management of the natural resources. This relationship is important especially considering that waterway resources are conditionally renewable and quality can therefore range between enhancement and degradation. Thus it is imperative that waterway resource base is protected from affects that cause declining resource quality. Currently revenue from resource use flows to State and Federal governments, and private beneficiaries. Return of this revenue to waterway resource management is only through State allocation from the Consolidated Fund. Other options which would increase funding and provide greater security include Federal funding and direct revenue funding as shown by the dashed arrows in Figure 1.

FIGURE 1: Waterway Resource Management Funding System



Source: Briggs (1994)

2.3 Other Waterways Management Investments

Many of the local government authorities (LGAs) implement major projects involving capital works and rehabilitation. and preparation of management plans to the implementation of these plans. I estimate that between Fremantle and Perth about $1million per year is invested and for the whole Swan-Canning waterway about $2 to $3million dollars.

2.4 Who Should Pay for Waterway Resource Management and How Much?

It is clear that government generates revenue from pub'ic and private use of waterways resources and therefore a user pays system already in part exists. This can be expanded by include as far as practicable all easily identified specific and general users. But in doing this it is essential for recognising the distinction between equity and ability to pay should be recognised in the discussions about user pays management funding opportunities.

Barbier (1994) in his study of natural resource systems suggests that because ecosystems as a whole often have certain attributes that have economic value either because they induce certain economic uses or because they are valued themselves it is helpful to distinguish between direct, indirect and non-use values. in view of this there are three distinct types of revenue generated from waterway resource use. These types include two current charging systems and the third a potential source of revenue. The description of each follow.

- Direct user fee collection (eg registration and other use fees) - These include users that pay fees directly to government (eg boat registrations and commercial foreshore and riverbed leases) and include only a portion of the total number of direct users. There are other uses that could derive rent charges which are accessible but not collected for example annual mooring fees. It is strategically impossible to capture all users. Parking fees at beach and similar feature areas and boat ramp users do not capture all this type of use. Also, swimmers, picnickers, canoers, sightseers, joggers and walkers using foreshore and water body areas are too dispersed for it to be efficient to collect entry or use fees (ABARE, 1993, and Pitt, 1993).

- Fees currently not directly accessible (eg taxes and levies) - Direct commercial use of waterway resources include, for example:
  - Income tax generated from commercial enterprises and operations such as tourism and fishing;
  - State and Federal marine fuel spirit levies;
  - Stamp duty and land tax from residential properties with "river views";
  - Sales tax from new boat sales, equipment and maintenance.

- Fees currently not charged for general amenity use of waterway resources - There is no effective means to collect from direct users such as swimmers and picnickers and those that use resources in a more indirect way such as sightseers. A potential revenue generating means is the application of general levies similar to the Perth Metropolitan Region Improvement Tax or a specific levy collected from all households. This would target those inaccessible user groups who derive benefit from waterways.

The "who should pay" question in this paper is taken as the user pays, given this the next question is how much should they pay. From my empirical observations there is an important matter to consider. If there is either sufficient funds, in regard to the $15million required by the Waterways Commission, but availability of funds is restricted by other government funding priorities such as health, law and order, education, or there is insufficient revenue collected from waterway resource use, how is this funding gap reduced? Some options to reduce this gap include:

- ensuring all users pay (eg not all users are directly charged);
- increase all existing charges;
- the state and Federal governments contribute more and,
- local government authorities contributing additional funds.

3.0 THE SWAN-CANNING WATERWAY CASE STUDY

3.1 Study Area Details

It is beyond the scope of this small funded study to analyse all WA waterways and therefore focus is made on the Swan-Canning waterway, a riverine and estuary system (Figure 2). The Swan-Canning waterway was chosen because its catchment contains WA's the most intensely urban, industrial and agricultural developed area also with the highest foreshore land values and the river and estuary is also the most intensely used of all the waterways in WA. Therefore, it provides a convenient benchmark on which all other waterways can be evaluated and assessed. This waterway is bounded by the Indian Ocean to the west, east to the Darling Escarpment, and to the north and south by the Gnangara and Jandakot Groundwater Mounds respectively. It is a flat sandy sedimentary coastal plain with natural and artificial drainage, groundwater seepage into the river and estuary system. It is also the downstream section of the Avon River catchment which is mainly a cereal agricultural area.

