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Australian Local Government Botanic Gardens contribution to Global Plant Conservation.

Wollongong Botanic Garden

Final Dissertation

Subject 15624 Research in a Local Government Context B

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November 2016.

The research report is written in fulfilment of the requirements for the Master in Local Government at the Centre for Local Government, University of Technology, Sydney.

ACKNOWLEDGEMENT

I would like to acknowledge my Research Supervisor Mr Ronald Woods for the support and guidance provided to me in the preparation of this dissertation.

This study process has been an overall rewarding challenge for myself, and it has been great to do it under the supervision of a great researcher and fellow passionate conservationist so thankyou Ron.

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EXECUTIVE SUMMARY

The rationale for this exploratory study is based on identifying the contribution of the Australian Local Government sector to global plant conservation objectives through its Botanic Gardens. The interest in this topic was generated due to the researcher's employment as a Local Government Botanic Garden Curator at the Wollongong Botanic Garden, a service of the Wollongong City Council.

Conducted using a range of questionnaires and in-depth interviews to Local, State and Federal Government Botanic Gardens, State Government Land Management Agencies and Botanic Garden industry bodies, the study has found that the Local Government sector is contributing to the conservation of threatened plant species via ex-situ methods in accordance with Target 8 of the Global Strategy for Plant Conservation, that aims for Botanic Gardens to collectively hold 75% of all threatened plant species in ex-situ collections by the year 2020 (CBD 2012).

While the study itself was never intended to quantify what the Local Government sectors contribution is, it did identify that valuable work is being done in some Local Government Botanic Gardens whilst others don't do any plant conservation work.

The study found that financial constraints, staff expertise and training, a focus toward meeting local community recreation expectations, and the lack of political support are common factors in preventing or restricting botanic gardens' work in plant conservation.

Interestingly, the study found that despite the mandated plant conservation focus for the State and Federal Botanic Gardens, these agencies were also constrained by similar factors to the Local Government Gardens with staff and financial resources, and balancing visitor expectations impacting their plant conservation work.

The study found consensus that the task of collecting 75% of Australia's threatened species to be held in ex-situ collections by the year 2020 was not achievable based on the current effort of the State and Federal Agencies.

Furthermore, through detailed Case Study the research has found that for Local Government Botanic Gardens to either commence or expand their contribution toward global plant conservation efforts, a collaborative partnership model with other Botanic Gardens and land management agencies will yield the best result based on resource sharing, information exchange, joint funding opportunities and, perhaps most importantly, avoiding a duplication of effort.

The study also found that the role of the industry bodies including the Commonwealth Heads of Australian Botanic Gardens (CHABG) and Botanic Gardens Australia and New Zealand (BGANZ) is crucial for building capacity within the entire Botanic Garden network through developing a national threatened species collections listing, and supporting regional (Local Government) Botanic Gardens with training and software to record collections information.

The study recommends Local Government Botanic Gardens should review strategic plans to include plant conservation objectives, and seek partnerships with other Botanic Gardens within geographic proximity. State and Federal Botanic Gardens need to understand the mentoring and training role they should provide to increase capacity within the Local Government sector, Presenting the research findings to BGANZ and CHABG highlighting the importance of a national plant collections priority listing and plant record keeping system for regional Botanic Gardens, in addition to professional development and conference themes focussed on awareness of plant conservation and capacity building within the Local Government Sector Botanic Gardens. Further University research is also recommended to address the emerging themes listed within the study.

1 INTRODUCTION

Plants are essential in ensuring our continued existence on this planet, providing for our basic human need from the oxygen we need to breathe and the food we eat, to the medicines we use to prevent and treat sickness.

Despite this the worldwide threat to plants is great with an estimated 25% of the world's flora currently at risk of extinction in natural habitat (Botanic Garden Conservation International 2016).

At the first United Nations Earth Summit held in Rio in 1992, the vast majority of the world's nations declared that human actions were dismantling the Earth's ecosystems, eliminating genes, species and biological traits at an alarming rate. This observation led to the question of how such loss of biological diversity will alter the functioning of ecosystems and their ability to provide society with the goods and services needed to prosper (Cardinale et al. 2012).

