

The Contribution of Biodiversity Conservation on Private Land to Australian Cityscapes

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Natural areas in cities make important contributions to urban life, contrasting built form, providing opportunities for citizen recreation, attracting international tourism, and supporting biodiversity, water and air quality conservation. Urban biodiversity conservation also remains an important sub-component of the Australian national identity, despite urban growth impacts on the natural environment.

Habitat connectivity and quality in urban ecosystems are fundamentals in biodiversity conservation, with major implications for species resilience in the face of urban development and after catastrophic events such as bushfire and prolonged drought.

The extent of private property ownership in Australian cities means that biodiversity conservation on private land has important implications for city integration both physically and psychologically, and is directly vulnerable to disintegrative forces in traditional urban processes. Consideration of this topic also has important implications for multi-disciplinary planning, including spatial, biological and behavioural aspects, and for alternatives to socio-economic fragmentation of cities.

Local authorities are frequently restricted in their regulatory ability with respect to private lands, whereas public lands within local jurisdictions are more easily managed, frequently as a result of legislation. Since large proportions of natural bushland occur on private land, conservation on these areas requires specific private land conservation measures.

How is urban conservation to be balanced with urban growth? There are a number of incentives being explored and implemented by state and local governments in Australia, including market-based management. The planning and development models used during the 2000 Olympic Games in Sydney set important benchmarks for human and ecosystem protection on public land (Smith 2003), re-shaping Sydney and contributing to a better, economically sound and cohesive city. The present paper describes approaches to biodiversity conservation on private land, including recent case studies from Sydney, Australia's first 'global city'.

Urban Biodiversity Conservation in Australia

The need for biodiversity protection and conservation is growing in Australia, in both rural and urban areas. Pressures from habitat clearing and environmental degradation are having a direct effect on biodiversity. Curtis and Lockwood (2000) conclude that there is a clear link between the condition of private land and biodiversity conservation in Australia, and that in some bioregions private land holds the majority of remnant natural areas.

Habitat fragmentation is recognised as contributing to biodiversity decline (McKinney 2002). Landscape connectivity is essential for both plant and animal species population viability. However, pressures from expanding urban areas and land clearing have negative impacts on landscape connectivity in much of suburban Australia. Scientists argue the merits and drawbacks of landscape corridors. Simberloff and Cox (1987) have been strong proponents of the need for landscape corridors for biodiversity. Corridors can provide safe movement for native species but may promote the spread and introduction of feral plant and animal species, and of disease (Hess 1994, Simberloff and Cox 1987, Simberloff et al. 1992). Other factors such as the threat of fire events and genetic integrity are also recognised, though the general conclusion is that landscape connectivity is an essential part of a healthy ecosystem.

It becomes apparent that there is a role for private land conservation to play in the maintenance of habitat corridor networks and landscape connectivity, especially when suburban areas encroach on natural bushland.

Australia has developed national legislation to protect biodiversity, and state laws identify government department roles as conservation regulators. Governments acknowledge the urgent need for this conservation focus to shift towards private land, recognizing that the diversity of Australian ecosystems is often poorly represented on public land (Figgis 2004). Protected land has historically been of low production value, with high nutrient land being used for agriculture and production. This means that public land contains very different vegetation types to those that exist on private land.

The early 1990's saw the development of a number of national government conservation initiatives featuring community grant funds, as well as a many local, state and federal conservation initiatives for both private and public land. Most of these projects had a limited lifetime, with programs not given adequate time to take permanent effect. This traditional approach to conservation program development has lacked integration.

Bioregional management models have developed internationally as a response to inadequate management of biodiversity through other means of spatial categorisation (Figgis 2004). They seek to create biodiversity networks that cut across both private and public land. Bioregional planning is generally recognised as an effective management style for biodiversity protection, concentrating on protecting reserves with buffer zones and corridors. In the 1970's and early 1980's twelve biosphere reserves were established in Australia under a UNESCO initiative (Figgis 2004). Private land in cities clearly plays an important role in such conservation and planning approaches.

A variety of methods for biodiversity conservation on private land are currently utilised in Australia. These include:

- regulation (key legislation includes the *Threatened Species Conservation Act 1995* and *Native Vegetation Act 2003*)
- land purchase and nomination of additional areas of high conservation value for public reserve
- private land conservation e.g. covenants
- community projects e.g. restoration
- education
- biodiversity offsets for development (*Environmental Planning & Assessment Act 1979* (EP&A Act) and land-clearing (*Native Vegetation Regulations 2005* made under the *Native Vegetation Act 2003*)
- proposed Biodiversity Banking schemes to “consistently and strategically” balance development and environmental protection

Private Land Conservation Programs

Voluntary Schemes

The history of private land conservation programs in Australia goes back almost 60 years to the creation of the New South Wales (state government) National Parks and Wildlife Service (NPWS) *Wildlife Refuge* program in 1948. This program has had significant success, claiming to have engaged more than 600 properties as refuges over its operation (Table 1). Since then Australia has seen the development of other programs, such as the *Voluntary Conservation Agreement* covenanting scheme run by NPWS, and *Land for Wildlife*, a NPWS program which has grown in popularity over the past decade (Figgis 2004). Agreements are formed with property owners who own areas of intact bushland, helping the landowner

protect and manage bushland through support from the government agencies. Many of these programs include local government, conservation groups and community groups. Some examples are listed in Table 1. They are voluntary and legally non-binding.