3.2 Current Revenue Sources

User categories described in Section 2.4 are adopted for the evaluation of current revenue raised from Swan-Canning waterway resource use charges. It is clear from empirical evidence that not all revenue collected through the various charges and forms of taxes are readily accessible. Table 2 indicates the sources of potential revenue for waterways management that could be

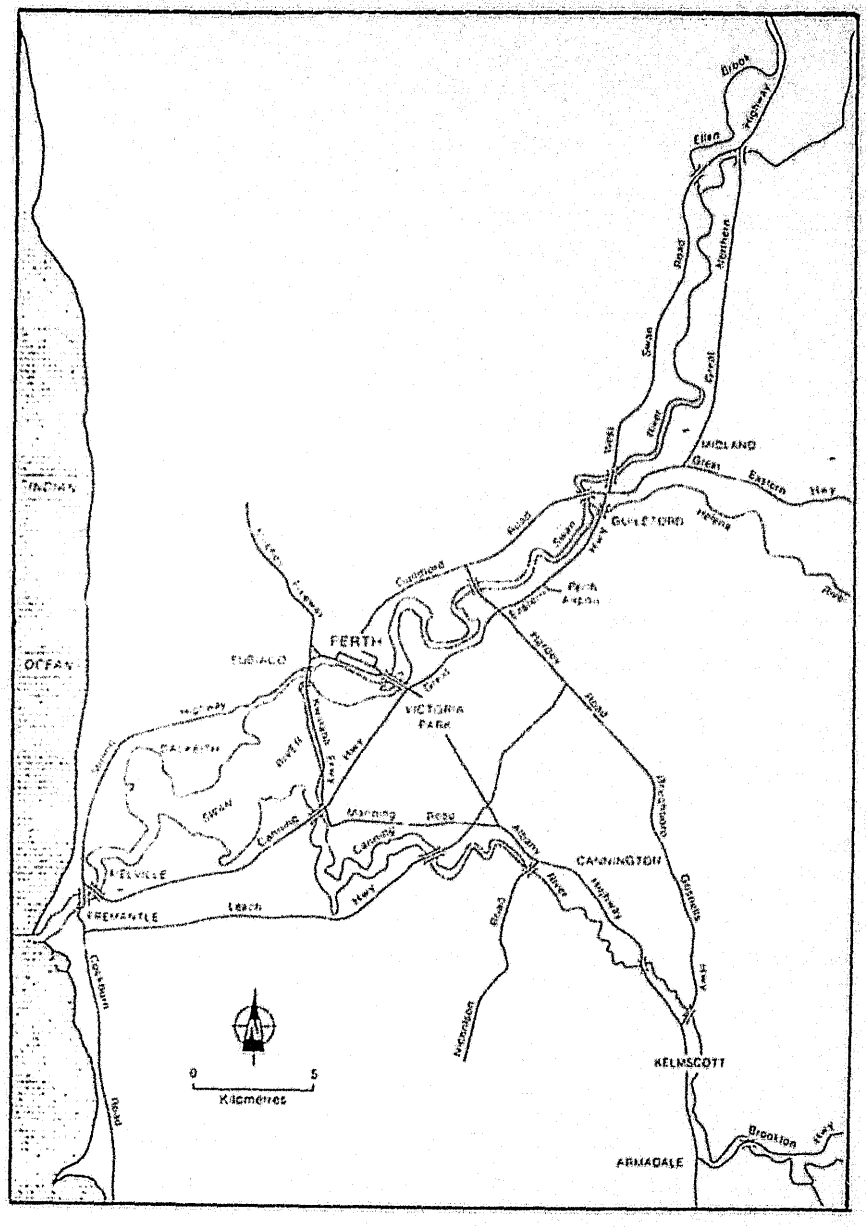


FIGURE 2: The Swan-Canning Waterway

directed to agencies with waterway management responsibilities. These sources have been divided into two categories to differentiate between first, those which are accessible because the present system of government charges and where new charges can be implemented simply (such as the mooring fees in the Swan-Canning River and surcharges on tourism as discussed later in this paper). Secondly, those which are virtually inaccessible in the short term such as income and company taxes.