More than 20 years later, human impact is still the biggest threat to plants in natural habitat with climate change, pollution, land clearing for mining, agriculture and development, and dominant pest plant and animal species introduction being just a few of the many factors that contribute to our current plant conservation crisis.

The researcher's particular interest relates to the role of Botanic Gardens in conserving plants.

The specific plant conservation role for Botanic Gardens can best be defined in the Global Strategy for Plant Conservation 2011-2020 (GSPC), a 16 target plan adopted by the Convention on Biological Diversity to ensure understanding, conservation and sustainable use of the world's plant diversity (CBD, 2012). While Botanic Gardens have a defined role in most GSPC targets to varying degree, it is Target 8 of the plan - an aim to have at 75% of all threatened plant species held in ex-situ collections where Botanic Gardens play a unique role (Wyse Jackson, Sutherland 2000).

> *To mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet.*
> Mission Statement – Botanic Gardens Conservation International.

Of the world's estimated 2500 Botanic Gardens (Oldfield 2010), more than 100 of these gardens are listed as the responsibility of Local Government organisations in Australia (CHABG 2016). By weight of numbers alone, this suggests that research into the role of these Botanic Gardens could identify a contribution by the Australian Local Government Sector to the Global Plant Conservation effort, a far cry from the traditional ratepayer Council service expectation of roads, rates and rubbish.

The aims of this exploratory research project include identifying the public value of Australian Local Government Botanic Gardens particularly their plant conservation contribution, their intergovernmental relationship with the State and Federal Botanic Garden agencies, and the factors in meeting local rate payer needs that may conflict, restrict, or perhaps prevent a greater plant conservation contribution.

The research details a case study of a recently established plant conservation partnership model involving Local Government Botanic Gardens and other stakeholders in the South East of New South Wales to determine what potential benefits this collaborative partnership model may have; and whether there may be grounds for suggesting that a partnership model has potential for wider application throughout other Australian Local Government Botanic Gardens to enhance the sector's contribution to the global plant conservation effort.

This research project gained ethics approval in accordance with the UTS Centre for Local Government / ACELG ethic program form. Ethics approval was received during the research proposal phase of the project in May 2016.

The ethics process identified questionnaires and interview guide as the research data gathering instruments, and that all participants would be de-identified within the research.

Draft data gathering instruments were presented as part of the research design and methodology phase of this project in May 2016. The research instruments were further refined incorporating feedback received as part of the formal assessment for the Research Design and Methodology Assignment, and through working with the Research Supervisor.

The final instruments used to conduct the research are presented in Appendice 1.

Research participants were provided the UTS: CLG Project Information Sheet, and the UTS: CLG Consent Forms. Questionnaires sent via email included specific reference for participants to read and understand the project information sheet and consent forms, and interviewees confirmed that they had read and understood the ethics documents prior to commencing the interview.

"The environment is so fundamental to our continued existence that it must transcend politics and become a central value of all members of society."
David Suzuki - The Sacred Balance: Rediscovering Our Place in Nature, 2006.

The research study addressed the following two research questions:

1) What is the current contribution of Local Government operated Botanic Gardens in Australia to the global plant conservation effort?
2) Is a collaborative partnership model an effective method for Local Government Botanic Gardens to make a greater contribution to the global plant conservation effort?

2 LITERATURE REVIEW

This literature review is presented as a narrative review (Woods 2015) aimed at supporting the overall research project objective by providing background knowledge and analysis of the current research within the field as shown in the research synthesis in diagram 1.

