

Retrofitting the Suburbs... Erutan in Emoh Ruo

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The Past, The Problems, The Cause

What we now recognise as bad decisions and bad management have created many of our urban environmental problems. Urban design, landscape design and horticulture and stormwater management have been and often continue to be the major threats to the environmental health of our cities.

In general we might be resentful of the problems caused by the past, such as extinction of species and degradation of the environment, but as with all history we have to look at this in context of the day. Urban environmental problems are often a result of past:

- Ignorance/Innocence
- Different values
- Lack of legislation/regulation
- Lack of technology

It is only when communities knew of the implications of their actions and refused to act that we should be resentful.

It has to be recognised that the genesis of our current urban environmental issues rests both in urban decision making as well as past rural management where the current urban area has spread onto past agricultural land.

The Past, The Problems, The Effect

The impacts of environmentally inappropriate urbanisation can be classified in many ways. A simple classification is:

- **Physical**
 - loss of soil
 - degraded soil structure
 - erosion of soil and stream banks
 - deposition
 - turbidity in streams
 - fragmentation of bushland and streams
 - loss of area of native soil
 - expression of acid sulfate soils
 - filling of wetlands and waterways
- **Biological**
 - extinctions
 - degraded gene pools
 - misproportionment of adventitious species or favoured species
 - pest species
 - restricted migration of species and genes
- **Potential for recovery/functionality**

- degradation of seed banks
- prevention of migration
- niche destruction or infilling with pest species
- loss of space
- increasing cost of recovery with increasing degradation

The Present, The Problems, Ongoing

It is easy to see, at least in broad terms, the relative past contribution of both town planning (including the past, relatively unplanned growth of Sydney and inappropriate design) and horticulture (including production horticulture, amenity horticulture and landscape architecture) to our degraded environment.

Many professionals recognise the past contributions of their fields to that degradation, but fewer recognise or admit to current degrading practices. Town Planners, Architects and Landscape Architects and Horticulturalists are still regularly making decisions and creating trends which are environmentally unsustainable and are actively degrading our environment both at source and sink. These include:

- selection of landscape species (environmental, genetic, fauna and health weeds continue to be used, as well as plants that have no ecological value)
- design (stormwater issues, destruction of corridors, fragmentation, bushfire issues, light pollution, ecological neutrality)
- human interaction (inappropriate access to waterways and other natural areas, noise, light, litter)
- sources and sustainability of materials (bushrock, sands, river pebbles, some clays)

Constraints to Recovery

1. Space, the Final Frontier

Space is a limitation, both from the perspective of competition for use of space in an urban context but also in that there is direct correlation between the space available for natural elements and the complexity and viability of those elements... complex, resilient ecosystems need room!

2. What's Possible

Returning ecological functionality can be, but rarely is just a matter of removing the degradational factors. Ecological restoration is an iterative process which involves the removal of degrading factors, ascertaining the systems' potential for recovery (resilience), manipulating the physical matrix to encourage that potential, possibly creating constructed elements to enhance the ecosystem (horticultural landscapes, habitat construction, stormwater works etc), possibly reintroducing species and then maintaining the system.

It is unlikely that we will ever create totally self-sustaining desirable ecosystems in urban areas. We will always have to undertake active management of the systems through such activities as managing nutrient and water flows, fire regimes, controlling weeds and assisting species perpetuation.

3. What's Acceptable

In many cases, people and governments want a "Disneyland" ecosystem. In other words, they want the aesthetic and amenity values without the associated undesirable elements... they like the views, the birds and butterflies, being able to catch fish and go swimming, but don't want to lose access to waterfront land and associated views, don't want the fire and flood risks, don't want the snakes and spiders or termites. If we are to be truly part of an urban ecosystem, we need to accept the perceived bad with the good, realising that there are constraints to what we can do in urban areas without severely damaging natural systems.

4. Who wants to pay?

There are a number of elements to consider here. The first is intergenerational equity. We are having to bear the costs of previous generations' mismanagement of the urban ecosystem, and yet we continue to degrade the same resources, not fully accounting for our activities, ensuring that future generations will

have to pay the costs for our mismanagement. There are considerations of geographical equity... should we spread the costs evenly across the population or use an abuser pays principle. Should urban communities also pay for the costs of their total environmental footprint?

5. Functionality vs Aesthetics and amenity

An ongoing issue, as mentioned before is that non ecologists often have a skewed view of what ecosystems are, sometimes having a belief that we can create Edens to live in. The harsher reality is that our urban areas are not usually conducive to the regeneration of pre-urban ecosystems and our human built ecosystems (through design or neglect) more often than not are simple and not vigorous. At best, we can aim to remove as many of the degradational factors as we can, see what elements of the previous ecosystems can survive in these conditions then actively manage the urban area to maintain as many of these elements as possible. Once the natural potentials of the urban area have been reached then engineered, technological or interventionist methods are needed to add ecological values. These might include stormwater management, engineering or de-engineering streams, creation of horticultural layers such as corridors or planting of habitat plants which may or may not have been part of the original ecosystem, flood and fire management. We have to be extremely careful about trying to enhance ecosystems though, as many of our current problems have been created through addition of species.

Building back nature

A few basic generalised concepts about the opportunities we have to regenerate our urban ecosystems.