TABLE 2: Accessible and Inaccessible Sources of Government Revenue from Waterway Resource Use

	Accessible	Virtually Inaccessible
Direct Fees	Recreational boat registrations Commercial boat registrations Mooring fees Commercial riverbed leases Foreshore land leases and licences Drainage revenue Tourism	
Taxes and Other Fees	Marine fuel excise and levy	Recreational boat maintenance and other services New recreational boat sales tax Residential river view and access land values Commercial fishing General income and company tax
General Amenity Fees	General improvement tax (eg Perth Metropolitan Region Improvement Tax)	

3.3 Accessible Direct Use Charges

Details of the accessible user types follow.

i) Recreational and Commercial Boat Registration

Boating activities in the Swan-Canning system is one of the large revenue raisers. At present these revenues are in the form of boat registrations and include all powered boats greater than four horse power. Those which are purely powered by sails are excluded from paid registrations. All registrations are collected by the Department of Transport and are invested in the construction and maintenance of waterway facilities.

The amount of revenue collected from recreational boat registrations in 1993/94 was $1.5million. That is, on a yearly average boat owners are prepared to pay about $1.5million for the use of the waterways. Details of commercial boat registration are not readily available. However, the estimated number of commercial boats specifically operating in the Swan-Canning is about 380 which generates $46,500 in registration revenue. Thus, the total revenue generated from boat registrations is about $2million.

ii) Commercial Riverbed Leases

Riverbed leases are an integral part of revenue raising and are associated with commercial and other foreshore leases. These include jetties, moorings and other river bed fixed facilities with charges focused on commercial (eg restaurants) and semi-commercial (eg yacht clubs) enterprises. These enterprises derive direct benefits from good waterway quality but the charging arrangements are steeped in historic agreements made prior top drastic declines in waterway quality and the more recent intensity of demand for river bed leases. Thus, it is suspected that given the revenue derived from riverbed facilities they may be under rated.

At present the revenue generated is $330,000 per annum, a figure which includes the anomaly of yacht clubs paying only ten percent of the total commercial value of the riverbed.

iii) Foreshore Land Leases

Foreshore leases and riverbed lease areas are mutually exclusive. The foreshore leases refer to reserved lands under the Land Act, for example A and C Class reserves, that are leased or a licence issued by the vestee for various commercial (eg restaurants) and sporting functions (eg yacht clubs). These reserves are either vested in a local government authority or in the Department of Conservation and Land Management (CALM). Local government authorities do not charge for the leases to yacht clubs but CALM does. The Department of Land Administration also receives revenue.

The current revenue raised is about $300 000 of which most is directed to the vestee rather than to the Consolidated Fund. As with riverbed leases it is suspected that due to the approval history for establishment of yacht clubs, clubs and other sporting bodies on Land Act reserves the lease charges are well below commercial rates.

iv) Drainage Revenue

The present government policy for drainage rates charged by the Water Authority of Western Australia (WAWA) is that five percent of all rates collected are directed to the Consolidated Fund. It should be noted here that drainage rates are applied only to the Perth Metropolitan Region with rural areas excluded. WAWA's total drainage revenue from the Swan-Canning

drainage area for 1993/94 was about $9million and its contributions to the Consolidated Fund about $455,000.

It should also be made clear that WAWA's drainage responsibility is confined to the Swan-Canning systems drainage catchment. It does not include responsibility beyond the point of discharge into the natural waterways. This matter is of importance because WAWA is not charged to discharge into this waterway system.

The drainage function of waterways is the responsibility of the WA Water Authority and Local Government Authorities. The Water Authority although not contributing to waterway management, in fact provides expert advice and other services specifically based in waterways. This was too difficult to quantify within the scope of this report. LGA's spend about $8million per year on capital works and maintenance (Briggs, 1994).

One of the factors in determining charges is water quality and volume discharged. At present there is no such system of charging by the Water Authority. However, the Department of Environmental Protection charges for effluent disposal in its licensing of industry and commercial operations and these fees are directed into the Consolidated Fund. These fees range from $120 per year for discharges of less than $20m^3$ per day to $5,600 per year for discharges greater than $10,000m^3$ per day. The Department of Environmental Protection advises that these fees are less than charged elsewhere in Australia.