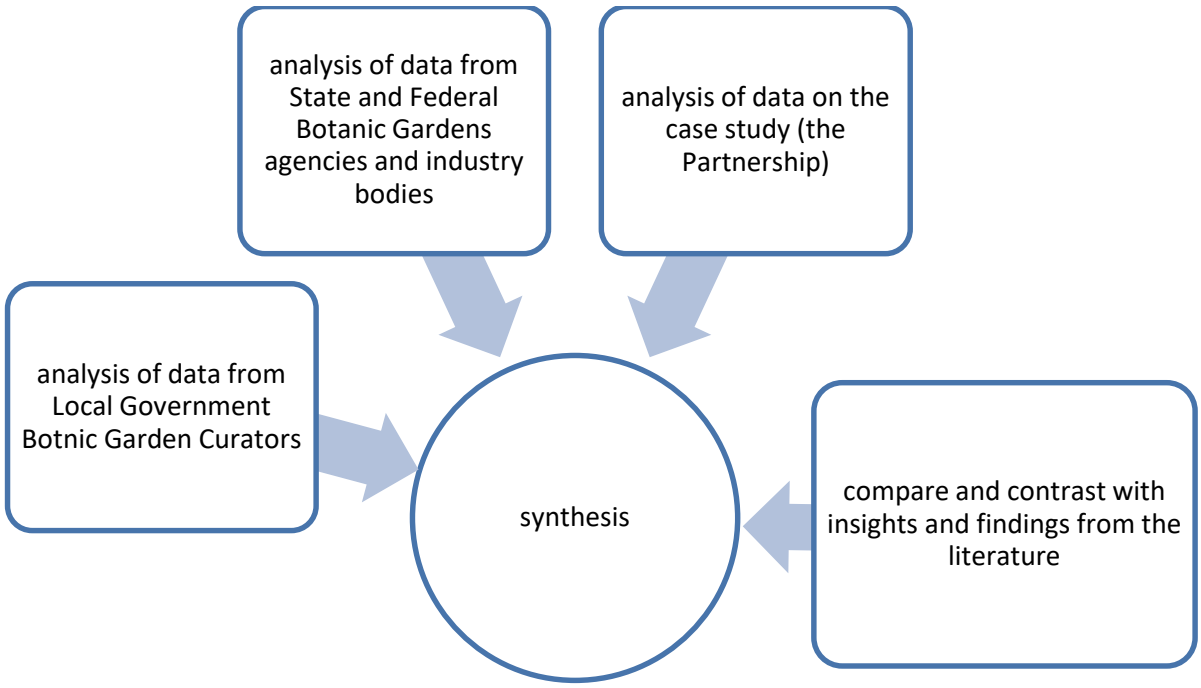

Diagram 1 Research synthesis

The first two sections of the paper provide background knowledge on the need for a Global Plant Conservation Effort including why it is important and the enormity of the task, the evolutionary role of Botanic Gardens generally, and specifically the role of Botanic Gardens in relation to ex-situ plant conservation. These themes whilst not directly related to Local Government Practice, do provide key background information and highlight the need for plant conservation and link to the current effort being undertaken by Botanic Gardens.

The third section of the paper however looks generally at service delivery within the Australian Local Government sector and more in depth at Australian Botanic Gardens including Local Government Botanic Gardens, their roles and service delivery objectives.

The final section of this paper reviews effective partnerships and collaborations to support the Case Study component of this research.

A limitation in ensuring the literature is directly related to Local Government Practice is the distinct lack of material that specifically relates to Local Government managed Botanic Gardens in Australia. Whilst this lack of material in itself supports the rationale for the overarching research project, it must be noted that Australia with 78% of its listed Botanic Gardens being managed by various tiers of Government are in direct contrast to the United Kingdom and United States where the majority of literature is produced where a large number of Botanic Gardens are privately operated (Moskwa and Crilley 2012).

2.1 The need for a Global Plant Conservation Effort

It is currently estimated that 1 in 5 of the known 369,000 plant species are threatened with extinction in the wild. There are a number of influencing factors as to why plants are under threat in the wild including pollution, climate change impact, natural disaster, human recreation and mining to a lesser degree, with the highest current factors being land clearing for agriculture, logging, development, natural area modification and threat from invasive species (Kew 2016).

The current threat to plants is compounded when considering a number of threats are only expected to increase into the future, with climate change, population and food security projections the main factors expected to further place plants at risk.

It is estimated that close to one billion people are currently undernourished (Havlik et al. 2015) yet projected growth in population estimates that food production must increase by at least 70% by the year 2050 to meet the needs of the projected 9 billion people (Sutton, Heywood et al. 2013) this challenging problem is further impacted by Climate Change predictions with major tracts of agricultural land throughout both the Northern and Southern hemispheres expected to be adversely impacted by human accelerated temperature warming which will result in increased aridity of the earth's surface as well as increase the occurrence of extreme weather events.

