THE VALUE OF TREES – THE BIG PICTURE

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INTRODUCTION

Eleven years ago, Canberra hosted the Royal Australian Institute of Parks and Recreation's first national tree seminar titled, Trees: Management Issues for Urban Australia (RAIPR 1991). I distilled these three key points for my tree care students at the time:

1. The value of urban amenity trees is seriously underestimated
2. As strategic national assets, urban amenity trees require the same level of management as other national assets
3. Education is the only long term tool in rescuing urban amenity from population decline

Now as I sit down eleven years later and reflect on our progress, I see that the true value of urban trees is still seriously underestimated. It is apparent that most of our urban street tree populations are still managed as unrelated individuals. I see that we still feel comfortable counting numbers of trees planted whilst we continue to ignore the vast number of planted trees left unmanaged for life, and our education programs have yet to make any significant in-roads to arresting urban tree population decline.

I also recorded these three proposals from the Canberra seminar:

1. That 'crisis' tree management is inappropriate because it does not address tree decline, loss of tree values, increased costs and liability, and the confrontational nature of reactive tree work
2. That our old prescriptive recipes for tree care must be wholly replaced by the new science based tree biology and by contemporary management philosophy
3. That risk management cannot be discounted, as the public authority duty of care is expanding

I will discuss these points to put the current circumstances into perspective.

Crisis management

We are still 'putting out fires' in dealing with urban tree issues - and there really is little choice but to work inefficiently because we have no legislative and resource framework to enable us to properly plan for and manage whole urban tree populations. I anticipate the reactive response will remain our *modus operandi* until we develop a broader, more rational and strategic approach to urban trees under the guidance of urban ecosystem management systems.

City, suburban and rural communities across Australia are facing the synchronous decline of large numbers of trees planted at the turn of the century and after the Great Wars. Most of these historic and venerable trees are large and so they are likely to present significant health and safety issues.

At the same time, communities are facing the premature decline of many of the popular native *Eucalyptus*, *Casuarina* and *Melaleuca* trees planted en-masse in the early 1970's. These trees are in decline either from the stressful nature of urban environs - eg toxic run-off, polluted air, loss of roots and growing space, and past bad

care practices - or they are removed because we did not anticipate their eventual size and vigour. Australia's seemingly insatiable appetite for unhindered motor vehicle access is also a primary source of urban trees stress including the loss of adequate growing space. It is also important to acknowledge that most of the 1970's native planting's were selected from wild sources rather than from stock bred for urban tolerance. This TREENET conference will develop this important theme further.

Knowing exactly when a given tree is about to collapse, fracture or die, is one of the most difficult tree management decisions for any urban community. Tree failure simply cannot be accurately predicted, but of course trees cannot be just left to die or collapse where they stand. For obvious legal, health and safety reasons most urban trees are, or will be manually felled long before they collapse or die. This poses some very interesting challenges for Councils, authorities and whole communities – for example, how would you convince a community that a great and statuesque avenue, planted in memory of fallen soldiers has to be removed when it still looks green and healthy. How should we respond when our cultural trees must go - can we agree on the point at which we should intervene. We need to consider this matter with care and compassion, whilst still acting responsibly.

There are encouraging developments in some larger management authorities, for example, the ACT government commissioned the development of a data system to manage about 500,000 trees in Canberra. A second project developed a precinct-scale tree management system to manage about 7,000 trees on a 150 ha campus in Canberra city (Bracks 1999).

Both of the Canberra management systems were developed by trained foresters. It is interesting to note that foresters have not been involved in urban tree management planning in NSW where amenity horticulture and arboriculture have tended to be at the centre of urban tree management. However, a review of urban forestry sites on the internet shows the significant input of forest science to strategic urban forestry planning in the USA.

I believe that with the right blend of forest science and modern arboriculture, with support from urban and social planning, landscape architecture and civil design, we could establish urban forestry and urban ecosystem management systems that will address many of the current tree related problems that beset us.

Outdated practices

The old 19th century prescriptive recipes such as wound painting and tree topping have been largely replaced in our major urban centres by modern arboriculture, but old practices continue to impress many tree workers and their clients outside our capital city areas. The teachings of modern arboriculture and the efforts of the city based tree maintenance sector should be credited for their success in eliminating tree topping from acceptable general practice. However, we cannot relax since there are still many authorities and communities who want tree topping to remain as the preferred solution to many tree problems. It seems to me that few public authorities are yet willing to adopt a contemporary management approach for their urban tree populations.

Risk management

I expect the current public liability insurance crisis in Australia will sooner or later motivate us to seek new ways to accommodate and care for urban trees. If we do not quickly find appropriate solutions to address the increasing demands for tree risk elimination coming from the utilities, insurers, lawyers and risk managers - to remove so-called 'costly' trees, then we must expect to continue to breathe toxic air, travel in streets cluttered by timber poles and dense aerial cable networks, and walk our children to school on shade-less footpaths where the tallest greenery is in the form of large shrubs.