1. Firstly, we are not creating ecosystems. The ecosystems are already there as compromised and degraded remnants of the pre-urban ecosystems. All our works should be seen in the context of reinforcing natural processes, removing or mitigating damaging pressures or reintroducing or adding new elements for the ecosystem to interact with.
2. In a spectrum from our highly urbanised CBDs through to the suburbs, peri urban areas and then to the "natural" areas, we find that there is an increase in resilience and space as we move out, resulting in greater opportunities for improvement. Similarly, within an ecosystem there is a greater average biodiversity as we move out from the urban centres as well as a greater potential for biodiversity. For environmental improvements, both biological and physical, we find that we have greater opportunities for more natural solutions the further from the city we get. The suburban, peri urban and rural areas also offer opportunities for refugia for our wildlife, areas for breeding and preservation of genetic stock, areas to study the impacts of urbanisation on ecosystems and templates for their regeneration.
3. We need to look at our urban areas as an interconnected mosaic of ecological potentials and actualities. Regenerating the areas of higher density habitat (such as bushland areas, stream corridors and the like) has flow on effects to the surrounding areas, while the human landscape offers us opportunities to reinstate ecological attributes that can no longer self perpetuate in the natural areas.

Opportunities for Recovery

There have been a number of initiatives to recover elements of our urban ecologies for many years, from ecological, horticultural and engineering perspectives. These have ranged from naïve to benign to beneficial and much work is still going on to refine and improve on the methods. Few started out as integrating the elements of the entire ecosystem, but some have moved this way. There still needs to be much work done in this regard.

What can we hope to achieve and what approaches we need to take vary from area to area and ecosystem to ecosystem

1. The Bushy Bits

Bush Regeneration and revegetation have significantly moved towards being proven, efficacious activities. Bush Regeneration started in Sydney 40 years ago and has moved from an art to a science and there have been sufficient revegetation programs to inform us of how to go about things to ensure a successful project. Unfortunately, both activities often suffer from an inconsistent funding base or poor planning, and many

projects have failed due to this. What we have learnt from bush regeneration and revegetation is helping us in our approaches to regenerate aquatic ecosystems.

2. The Watery Bits

Restoration of the biological aspects of aquatic habitats is still to a large degree an evolving science. Much work still needs to be done to ascertain how well these ecosystems can recover through removal of known degradational factors, such as stormwater flows, nutrient loads, foreign species, degraded riparian zones, seawalls and hard edges, barriers, erosion and sedimentation and contamination. Once these potentials have been determined, then specific measures need to be trialed to see what can be done to engineer recovery. One area of stream rehabilitation that we have a good understanding of is in determining ways to successfully rehabilitate the geomorphological attributes of streams. In itself this adds a better physical matrix for the recovery of the biological elements of the ecosystem.

3. The Bits in between the Bits

These areas pose the greatest challenges and in some respects give us the greatest potential for improvement and embedding more sustainability into urban areas. Once the bushland areas have been significantly regenerated and streams are improved through stormwater and other management, the only spaces left to improve the environment is in the human landscape. The challenges we face in doing this are in changing paradigms, reversing the extant negative impacts and firming the regulatory basis of planning and development to ensure compliance.

Some areas for obvious and easy improvements are to entrench and improve Water Sensitive Urban Design, including stormwater management; prohibit the spectrum of weed species still used in horticulture; discourage ecologically neutral landscapes and encourage ecologically positive landscapes; develop systems to use local genetic stock in plantings; use local species in street and park plantings; create buffers to and corridors between natural areas, provide specific habitat elements that can no longer exist in the natural areas; actively manage pest species; control light pollution and create nature only areas. Added to this we need to improve the development ethos to go beyond Water Sensitive Urban Design and start embedding Biodiversity Sensitive Urban Design, Soil Sensitive Urban Design, Nutrient Sensitive Urban Design and possibly others.

We will have to realise though that while we can create ecological functionality within the human environment, that they will be simple systems, as there is simply not the space to create complex systems (regeneration of original ecosystems) and there are too many ongoing degradational factors. Some ecological elements can be made resident, such as plants, and some insect, reptile, mammal and bird species. However, many species which may be able to exploit the constructed ecosystems will only be transitory. This behoves us to create good links between the core, dense habitat areas and the diffuse habitat areas in the human landscape.

4. General principles of constructed ecosystem elements might include:

- Model the construction on extant natural systems
- Build in as much complexity as possible
- Using local species encourages local species
- Monitor to ensure no cascading problems
- Build in the physical as well as the biological
- Build the connections to natural areas to allow migration

So! What's stopping us?

There is still a great degree of conflict stopping us from having a shared vision of how to move forward towards an ecological city. There are still fundamental conflicts between horticulture and ecology. The community expectations of what they want their areas to look like does not always fit with good ecological management. There is still a real fear of nature in some areas. Probably the greatest impediment is that economics is often the greatest determinant in what happens to our city.

Ways Forward

None of these suggestions are particularly new or revolutionary. Fundamentally, the natural resource agencies, natural areas teams in local councils, academics and environment groups have been thinking about these things and running projects in urban ecology for up to the last 40 years in some cases

Currently, in NSW, the Catchment Blueprints give us a process which can address most of the issues that have been raised by myself and others at this conference. The Blueprints, which are catchment based, set the natural resource agenda for Sydney, so effectively cover the cumulative impact issues, the development issues, the restoration issues, the landscape and horticultural issues and the cultural issues. The Blueprints set out to solve the issues by bringing together multidisciplinary teams to “own” issues and to solve problems. Because the Blueprints have been endorsed by the NSW Cabinet, it gives them the status of State Government policy and gives them a good, strong driver to be implemented.

I have been able to touch on just a few of the recognised issues relating to urban ecology and landscapes. I'd ask any of you who are interested in becoming involved in these issues to work with the Department of Sustainable Natural Resources and the Catchment Boards in making Sydney a true Ecological City