The direct threat to plants caused by climate change and food security response is that natural areas will likely continue to be cleared for agriculture, placing plants in natural habitat at risk as evidenced by the Madagascar experience outlined in diagram 2, and the threat of climate change on agriculture is the potential risk to the viability of food crop plants. Only 30 plant species form the main crops that feed the world (Oldfield 2010) yet it is estimated that approximately 30,000 species of plants have a current or potential food use for humans, and the collection and storage of these plants to adapt to a changing climate is one of the key objectives of the Millennium Seedbank at the Royal Botanic Gardens Kew (KEW).

Aerial image of sediment runoff into the ocean. The Betsiboka River Madagascar. (solarviews.com)

The Plant Conservation Crisis of Madagascar.

One of the worlds largest and most isolated ecological sites, Madagascar is home to some of the most unique plants and animal species on earth.

The degradation of the Madagascan landscape however results from land clearing associated with sustenance farming the process by which slash and burn style agricultural farming is undertaken so people can feed themselves.

Areas of forest are slashed and then burned with food crops then planted. the loss of forest and in particular tree roots destabilises the organic top soil layer plants need to grow in, and during periods of heavy tropical rainfall this soil is washed into the ocean, leaving the remaining grounds barren (Wild Madagascar).

Madagascar has more than 9,700 plant species endemic to this island and found nowhere else on the planet, however mass landclearing has resulted in a mere 9.9% of natural habitat remaining on the island. (Myers et al. 2012)

Of the 192 unique species of Palms found in Madagascar, 160 are currently at threat of extinction (IUCN).

Diagram 2 – Plant Conservation crisis of Madagascar.

Of course reliance on plants by humans is not limited just to food. Plants provide very practical solutions providing shade and shelter, and support numerous agricultural and forestry economies, through to important biological processes that support life on the planet including the absorption of carbon dioxide and the production of oxygen (as a bi-product) of photosynthesis, and the filtration of water through the plant transpiration process (VanDer Zanden2004).

Plants also have applied uses in traditional and pharmaceutical medicines. It is estimated that up to 80% of the African continents population still rely on traditional medicine including plant derived herbal medicine as their primary form of healthcare, whilst it is estimated that 25% of all modern pharmaceuticals are plant derived (World Health Organisation 2003).

As highlighted, the plant conservation crisis is largely attributed to human induced impacts, yet human's reliance on plants for our most basic needs including food and shelter highlight a greater potential extinction threat to mankind unless plants are better protected.

The preferred method for any type of conservation of flora or fauna is to protect their natural ecosystems through in-situ conservation activity. Preserving a species within its natural environment allows the ecosystem as a whole to influence the longevity of the species (Pinheiro et al. 2004) with varying levels of human involvement.

Environmental protection is a core role for Local Government in Australia (ALGA) and the restoration of natural areas through programs such as Bush Care volunteering (Bushcare 2016) highlights just one practical example where in-situ plant conservation activities are undertaken as part of the restoration of natural habitat. Press et al, argue Local Government should play a broader role in the conservation of rare species by using local action to deliver national conservation agendas based on conserving plants in natural areas, but also funding (natural) land acquisitions to ensure rare species are protected (Press et al 1996).

The focus of this research however looks at the contribution of Local Government Botanic Gardens to the global plant conservation effort and this often involves varying contributions in a number of ways including education and research and in-situ conservation activity as highlighted above, however it is the unique ex-situ plant conservation role (Wyse Jackson, Sutherland 2000) of threatened plants where plants are removed from habitat for safekeeping, being the major focus of this research.

2.2 The role of Botanic Gardens

2.2.1 The evolution of the 'Modern' Botanic Gardens

In an evolutionary sense, the primary purpose of Botanic Gardens has continued to change throughout time. 'Botanic Gardens' date back to ancient times circa 3000BC in Egypt and China (Oldfield 2007), with the first of the modern Botanic Gardens established throughout the renaissance period by Universities and used as places of learning to support the study of medicine, and were followed in the 17th to the 19th centuries with gardens established to support a number of objectives additional to medicine including the establishment of tropical gardens associated with colonial expansion to expand trade, food and spices. Ornamental Horticulture or display gardening also emerged in Botanic Gardens during this period, (BGCI) however it wasn't until late in the 20th Century that plant conservation objectives emerged as a purpose for the establishment of Botanic Gardens.