3.4 Accessible Indirect Use Charges

i) Marine fuel excise and levy

There are two types of marine fuel charges, namely the Commonwealth Excise and the State Levy. This revenue is considered to be accessible only in that it is raised from a specific use. In the Perth Metropolitan Region, most of the registered boats use the Swan-Canning therefore a high proportion of the metropolitan marine fuel use is derived from this waterway. The Commonwealth Excise collected is estimated to range between $2.8million and $10.5million per annum (Table 3). Similarly, it is also reasonable to presume that the State Levy is also derived from the Swan-Canning. This is estimated to range between $0.5million and $3million (Table 3). Together these charges to recreational users in the Swan-Canning waterway ranges from about $3.2million to about $20million (Table 3).

The mechanism for collecting these funds requires a direct approach by government to its Treasury and to the Commonwealth Treasury. There is no existing system in place. It is an important potential source of waterway funding and there is no allocation of tagged funds to waterways management.

TABLE 3: Estimates of Marine Fuel Excise and Levy on Unleaded Motor Spirit for the Perth Metropolitan Region: Recreational Boaters [a].

Scenario	Average trips per year	Average litre usage per trip	No of Registered Boats Perth Metro Region [b]	C'wth Excise 30.75c/l ($)	State Levy 5.67c/l ($)
Lowest	10	25	36214	2.780 000	510 000
Medium	15	50	36214	8.350 000	1.540 000
Highest	20	75	36214	16.700 000	3.080 000

a All off-road users of diesel fuel are exempt, if apply for the Certificate of Exemption. Commercial boats are predominantly diesel users. Exemptions for off-road use of motor spirit applies only to farmers. Most recreational boaters use motor spirit and so are not exempt.

b All fuel levy (State) receipts are now hypothecated to road expenditure. The fuel levy is paid by fuel wholesalers by way of a monthly licence based on the previous month's sales.

ASSUMPTIONS: 10 days per year (DoT's PA Study, 1981 A Study into Recreational Boating Facilities within Western Australia) .

3.5 Inaccessible Indirect Use Charges

The following discusses the inaccessible indirect charges identified and the list here is obviously not comprehensive, but does give an indication of those which are pertinent to this study.

i) Recreational boat value to the economy

It is estimated that the initial investment for boats based on the replacement cost is $460million. As a general approximation ten per cent of the total value of boat is spent on maintenance each year, that is, about $46million per year. This amount has a significant economic spin-off for boat chandleries and maintenance companies but this was beyond the scope of this study.

ii) New recreational boat sales tax

There were 2,061 new recreational boats registered in the 1993/1994 period (Dept of Transport 1994) and this is estimated to have a sales revenue of $9,720,000 (pers. comm. various marine brokers). The Australian Tax Office 21% sales tax on new boat sales in this period means that it generated about $2million.

iii) Foreshore residential land values

Residential properties with river views are more expensive than similar nearby properties without river views. An analysis of unimproved property values in all suburbs between Fremantle and Perth (excluding Crawley) shows that the river view component of the unimproved land values ranged between 17% at Fremantle to 65% at Claremont. For example, in Applecross the average unimproved land value in 1994 is $460,000 for properties with river views and a similar property without river views is $310,000.

Stamp Duty revenue generated from the sale of these river view properties is about $1.2million per year. Land tax component of non-primary principle residences is about $550,000 per annum. Of significance here is the amount of revenue generated from Stamp Duty at the time of sale of the property and Land Tax charged on non-primary principal residences. Within the study area it is estimated that the combination of both annual stamp duty and land tax is $1.8million. To account for the Central Business District and the remaining foreshore residential and commercial properties this annual fee could be up to three to four times this amount, that is, between $5.4million and $7million.

iv) Tourism

Although tourist operators can be easily identified, the income they generate from tourists is not readily available. Determining the amount that tourists pay is difficult because of the lack of clear information about the number of day trippers and overnight visitors using waterways as a destination. Available tourism data includes both land and water based tourist visits. There was difficulty is distinguishing the number of tourists in each category but in terms of 'river tours' there are some broad estimations of numbers and the average dollar spent by tourists on river trips. The estimated expenditure incurred on journeys during which a river cruise was taken, is about $2.7 million.

v) Commercial fishing

The value of the commercial fishery in the Swan-Canning system for 1992/1993 was $225 112 (Dept Of Fisheries, 1994). This is marginally higher in value than the average value since 1989, namely, $221 135 per annum. However, potential revenue generated is difficult to determine in the absence of information about tax revenue raised from this fishing industry and remains an unresolved problem. Given the relatively small contribution generated from the low yearly average value of catch, it is not advanced as a major funding source.