Option	Landholder's commitment	Benefits for landholder
Conservation Agreement	Permanent legal protection for the property, registered on the property title. This is the highest level of protection, and remains on the land with a change of ownership.	<ul style="list-style-type: none"> • Property visits • Legal agreement, with detailed management strategies • Management advice • Rate exemption • Money for on-ground work • Property signage • Technical notes and 'Bush Matters' newsletter • Field days • Local networking
Wildlife Refuge	Land is legally declared a wildlife refuge, though this status can be changed when required. The status is noted on the land title and remains with a change of ownership.	<ul style="list-style-type: none"> • Property visit • Brief scheme of operations • Management advice • Property signage • Technical notes and 'Bush Matters' newsletter • Field days • Local networking
Property Registration	The property is registered with NSW NPWS, to be managed for conservation. This is not legally binding, and it does not change the property's legal status. Registration ceases when the property is sold.	<ul style="list-style-type: none"> • Property visit • Management advice • Property signage • Technical notes and 'Bush Matters' newsletter • Field day • Local networking

Table 1: National Parks and Wildlife Service private land conservation schemes (NPWS 2006)

Non-voluntary Schemes

Legally binding mechanisms include several types of covenanting schemes, for example the *Conservation Agreement* program run in the state of New South Wales by the NPWS. These may apply to a whole property or a designated area. The terms of agreement are generally negotiable with the landowner. The result is a legally binding condition on the land title stipulating binding management or development controls which continue when the land title changes ownership (Figgis 2004). In return a landowner may receive financial incentives such as assistance with the set-up and ongoing costs of conservation activities, access to technical advice and property visits from assisting government staff. In other cases tax concessions may be available to landowners through rate rebates or rebates on financial tax returns.

Another form of covenant program is the ‘revolving fund’. These have been set up, usually by non-profit organisations, to purchase, covenant and on-sell properties of high conservation value. Funding is thereby released to reinvest for conservation on other properties (Figgis 2004). Revolving funds may be set up to receive donations and public bequests, benefiting from a perceived independence from government (Figgis 2004). Versions of revolving funds are operating in all states of Australia, and have in recent years been gaining government and public support as an effective means of private land conservation.

Local Government Roles

Local government is in a good position to encourage private landowners to conserve on their land through various incentive schemes, and there are several financial and non-financial ways this can be done (see Table 2).

Council corporate or management plans, Local Agenda 21 plans, local biodiversity strategies and local planning schemes may play a role in the delivery of conservation objectives (Bateson 2001). Benefits may be gained through partnering with other environmental management organisations such as state government authorities, and with community or industry groups. Other important components of successful programs include education and marketing, community recognition and involvement, technical support and an integration of the local council’s regulatory framework (Bateson 2001).

McKinney (2002) has described the importance of educating highly urbanised communities about the impacts of urban development in the interests of biodiversity conservation. Smith and Drinnan (2004) and Smith and Scott (2006) have described the application of risk assessment methodologies to local area planning as a basis for public education and engagement in conservation.

Incentives	Supporting Mechanisms
<p>Financial Incentives</p> <ul style="list-style-type: none"> ▪ Rates rebates ▪ Grants or annual payment to individuals and groups ▪ Linked to Management Agreements under local planning schemes <p>Non financial Motivational Incentives</p> <ul style="list-style-type: none"> ▪ Local award schemes ▪ Training for property management or whole farm planning ▪ Technical support, materials (eg weed control) and use of machinery 	<p>Development Incentives</p> <ul style="list-style-type: none"> ▪ Tradeable or transferable development rights <p>Property Right Mechanisms</p> <ul style="list-style-type: none"> ▪ Management agreements, voluntary conservation agreements or covenants ▪ Revolving funds <p>Revenue Raising Mechanisms</p> <ul style="list-style-type: none"> ▪ Environmental levies (can be used to fund environment programs) ▪ Developer contributions

Table 2: Public incentives available to Local Government (Bateson 2001).

Biodiversity Banking

At least one of the six state governments in Australia is well advanced in a proposal to introduce a direct market-based approach to conservation on private land, Biodiversity

Banking ('Biobanking'). The concept is based on the U.S 'Mitigation Banking' scheme established under the Clean Waters Act 1970 and the Californian 'Conservation Banking Program' established under the *Federal* Endangered Species Act 1973, and several state Acts. It proposes to address urban disintegration in the face of development pressure, where biodiversity conservation certification has been conferred on a local planning instrument, or similar specified areas. Where development is judged to include unavoidable impacts on biodiversity, the development will only proceed if offsets are used to maintain or improve local biodiversity.