The 20th Century emergence of plant conservation objectives has gradually become a common goal for Botanic Gardens. Established major Botanic Gardens such as Kew have adapted to this challenge by changing focus to take a leading role in plant conservation and this is evidenced for example

through their Millennium Seedbank, a seed storage facility (with 80 contributing partner Countries) that currently hold 13% of the worlds wild plant species and has a set target to secure 25% by the year 2020 (KEW).

A much younger garden, The Western Australian Botanic Garden (The Kings Park and Botanic Garden Perth) a Western Australian Government Organisation at 50 years old was established for the specific purpose of showcasing and conserving the flora of Western Australia (BGPA).

Gardens today are havens for species that are extinct in the wild. (Rinker 2002). A specific ex-situ plant conservation objective for Botanic Gardens emerged in the 1970's after the International Union for the Conservation of Nature (IUCN) began encouraging this work as a way to conserve threatened species (BGCI). Termed the 'Ark Paradigm' Botanic Gardens began holding collections of threatened species in cultivation during periods of habitat degradation (Havens et al. 2006). Now one of the primary plant conservation roles of Botanic Gardens, ex-situ collections are kept either in live form or stored as seeds or tissue culture.

Ex-situ conservation is defined as *the process where individuals of a species under threat are removed from their natural ecological processes and are managed by humans.* (IUCN 2014) Affectively, Botanic Gardens through the process of sourcing and displaying exotic plant species have been creating an ex-situ plant collection since their inception, however the more defined role of ex-situ conservation activity on threatened species is best defined within the Global Strategy for Plant Conservation.

2.2.2 The Global Strategy for Plant Conservation.

The Global Strategy for Plant Conservation (GSPC) was adopted in 2002 by the Convention on Biological Diversity, an international treaty aimed to conserve, sustainably use, and share the benefits arising from biological diversity (Williams et al. 2011). The GSPC was developed in response to the concerns first raised by expert botanists at the 1999 XVI International Botanical Congress held in St. Louis, Missouri, USA that a plant focussed conservation initiative was required to highlight the extinction threat of plant species around the world (Wyse-Jackson, Sharrock 2011)

The strategy aims to halt the continuing loss of plant diversity through key objectives that aim to understand, document and conserve the Earths plant diversity, ensure sustainable and equitable use of plants, and increase awareness through education and public awareness of plants and their importance to all life on Earth (CBD 2012).

The Australian Government is a signatory of the Convention for Biological Diversity (CBD) and formally meets its obligation to target 8 of the GSPC through the Australian Seedbank Partnership, an initiative of the Council of Heads of Australian Botanic Gardens, made up of the major city Botanic Gardens managed by State and Federal Government agencies (CHABG 2011).

Australia has 20,000 known plant species with 7% of these listed as threatened (CHABG 2008). The Australian Seedbank Partnerships main ex-situ conservation priority is to collect and store 75% of Australia's threatened flora by the year 2020 as seed only (CHABG 2011).

Despite the clear targets and the apparent clear plan of attack for Botanic Gardens to contribute to the GSPC, the performance to date of the GSPC particularly the achievement of the target 8 from both an international and an Australian perspective is not entirely clear.

The initial GSPC was adopted in 2002 and contained targets for the year 2010.Target 8 of the 2002 plan aimed to secure 60% of threatened species in Ex-situ collections, with 10% of these available for recovery and restoration programs (Williams et al. 2011)

The Global Strategy for Plant Conservation 2011-2020 suggests that the former 2010 target achieved 'significant progress' (CBD 2012) however a clear result is not given. A 2007 (halfway into the first 10 year GSPC) workshop hosted by the Convention for Biological Diversity on the progress of the GSPC identified that approximately only 1/3 of the CBD signatories had even agreed to set ex-situ plant conservation targets within their own Countries and that the general target itself to undertake ex-situ conservation activities as opposed to the 60% of threatened species in ex-situ collections was the main focus of participating countries (CBD 2007).