3.6 General Amenity Fees

In Section 2.4 reference was made to Barbier's (1994) direct use, indirect use and non-use types of users. Here the non-use groups are those which derive some benefits from waterways such as general urban amenity. In addition there are also those users that derive indirect benefits such as driving along foreshore roads in preference to inner residential roads, and also that choose to live in places with river views or in easy access of the river. None of these are charged specifically for the benefits they derive from waterways but complain when the Swan-Canning estuary and rivers detract from use from the occurrence of toxic algal blooms and other major problems. In view of this such beneficiaries should contribute to waterway resource management. One such means is a general amenity tax.

A current charging means in Perth is the Metropolitan Region Improvement Tax. This tax is charged at the rate of 15 cents in the dollar on all non-primary principal residences and on commercial property unimproved land values and raises about $18million per year. This revenue is allocated within the Metropolitan Region Scheme for land purchase, Region Open Space management and Important Regional Roads. The actual amount put towards managing Region Open Space along foreshores was not available but if equated to the average amount that LGAs invest in their management, it could be about $200,000.

3.6 Current Contributions to Waterway Management

The total collected from each of the current government charging systems is to about $12million to $26million of which about $3.2 is reinvested, primarily by LGAs' foreshore management programs, for waterway management. This indicates that the revenue collected from the Swan-Canning waterway resources is sufficient to fund the Swan-Canning system itself and the whole State. As stated earlier, not all is readily available because of other government budgetary priorities. Given that the revenue identified in this study is only a fraction of the true economic value (eg excludes economic spin-offs to marine industries), it clearly indicates there are sufficient funds available if Consolidated Fund allocations for waterway management were based on a commensurate economic value basis.

4.0 INCREASING REVENUE

If the user pays principle is adopted then there are a number of matters that require consideration in identifying and examining new sources of revenue and these follow.

This principle states that all waterway resource users contribute to management costs of these resources, that is equity among all users. However, not all users have the same ability to pay. This means that not all can afford to pay equal amounts in each user group. A precedent has been set in this regard by the WA Water Authority in its differential drainage rates in the Perth

metropolitan region. Here, low income groups such as pensioners and church groups are charged less than other residential properties in terms of gross rateable property values.

Thus there are some difficulties in assigning equitable charges, for example:

- determining a fair and just charge for swimmers who may use the waterway frequently and power boat users who may rarely use the waterway;

- quantifying the amount of damage to or benefits derived from waterway resources, that is can the cause of a particular problem be traced to a specific user group and similarly can a particular benefit to a specific group be identified (polluter and user pays);

- determining a reasonable charge related to such damage or benefits;

- if an externality arises such as the use of the resource by one user group adversely affects the use by another then a reasonable amount must be determined that is consistent with the value of the amenity lost to the other users (polluter pays).

- where the total revenue from all of these is insufficient to fund the required expenditure, the required shortfall should be obtained from State and Federal funds or from a general amenity tax to reduce the occurrence of cross subsidisation of one group by another (cross subsidisation).

A further problem may arise. A change may be quantifiable but is perhaps inefficient to collect due to logistical constraints for example, collecting entry fees to waterways. Also, collection of fees directly from swimmers throughout the waterways is too large a task and collection cost would be far in excess of the reasonable fees charged. Fee collection is efficient either from point sources (eg boat ramps and special park facilities) or from formal registration charges (eg boat registrations and river bed leases).

4.1 Increasing Current Accessible Direct Use Charges

There are some inherent problems of increasing existing charges particularly in determining equity amongst user groups and within user groups. Although a mechanism can be attempted it is beyond the scope of this study and more importantly is really a political decision. However, examples of raising some charges follows and demonstrates the difficulty in choosing an appropriate rate.

In the case of recreational boat registrations two different approaches can be demonstrated, first, a flat percentage increase (eg 10% and 20% in Options 1 and 2 respectively) and secondly a sliding scale (Option 3) in which owners of larger boats are assumed can afford to pay a

relatively larger rate of increase than owners of smaller boats (Table 5). Either approach could be argued as acceptable but which is fair?