If such conditions prevail we should also expect the urge to escape our urban surrounds as often and for as long as possible to continue to frustrate us all. It would be better of course, if we could live satisfying lives in sustainable, healthy and attractive urban communities in the first place. We do have choices.

URBANISATION

Australians are said to be amongst the worlds most urbanised cultures, with more than eighty percent of the population living in towns or cities (Solness 1999), and more than two-thirds of the population of Europe now live in urban areas. Despite our national denial, we are indeed urban beings, and in some ways I feel our rather bucolic national self-image may be part of the reason we are reluctant to look more critically at the health and status of our urban ecosystems.

Urbanisation leads to rapid transformation of soil and vegetation such as bushland, woodland, forests, and agricultural land, and it introduces significant amounts of heat absorbing and radiating materials, impervious ground surfaces, and it carries high levels of polluted run-off to receiving waters. Transport, communications, water and energy infrastructure, and buildings rapidly become the dominant urban form. Most of us have seen bushland cleared very short time, then transformed a couple of months later into perhaps a supermarket complex with hectares of shade-less roof area, heat absorbing car parks and roads. Tokenistic tree planting usually completes the 'development' – at least until the retailers need to expand their shops and parking areas again, and then again!

The on-going process of urbanisation should have motivated our community leaders and policy makers to plan, develop and maintain truly sustainable communities by addressing the problems of air, noise and water pollution, waste management, energy consumption, in synergy and not in isolation as at present. Community leaders are unable to lead in this critical area because we lack the legislative framework and the primary data on which to base policy planning and future action.

Urbanisation is much more than just a process of environmental transformation – it effects people at a psychological level as well. For example we know that people deprived of green space and trees in their daily lives tend to act in destructive and often violent ways, and we know that the recovery of hospital patients is influenced by the presence or absence of trees (Prow 1999)

I have been asked on occasions to address senior high school students on the planning and political issues leading to clearing and development of bushland surrounding their school campus.

On every occasion, the students felt that whilst they understood the social need for development, they could not understand the obvious destructive impacts but felt powerless to effect the outcomes. I am convinced that as a society we can and must do better.

Tree Preservation regulations

Most communities in urban parts of NSW have adopted a tree management model based almost solely on the regulatory power of a Tree Preservation Order (TPO). As a principal mechanism for tree management, regulation has proven wholly inadequate mainly because it addresses trees in isolation, and does not consider the collective ie an 'urban forest' and therefore does not account for cumulative impacts.

A TPO really functions most effectively as one tool in a planned and systematic urban forestry program. It is therefore essential that we seek new, more inclusive ways of addressing the impacts of urbanisation and urban ecosystem management. In my view the way forward is through adoption of an urban forestry planning framework.

AN OVERVIEW OF URBAN FORESTRY

Urban Forestry in the USA

Urban forestry is particularly well developed in the United States where strong Governmental support is a feature of its development.

The US Federal Government introduced the *Urban Forestry Act* in 1971 followed in 1978 by *The Cooperative Forestry Assistance Act* authorising the financial and technical assistance of state foresters under administration of the USDA Forest Service.

The *Urban and Community Forestry Act* was introduced in 1989, and the *1990 Farm Bill* called for the establishment of a National Urban and Community Forestry Advisory Council (NUFAC) One of NUFAC's assigned tasks was to develop a national urban and community forestry action plan. (NUFAC 2002)

Intensive community participation is a key characteristic of successful urban forestry programs in the USA.

Urban forestry in the European Union

The European Union recognises urban forestry as a separate scientific, multi disciplinary domain. In 1997 the European Community approved COST Action E12 involving 21 countries by June 2000. COST is a loose acronym for *European Co-operation in the field of Scientific and Technical Research*. The intent of COST E12 is to coordinate urban forestry research, avoid duplication and improve efficiency (Gerhold 2002)

The objectives of E12 program are to:

- improve the knowledge base and understanding of urban trees and woodlands;
- promote better planning, design, establishment and management of urban trees and woodland;
- establish urban trees and woodland as a recognised scientific domain in Europe;
- place urban trees and woodland on the European and national political agendas.

Each country involved produced a *State of the Art* report on the extent of their urban forestry research. The reports were combined into a single publication by the European Union (Forrest 1999)

The importance of E12's focus, according to Simson (2001) is in its linking of science, policy and practice in urban forestry, but the links were often not strong. Good examples of successful inter-disciplinary work can be found however in Denmark, Sweden, the Netherlands and the United Kingdom, but they were not considered to represent the norm.