In a 2011 research paper to seek feedback on the uptake of the GSPC, Williams et al. found the contributions of Individual Botanic Gardens is unclear due to the absence of a feedback and or reporting mechanism on the GSPC, and also due to the fact that there were a large number of Botanic Gardens that were simply unaware of the GSPC framework, that still undertook ex-situ plant conservation work as part of normal operations (Williams et al. 2011)

Within an Australian context, the Australian Seedbank Partnership is a joint initiative of the State and Federal Government Botanic Gardens along with the Royal Botanic Garden Kew, and not for profit agencies including Greening Australia and the Australian Network for Plant Conservation (CHABG 2011). At no point in this plan is the contribution of Local Government Botanic Gardens factored.

The contribution of the Australian Local Government sector to ex-situ plant conservation is simply not known as it is not reported through the Australian Seedbank Partnership and there is no reporting mechanism for individual botanic gardens directly to the GSPC.

There are 2 x successful international examples however that Australia could draw on as a potential methodology to increase participation of Local Government botanic gardens and in turn focus and enhance its ex-situ collections.

The South African example is that of the national botanical garden network. The South African National Biodiversity institute (SANBI) established the Kirstenbosch Botanical Garden in 1913 to '*research, conserve, display and represent South Africa's unique indigenous plants'* (Willis 2013).

SANBI claim to be pioneers in plant conservation in the sense that they recognised early that due to the vast flora within South Africa, they would require a network of gardens across the country with different climatic and topographical features if they were to be successful in representing all South African Flora. Today SANBI has 9 established Botanic Gardens in its network (Willis 2013) and is about to open its 10th garden, the Kwelera Botanic Garden near East London shortly (SANBI).

In Australia, there is no one agency that manages all gardens however like South Africa, there are gardens representing a diverse geographical climate zone spread across Australia.

The Plant network project established in the United Kingdom however may hold even more merit in an Australian context. The plant network is a collaboration between botanic gardens in the United Kingdom, and in response to how they achieve target 8 of the GSPC undertook a mapping exercise of all Botanic Gardens in the UK and then overlaid on this map the location of all known threatened species. This gave gardens in close proximity to threatened species lead role in collecting ex-situ plant collections which reduced duplication and crossover of effort. At the commencement of this project in 2005, the Millennium seedbank Kew held 60% of all threatened species in the UK, however as at 2010 hold more than 90% as a result of this partnership. The UK example has also seen added benefit through extensive collaborative relationships between gardens, increased networking, skill development and information share, and a sense of competition with individual gardens collecting more than their allocated quota of species (Blackmore et al. 2010).

2.3 Botanic Gardens a service of Australian Local Government?

Prior to the 2016 NSW Local Government Amalgamations, there were 571 Local Government organisations across Australia (DIRD 2015). Local Government ensures the provision of democracy at the local level with the election of representatives to serve local communities, but Local Government also provides an extensive range of good and services to these communities (ACELG 2015). This essentially ensures citizens are both 'voters' and 'ratepayers' and citizens are 'customers' (Ryan et al. 2015). Australian Local Government is not recognised in the federal constitution, but rather is the constitutional responsibility of the States. As such the democratic process and range of services varies greatly from State to State, but more importantly the process of Local Government in meeting individual communities needs means that service delivery also varies from Council to Council.

Botanic Gardens are a good example of the diversity of service provision in Local Government, with more than 100 botanic gardens across the country the responsibility of Councils (ANBG).

Regional Botanic Gardens including Albury NSW, Geelong VIC, and Rockhampton QLD are three examples of a number of Gardens that were established between 1850 and 1900 and these gardens like many of their era were established in a formal Victorian era landscape layout with ornamental horticulture their primary purpose (Britton 1896).

Botanic Gardens continue to be established by Local Government with examples of recently established gardens including Eurobodalla NSW 1987 and Mackay and Gold Coast QLD both in 2003 (ANBG 2015) reflecting the trend in Local Government for an ever increasing provision of more services within Local Government (ACELG 2015) with these newer gardens having a more focussed conservation purpose in displaying local plants, but also provision of an increasing number of visitor services including education program, events, and cafes and restaurants.

Botanic Gardens are operated within each tier of government within the Australian Federation meaning that in the shift towards a Governance approach to decision making Botanic Gardens can drive a collective action (Bevir 2011) approach to plant conservation objectives which in turn supports wider biodiversity and climate change response.

Flowers of the Neiosperma kilneri (Mackay 2014)

Ex-Situ Conservation at Mackay Regional Botanic Gardens.