TABLE 5: Increased Recreational Boat Registration Fee Options

	Option 1		Option 2		Option 3	
Boat Length (metres)	Fee +10%	Revenue ($)	Fee +20%	Revenue ($)	Fee +%, ($)	Revenue ($)
0.01 - 4.99	30.8	646 615	33.6	705 378	+10%, 30.8	646 615
5 - 9.99	61.6	734 087	67.2	800 822	+20%, 67.2	800 822
10 - 19.99	114.4	144 144	124.8	157 248	+35%, 140.0	176 400
>20.00	156.2	2 343	170.4	2 556	+50%, 213.0	3 195
Total		1 527 189		1 666 005		1 627 032
Reg. Fee		99 092		99 092		99 092
TOTAL		1 626 281		1 765 297		1 726 124

4.2 New Accessible Direct Use Revenue Sources

There are other options for raising revenue for waterways management. Some of these are discussed below and include the introduction of mooring rentals, tourism surcharges, rural drainage charges, and commercial based agreements such as practised in Greater Melbourne.

i) Mooring Fees

Currently there are no mooring rental fees charged in the Swan-Canning estuary even though rents exist elsewhere in WA. An estimate of the revenue that could be generated from charging rent in the Swan-Canning could range between $100,000 and $200,000 based on mooring charges in other WA waterways.

Boat owners pay no government fees for installation and there is no rental fee imposed even though they benefit from waterway management. Owners can also profit from the sale of the mooring. In the Greater Melbourne region Melbourne Water charges between $60 and $100 per mooring but in close proximity to Melbourne it increases to $2,000 per metre of boat length. Similar charges are made in Sydney's waterways.

ii) Tourism

Tourism here includes all commercial boat trips that travel along the reaches of the Swan-Canning system. For example, the day trips from Perth to Fremantle and the Swan Valley area. Present information indicates that there are about 63,500 people trips on the Swan-Canning. There is no existing surcharge applied to tourist river trips. That is , because commercial boat operators gain profit from their use of the waterway resources and are dependent on the waterways being maintained in good condition to guarantee customer use of their facilities. Thus, commercial boat operators should contribute, in a transparent way that reflects the true value of commercial benefits derived, to waterway resource management.

For example, a surcharge, similar to that charged to tourists visiting the Great Barrier Marine Park and WA's national parks could mean, at least in the Swan-Canning, a revenue of about $100,000.

4.3 New General Amenity Fees

In Melbourne, there is a similar fund to the Perth Metropolitan Region Improvement Tax, namely the Metropolitan Improvement Rate which charges each residential and commercial property, not just non-principal property, and realises $58million per annum. This amounts to an average of $41 per residential household (90% of all properties), and $47 for all other properties. This is allocated to: operating Melbourne Parks and Waterways; the Royal Botanical Gardens and similar areas; and, funding the Parks and Waterways Program which provides grants and planning assistance via park agencies and local government for open space improvements across the greater metropolitan area. About one third of the total collected is allocated to waterway management in the Greater Melbourne region.

5.0 FUNDING MECHANISM

5.1 Current and Potential Direct and Indirect User Revenue

Having established the amount and potential new sources of revenue in the Swan-Canning system, a statewide approach can now be examined.

If waterways are seen as a national asset, for example, the National Water Quality Management Strategy (Australian Water Resources Council, 1992) then there may be some precedent set for larger Federal government contributions. There are mechanisms in the USA where the federal government support State efforts in natural resource management such as in the management of the coastal zone and estuaries. But even if Federal funds were available the state including the community would still have to contribute. The follow section discusses how much the community may have to pay under a variety of scenarios.

5.2 Federal and State Funding Mechanism Options for WA Waterways

The total estimated for waterways management is $15million (Briggs, 1994). The $15million can be raised in a number of ways depending on the contributions from Federal and State governments. Here, Federal contributions are in addition to those currently given through the State Consolidated Fund (CF) and the potential General Amenity Tax (GAT) described in Section 4.3 is adopted, that is, the households will contribute to waterway management costs.

To determine these amount the community may contribute through the general amenity tax four scenarios are developed and analysed these to estimate the likely cost to each household under such arrangements. It should be clearly noted that the options developed are on a statewide basis and not on the Swan-Canning system.

The following four scenarios were developed on the basis there would be:

1. A one third (33%) Federal, and two thirds (66%) State contributions
2. An even split between Federal (50%) and State (50%) contributions
3. A two third Federal (66%) and one third State (33%) contributions
4. No Federal contribution, (100%) from State contributions.