Urban forestry in Australia

Urban planners and designers in Australia seem largely unaware of or choose to ignore arboricultural best practice, and managers have limited appreciation of urban design theory, and both pay insufficient attention to the socio-economic benefits of community and urban forestry.

As might be expected, the concept of urban forestry is poorly developed in Australia. (Fakes 2002) This concurs with my observations over two decades of municipal tree management.

However, many Australian tree managers are now developing understanding of the ecological, social and environmental values of the 'collective' of urban trees – or urban forest as it is commonly called. The lack of a clear conceptual, legislative and planning framework in which to articulate collective tree values severely hinders national and local progress.

All Australian communities, from rural villages to the largest cities are presently labouring under an unprecedented expansion in public liability responsibilities effecting almost every aspect of public administration. Urban street trees are very much caught in this situation, and in my recent experience I believe street trees are amongst the most seriously threatened because of the plethora of infrastructure and management jurisdictions in our streets.
If we do not respond immediately and in concert to this situation, then there is every possibility we will not be permitted to plant anything taller than shrubs in our streets in the very near future. (Anon 2002)

THE CHICAGO STUDY – A MODEL TO CONSIDER

I will now give a broad overview of the direction we might take in order to create urban areas truly supportive of people and trees, and I will conclude with an overview of my attempts to introduce urban forestry thinking to the City of Newcastle, NSW.

I am grateful to Dr Jane Tarran, of the Department of Environmental Sciences at the University of Technology, Sydney, for providing me with a copy of the Chicago Urban Forest Climate Project (CUFCP) - an immense, unique three year study quantifying the effects of urban vegetation on the local environment and to help city planning and management organisations increase the net environmental benefits derived from Chicago's urban forest. (McPherson et al 1994)

The CUFCP evaluated the role of trees and other vegetation in the Chicago regional urban forest ecosystem. Analysis of the ecosystem provided an effective approach to planning and controlling the distribution of benefits and costs associated with

ecological effects. Importantly, the study found that the flow of energy, water, carbon, and pollutants through the urban ecosystem can be changed by changing the amount and spatial distribution of trees. This is a very important point to consider.

The findings of a benefit-cost analysis of estimated net present value for proposed tree plantings revealed that despite the expense of planting and caring for trees in Chicago, with time the benefits that healthy trees produce can exceed their costs. (McPherson et al 1994) This is a very important finding when we consider that many Australian authorities are questioning the economic wisdom of retaining urban trees in streets at all!

For example in 1991 the Chicago urban forest removed an estimated 15 tonnes of carbon monoxide, 84 tonnes of sulfur dioxide, 89 tonnes of nitrogen dioxide, 191 tonnes of ozone, and 212 tonnes of particulate matter. In addition, in terms of reducing atmospheric CO_2 trees in urban areas offer the double benefit of direct carbon storage and the avoidance of CO_2 production through energy conservation from properly located trees. (McPherson et al 1994) The CUFCP is too detailed to expand further in this paper but the few findings I have given reveal the enormous unrealised potential of urban trees to achieving sustainable Australian communities.

I believe the full Chicago urban forest climate report should be studied by all local government councillors and community leaders.

THE NEWCASTLE EXPERIENCE

Risk drives the process

Newcastle City Council committed to the Statewide Mutual's *Best Practice* risk management regime in 2000 to address burgeoning public liability claims for slips, trips and falls on member Council's footpaths. The insurer was concerned that member Councils lacked a systematic, integrated approach to managing public trees and infrastructure maintenance.

The insurer developed a series of *Best Practice* management guidelines including one for tree root management, to be used by member Councils under the Statewide insurance members scheme. The approach was essentially a 'carrot and stick' model since member Councils that fail to adopt the model are warned they may loose their liability protection for existing trees and for new planting. This inducement, coupled with loss of the historical local authority liability protection under misfeasance rules, left Councils extremely exposed and especially nervous about their trees.

The *Best Practice - Trees and Tree Roots* manual was supported by Council but got very little support from the arboriculture profession generally because it promoted a biased and negative view of urban trees, it contained incorrect technical information, and it would have eliminated a large number of street trees. The process introduced draconian guidelines for new tree selections by drawing 'damage circles' around utility services and structures that made it almost impossible to plant on or near a public footpath or other structure without risk of losing liability protection altogether. (Anon 1999)

As a result I proposed a total review of the *Best Practice* trees and tree roots manual to remove the bias, correct technical errors and provide a more reasonable approach to managing and selecting trees. My review in conjunction with Judy Fakes of NSW

Tafe Commission, was completed in July 2002 and is under consideration by StateWide Mutual.