In Australia existing state government legislation, which enables the planning minister to certify environmental planning instruments involving maintenance or improvement of biodiversity value and endorsing 'trade-offs' such as tree-planting or improved management of existing vegetation, is used to ensure the enforceability of the scheme.

Development on areas of remnant native vegetation will identify and fund offsets which improve biodiversity elsewhere to balance development with conservation in areas with high population growth and economic development. The stated intention of the scheme is to 'maintain or improve' biodiversity through this process. The proposed scheme seeks to correct market failure by including biodiversity values in land prices.

In practice Biobanking will be implemented through a rule-based assessment methodology to quantify anticipated biodiversity losses, using scoring to indicate the number of biodiversity credits which would be needed to maintain or improve biodiversity values. Development proposals will be adjusted to eliminate loss, or make up for losses by purchasing the requisite number of credits from the (government) Scheme Manager, who manages scheme funds, or a conservation broker, including corporations or statutory public bodies. Credits will be created through improvements to biodiversity values at suitable locations. The broker accumulates funds to invest in more cost effective measures to meet the regional conservation plan requirements by selling credits.

The price of biodiversity credits is to include:

- Costs to implement management methods
- Land acquisition costs
- Costs of security measures such as endowments
- Compliance, monitoring and reporting costs

Case Study, Sutherland Shire Council, Sydney, Australia

The local government area of Sutherland Shire is a 300 square kilometre suburban residential settlement of some 200,000 peoples in the southern suburbs of Sydney, is adjacent the Pacific Ocean, with extensive bushland areas to the west, and interspersed with several rivers. The area has examples of both voluntary and non-voluntary urban conservation processes on private land.

Voluntary Programme

A well-established voluntary scheme is the "Greenweb" programme, developed in 2002. The programme protects and enhances native plant and animal populations by identifying key areas of bushland habitat and establishing interconnecting 'linkages' or corridors. These corridors run through public and private lands and connect islands of bushland making it easier for the movement and interchange of fauna and flora. This maintains healthy populations and diversity and ensures the long-term sustainability of the natural environment.

Although Greenweb incorporates both public and private lands in Sutherland Shire its main target is private property owners, particularly those within key identified corridor networks.

The Council heavily promotes Greenweb through media releases, displays, presentations, brochures, videos, and posters. The focus is on voluntary participation with incentives to encourage people to participate. This involves inspecting the resident's property and providing free "garden consultations". The visits may involve identification of appropriate native plant species, invasive weed species, and appropriate landscaping for native fauna, and will answer environmental or horticultural questions.

Appropriate information is forwarded to the resident and regular newsletters are distributed. Participating residents have access to free native plants from Council's nursery and in some instances a second greenwaste bin and/or bush regeneration bags are allocated for weed collection. Residents also receive a free Greenweb sign to acknowledge their efforts and participation in the program. Individual vegetation management plans may be offered for the restoration of bushland on private property. Community grants are available for ecological restoration works of natural bushland on private property.

Schools are important participants in the Greenweb program, due to the presence of remnant bushland on many urban school sites. Educational talks about Greenweb (bushland & biodiversity), planting days and bush regeneration works are also undertaken at several schools. The schools program has received high commendation in government environment awards.

Regulation and Biobanking

Regulatory measures control development on lands identified in the Greenweb linkage and corridor network. Planning provisions allow council to assess the impact of development on wildlife habitat, corridors, significant natural features etc. Greenweb has been incorporated into local planning instruments, together with detailed planning controls which provide a legal planning framework for urban development. Greenweb identifies key habitat linkage or quality areas which are particularly important to biodiversity conservation. Appropriate assessment of development applications, and purchase of key areas of private land by the local Council, encourage an appropriate balance of development and native vegetation, with targeted protection of environmentally sensitive areas. Figure 1 illustrates several private residential properties in an important biodiversity corridor link area where the Council negotiated purchase of part of the properties, dedicating them to native vegetation preservation, while approving development rights for the balance of the private land.

An initial form of biobanking has been undertaken in this same suburban area, adjacent the area in Figure 1, where the state government roads and traffic agency, recognising it could not avoid or minimise the impacts of a major road corridor, purchased 35 hectares of compensatory habitat, and secured a further 38 hectares of 'biobanking credit' for future projects.

The local government authority has indicated that it sees some merit in biobanking schemes operating at the local level, subject to proper quality control, planning practice, and attention to issues such as prioritisation of corridor and linkage aspects of urban biodiversity conservation.

Endnotes

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Figure 1: Private properties (red border) in linkage habitat areas which were part-purchased by local government for native vegetation corridor preservation. Sutherland Shire Council

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