Each scenario was extended to provide variations to test possible outcomes. The breakdown of the scenarios in options includes a 50:50 split between GAT and CF, and 66:33 split between GAT and CF and vice versa. The reason for the 33:66 split is based purely on what could be considered a good indicator of what may happen. The 66% split for all scenarios is well within the current revenue collected from specific users and placed in the State's Consolidated Fund. The four scenarios follow.

Scenario 1 Here the Federal government contributes what is in effect a one third contribution to the total $15million required for WA waterway management. From this three options can be developed.

Case 1: All $5million is raised by GAT and there are no specific user groups contributing additional funds (ie no charge increase for boat registrations), and $5million from CF. To raise the $5million from GAT means a charge of $9.09 for each occupied household.

Case 2: The $10million for State contributions is raised by $3.33million from GAT and the remaining $6.66million from CF. That is, both the State and Federal consolidated funds contribute $5million each but the specific user charge is increased by $2million.. To raise $3.33million means a charge of $12.13 for each occupied household.

Case 3: The $10million for State contributions is raised by $6.66million from GAT and the remaining $3.33million from CF. To raise $6.66million means a charge of $6.07 for each occupied household.

Special Case: In addition, there is also another option under Scenario 1 where the specific users and the general users contribute without increasing the CF contribution. Here, the $5million is raised by $3million from GAT and the remaining $2million from specific users. That is, both the State and Federal consolidated funds contribute $5million each but the specific user charge is increased by $2million. Here, each household contributes $5.45

SCENARIO 2 Here the Federal Government contributes $7.5million and as in Scenario 1 there is the even split between GAT and CF and the remaining two options having 33:66 splits.

Case 4: The $7.5million for State contributions is raised by $3.75million from GAT and the remaining $3.75million from CF. To raise $3.75million means a charge of $6.82 for each occupied household.

Case 5: The $7.5million for State contributions is raised by $5million from GAT and the remaining $2.5million from CF. To raise $5million means a charge of $9.09 for each occupied household.

Case 6: The $10million for State contributions is raised by $2.5million from GAT and the remaining $5million from CF. To raise $2.5million means a charge of $4.55 for each occupied household.

SCENARIO 3 Here the Federal government contributes $3.75million and again the State contribution is split evenly, and the two combinations of 33:66

Case 7: The $12.25million for State contributions is raised by $5.62million from both GAT and CF. To raise $5.62million means a charge of $10.27 for each occupied household.

Case 8: The $11.25million for State contributions is raised by $7.50million from GAT and the remaining $3.75million from CF. To raise $7.50million means a charge of $13.64 for each occupied household.

Case 9: The $11.25million for State contributions is raised by $3.75million from GAT and the remaining $7.50million from CF. To raise $3.75million means a charge of $6.82 for each occupied household.

SCENARIO 4 Even though the Federal government is encouraging improved water catchment and water quality maintenance and enhancement there is no guarantee that it will contribute specifically to specific waterway management. Therefore, this scenario excludes the Federal government and contributions emanate from State Consolidated Fund and specific user and general amenity tax.

Case 10: The $15million for State contributions is raised by $7.50million from GAT and the remaining $7.50million from CF. To raise $7.50million means a charge of $13.64 for each occupied household.

Case 11: The $15million for State contributions is raised by $10million from GAT and the remaining $5million from CF. To raise $10million means a charge of $18.18 for each occupied household.

Case 12: The $15million for State contributions is raised by $5million from GAT and the remaining $10million from CF. To raise $5million means a charge of $9.09 for each occupied household.

The calculation of the amount per household is simply from dividing the total required to be met from GAT and the 550,000 occupied dwellings in WA. It is important to here that commercial properties (eg offices in the CBD with river views, boat manufacturers and equipment suppliers, and general industry and businesses) are not included but should be if the Melbourne Parks and Waterways model is to be followed. Thus the amount per household is an overestimate if commercial properties were to be included.

From Table 5 the least cost under GAT is Case 6 at a charge of $4.55 per household and the highest charge in under Case 11 at $18.18 per household. Both of these are significantly less than that charged in the Greater Melbourne Area for Melbourne Parks and Waterway compulsory rates per household (ie about $39 to $41). The analysis of these charges really depends on the likelihood of the arrangements in the scenarios eventuating. Even so, there are a number of options resulting in similar charges even though the scenarios are different. For example, Cases 3, 4, and 9 are similar, and so are Cases 1, 5, 7, and 12.