Established in 2003, under the management of Mackay Regional Council, the principle objective of the Mackay regional Botanic Garden is 'To work towards key aims of sustainability, conservation and education about flora under guidelines adopted by Botanic Gardens Australia and New Zealand (BGANZ), and Botanic gardens Conservation International (BGCI)' (Mackay 2010)

Ex-situ conservation activities are part of this role with species such as the Neiosperma *Neisosperma kilneri*. This vulnerable rainforest species found within the Mackay bioregion is held in an ex-situ collection at the Mackay Regional Botanic Garden (Mackay 2014).

Diagram 3 – Ex-situ conservation activity at Mackay Regional Botanic Garden.

2.3.1 Botanic Gardens in Australia.

There are currently 170 listed Botanic Gardens in Australia, and these gardens are managed and operated under all tiers of Government including Federal, State and Local Government, in addition to a number of privately owned and not for profit organisations managing gardens (ANBG 2015)

The vast majority of Botanic Gardens in Australia are operated within the Local Government Sector as fully funded facilities or supported through (for example) the provision of land and or funding to volunteer run Botanic Gardens (ANBG 2015).

One of the challenges in determining the plant conservation contribution of the Local Government sector apart from not being formally recognised as a contributor through the Australian Seedbank partnership is the general lack of literature relating to the role of Local Government Botanic Gardens.

In addition, a search of the BGCI Global Botanic Garden search database shows that of the 90 listed Australian Local Government Botanic Gardens, only 8 have listed that they undertake ex-situ conservation programs; however the details of these programs are absent. A further 8 x gardens reported they do not undertake any ex-situ conservation work, and the remaining 74 failed to provide any information relating to conservation programs (BGCI).

There is no legal accreditation process for a site to call itself a 'Botanic Garden' so essentially anyone can use this name to describe a site (ANBG) and this view is shared by the BGCI who have accepted organisations into its membership despite the fact they cannot be clearly identified between being a Public Park and a Botanic Garden (Wyse Jackson, Sutherland 2000).

The wider lack of accreditation or qualification for a site to be called a Botanic Garden raises the question as to whether there are Local Government Botanic Gardens in Australia using this term in name only and actually don't function as Botanic Gardens.

A concerning indicator to the current status of the Plant Conservation contribution of Local Government Botanic Gardens *could* be drawn from the recent failure of a proposed Botanic Gardens Australia and New Zealand (BGANZ) regional (Victoria) conference scheduled to be held in Bendigo Victoria in November 2014. The conference themed '*Plant Conservation: An Attainable Goal for Regional Botanic Gardens*' was cancelled due to lack of interest from regional botanic garden members. This conference was focussed on identifying opportunities for Local Government managed Botanic Gardens to make a contribution to the Global Plant Conservation Effort (BGANZ)

Alternatively, the diverse services these gardens provide to local communities may simply mean that plant conservation is not high on individual garden agendas.

To highlight the challenge for Local Government Botanic Gardens in balancing conservation objectives and meeting the needs of their local communities, The University of South Australia has led visitor perceptions research in Australian Botanic Gardens since 2008 that show interesting results. The 2008 survey of Australian regional (Local Government) Botanic Gardens 'Identifying Visitor Service Quality in Australian Regional Botanic Gardens' shows that visitors valued a 'sense of safety' and 'peace and tranquility' as the primary reason for visiting Botanic Gardens above criteria such as 'showcasing a variety of plants' and 'accurate current plant information' (Crilley et al. 2011)

The updated survey completed in 2011 'Perceptions of Service Quality at 7 Australian and New Zealand Botanic Gardens' showed the same consistency as the 2008 survey with sense of safety and peace and tranquillity being of more importance to visitors than 'special plant collections' and 'opportunities to learn about plants' (March 2011)

Following on from these surveys, a further research project in 2012 was undertaken by the University of South Australia to compare the conflicting views of visitors to Botanic Gardens with the views of Botanic Garden volunteers and Management. This paper highlights that only 9% of visitors to Botanic Gardens in Australia were interested in education and learning about Plants, whilst only 20% of visitors were actually aware that Botanic Gardens have a plant conservation role. Botanic Garden Volunteers however identified the main function of Botanic Gardens to educate the public about plants, which conflicted with Botanic Garden management that listed Conservation and Biodiversity with 31% of the survey as the main role of Botanic Gardens (Moskwa and Crilley 2012)

Moskwa and Crilley also highlight the challenge for government managed Botanic Gardens in this operating environment is that 80% of income is generated from Government sources and this funding is largely dependent on visitor satisfaction measures (Moskwa and Crilley 2012).