I believe the rationale behind the Statewide Insurance *Best Practice* approach is sound – it promotes a systematic, planned and integrated approach to trees and public risk management. Member Councils must develop an inventory on the condition of all public trees along with records of public requests and all tree maintenance work undertaken. Tree requests and necessary work are to be scheduled according to risk profiles and an inspection cycle has to be set. A similar inventory and management program has already been developed for Council footpaths and the tree data will form another layer on a multi layered graphical based information system.

The strategic value of the *Best Practice* approach was realised on completion of the tree resource inventory. We now know we have 54,000 street trees and we are now analysing the data to develop species and risk profiles. It has become clear that the full environmental and social values of appropriate urban trees planted at the right densities, can only be addressed when the full extent of existing resource is known.

The *Best Practice* approach highlighted the inadequacies of our traditional crisis response to trees in Newcastle. The electricity distributors, whose mostly uninsulated cables are carried on timber poles on most Newcastle streets, also operate under a strict liability regime leading to tree trimming far in excess of that tolerated in the past. The electricity distributor further seeking to reduce future street tree planting to shrubs that do not require any trimming whatsoever under their cables. (EnergyAustralia 2002) It is apparent that the Newcastle community is not sufficiently informed on the values of urban trees to counter the energy distributors negative policy toward its street trees.

This was a critical time to introduce urban forestry concepts to senior management and elected Councillors. I began promoting urban forestry as an economical and effective means to address the social and environmental consequences of intense urbanisation such as powerlines and communications cable proliferation.

I held a series of briefings for Councillors presenting graphic PowerPoint images from the American Forests and USDA internet sites combined with images of Newcastle streets to give the ideas local application. My aim was to translate tree values for decision makers who needed to feel confident they understood the issues before they could consider and make critical decisions – in my view this is all about developing attitudes in decision makers rather than telling them what to do.

I adopted the anthropocentric view of 'trees at work' operating without respite in our streets, coupled with images of veteran trees in Newcastle streets and Parks, focussed my messages. Discussion about skin cancer and the need for shade over footpaths and in coastal parks and car parks was supported by images of barren areas of bitumen and unshaded picnic areas. I downloaded images from the American Forests websites and other links to graphically illustrate the role of urban trees in stormwater capture, and I quantified dollar savings from urban forestry programs that used the Urban Ecosystem Analysis (UEA) software developed by American Forests. Individual Councillors spoke to me after the briefings expressing their interest in further developing opportunities for urban forestry planning at Newcastle. A Greens Councillor immediately took the process further, gaining the General Managers support for me to assist him develop a policy motion on urban forestry to be put to the NSW Local

Government Association at its 2002 conference at Broken Hill. I now that sense change is close at hand.

Urban Ecosystem Analysis

The voluntary American Forests organisation pioneered the development of urban ecosystem analysis (UEA) designing computer software to calculate in dollar terms the contribution of trees to carbon sequestration, stormwater control, ultra violet radiation control, heat energy reduction and absorption of suspended particulate matter. UEA software was trailed 'off the shelf' by Brisbane City Council in 1999 but with limited success as the program uses US soil, plant and climate data requiring extensive conversion for application in Australia. (pers com Lindal Plant, 2000)

There is scope to research UEA further and this challenge has been taken up by the NSW Local Government Association in partnership with Newcastle City.

Street tree survey

The Newcastle street tree survey took two staff 18 months to complete, recording the health and condition of 54,000 street trees. Data was collected using a pen computer from a motor vehicle. Park trees are yet to recorded. The street tree database has been used to profile potentially high risk trees and a policy is being developed to address tree management needs.

I should add that the separate but sudden failure of seven prominent large trees in the past two years at Newcastle has focussed Council attention on urban tree issues. My fear now is that short term cost savings from wholesale removal and non-replacement of street trees may prove more attractive than strategic expenditure for long term urban sustainability.

It remains to be seen if the urban forest 'genie' can be kept out of the bottle and in front of the right people in order to bring about the necessary change in attitudes.

CONCLUSIONS

I opened this address lamenting the slow pace of change in our approach to urban trees. I highlighted the problems of inappropriate tree management models, outdated tree care practices, and the public liability insurance situation.

I gave an overview of urban forestry in the USA and Europe and noted its poor development in Australia. I outlined the Chicago urban ecosystem research project to illustrate a direction I believe we need consider, and I cautioned on the risk of delaying action especially in the current liability environment as it effects our street and park trees.

I gave support to the StateWide Mutual's *Best Practice* tree management approach and gave insights into how I am attempting to convince community leaders and Council management of the benefits of further researching and supporting urban forestry principles.

I congratulate the University of Adelaide for presenting this timely symposium on street trees and ask you to reflect on the presentations within the 'big picture' framework of urban and community forestry If this happens, there is every chance we will be inspired by our progress in ten years time.

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