The best outcome may be Scenario 1 where Case 3 and the Special Option which result in charges of $6.07 and $5.45 respectively. However, the Federal government may decide not to contribute additional funds and therefore all funds will have to be raised within WA. Here the least charge option is Case 12 at $9.09. Under this option the $10million to raised from CF is about equal to the revenue collected from the Swan-Canning system.

TABLE 5: Federal and State Funding Mechanism Options

Cases	Federal Contribution ($million)	State Contribution ($ million)		Charge per household ($)
		Consolidated Fund	General Amenity	
1	5.00	5.00	5.00	9.09
2	5.00	3.33	6.66	12.13
3	5.00	6.66	3.33	6.07
Special Case			$3m. GAT and $2m specific users	5.45
4	7.50	3.75	3.75	6.82
5	7.50	2.50	5.00	9.09
6	7.50	5.00	2.50	4.55
7	3.75	5.62	5.62	10.27
8	3.75	3.75	7.50	13.64
9	3.75	7.50	3.75	6.82
10	0	7.50	7.50	13.64
11	0	5.00	10.00	18.18
12	0	10.00	5.00	9.09

5.3 Security of Funding

It has been clearly shown that large revenues are collected from waterway resource users identified in this report. However, this revenue is expected to be only a portion of what is actually collected from direct and indirect use by specific and general users. In view of this and Cabinet's request for a management framework to be developed for enhancing waterway resource quality, it can be shown that such a framework can be developed and secondly that there are adequate funds already collected to assist in the implementation and continued operation of waterway management in this State. These funds as already shown are available from existing funds, other uncharged users and from new sources such as a general amenity tax and are sufficiently large for a portion of these to be specifically allocated to waterway management. Thus, State government should contribute commensurate funds towards waterway management.

In terms of the Federal government it to should also contribute and this is based principally on its precedent set in its own programs such as the National Water Quality Management Strategy which in part includes reference to waterway quality. Thus the Federal government to should

also apportion funds from the revenue it already collects from charges to WA's waterway resource users towards waterway management.

It is imperative to ensure that State and Federal funds are secure to permit immediate to longer term management programs including cooperative projects say between State and local government agencies.

6.0 CONCLUSION

This report focuses primarily on the opportunities to realise revenue from existing direct and indirect waterway resource users through existing direct fees and taxes and levies within the Swan-Canning system. It also explores the use of an improvement tax based on the ones that already exist in Perth for parks, roads and land acquisition, and in Melbourne for waterway resource management. It also focuses on possible funding arrangements involving Federal government allocations.

These current sources of revenue opportunities may not all be achievable such as those associated with the various forms of taxes. But legitimate proof that they originate from and depend on waterway resource quality is clear. If it was successful then the required funds estimated for waterway management for the Swan-Canning system and the remainder in WA can be theoretically met.

It is clearly shown that the existing direct and indirect charge for using the Swan-Canning system resources identified in this report already amount to about that the estimated cost of WA's waterway management. This does not include the spinoffs from waterway use such as tax on income generated from the sale of boats, boat maintenance and the value that people place on their aesthetic uses of the waterways. The report also identifies the waterway resource uses that are not currently accounted for in the Swan-Canning such as mooring and tourism boat charter fees.

The specific charges can be identified and a charge allocated but this was beyond the scope of this study. The general users such as swimmers, picnickers and those who gain some intangible benefits from waterway resource use are difficult to individually identify and furthermore more difficult to charge. At present there is no formal mechanism in place to charge these general users. Thus a mechanism similar to both the Metropolitan Improvement Tax and the Greater Melbourne Parks and Waterways levy was considered. From this a number of options were explored to estimate the charges that could be imposed on all occupied dwellings. This ranged between about four dollars and nineteen dollars, however, this is an inflated cost because the commercial input was not included. However, these options indicate the amounts that could be charged and demonstrates that these are significantly less than the current $41 charged per occupied dwelling in the Greater Melbourne Area.

Therefore the need for waterway resource management is clear and management funding can be achieved through specific and general use charges but what is required apart from further detailing of charges is a government commitment towards establishing a framework for ensuring adequate and secure short and longer term funds.

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