The research within an Australian context suggests that Conservation objectives may be of importance to Botanic Garden managers however the work being undertaken may not be adequately promoted, or the challenges of meeting the recreational needs of visitors prevents a greater contribution.

The trend of recreation and leisure being more valued than conservation objectives by visitors is apparent in other parts of the world including the United States, the United Kingdom and South Africa.

In the South Carolina Botanic Garden in the United States a survey of visitors found that localised climate change impact within this site would not impact their reason for visiting for recreation purposes (Brownlee et al. 2013). A 1985 survey in the United Kingdom of Botanic Garden visitation also shows 88% of visitors came for recreation purposes as opposed to 12% for specialist botanical visits (Neilson 1985) while in a current context Dodd and Jones argue that Botanic Gardens are still viewed as 'exclusive and elitist' in the United Kingdom preventing their ability to appeal and subsequently educate the broader public about plant conservation (Dodd, Jones 2010).

This trend is particularly evident in South Africa where a survey of visitors to 6 (of the 10) National Botanic Gardens found that 95% of all visitors to these sites came for recreational purposes, 99% of all visitors valued these spaces as urban green space, yet only 67% felt these gardens effectively promoted their conservation purpose (Ward et al. 2009)

The South African example is particularly interesting as the National Botanic Gardens surveyed are all managed as 'Conservation Gardens' a mix of landscaped and Natural areas by the South African National Biodiversity Institute whose primary objective in managing these Botanic Gardens is to '*educate and inform the broader public of the value and importance of South Africa's rich biodiversity and ecosystems. As national biodiversity facilities, the National Botanic Gardens document and conserve their biodiversity through consultation with professional biologists and amateur organisations'* (SANBI)

It is clear from the literature on visitor perceptions that a challenge for Australian Local Government Botanic Gardens will be finding ways to undertake ex-situ plant conservation and have this work recognised, whilst balancing the recreational needs of its visitors and perhaps successfully promoting the importance of plant conservation to its visitors.

2.4 Proposal for a collaborative conservation partnership.

The case study of the SEBWG partnership fits the definition of an 'action network' whereby the partners have come together to formally adopt collaborative courses of action, and deliver services, along with information exchanges and enhanced technology capability (Agranoff 2006)

Operated under formal agreement (Taylor 2013) the SEBWG partnership case study explores the factors that led to its development, through regular networking the potential of an interdependent partnership where increasing each organisations capacity on multiple levels (Gough and Accordino 2013) including resource and information sharing, achieving more, promoting the importance of the plant conservation and avoidance of work duplication was realised which led to the formal partnership agreement in 2013.

Despite the relative infancy of this partnership, there are a number of published 'partnership success factors' that have been realised by the SEBWG including:

- **Leadership:** Authority within the partnership is shared (Agranoff 2006) with each agency having shared ownership and responsibility for delivering on outcomes (LGA NSW 2012). Despite the varied difference in skills and expertise, and individual agency objectives (and budgets) there is a strong sense of shared power and control (NPS). This is evidenced through the formal agreement where agencies are encouraged to each lead projects, for example Wollongong Botanic Garden leads the Bomaderry Zieria conservation project, Booderee Botanic Garden leads the *Banksia vincentia* project, Mt Annan leads all seed banking as it houses the NSW Plant Bank, and the National Botanic Garden Canberra leads the recently announced *Pomaderris* species restoration grant on behalf of the partnership. The partnership also draws in additional partners for specific projects including community based land management groups, and other Botanic Gardens to which the shared authority applies.

- **Clear objectives:** The partnership has a number of clear objectives formalised within its agreement that focus on mutually beneficial resource sharing, developing a regional collections focus (as opposed to individual agency collections focus), the backing up of important plant collections across multiple sites (Fant. et al 2016), linking to partners engaged in regional plant conservation, cross promotion, and joint project initiatives. Agranoff, highlights the public value benefit of partnerships with clear objectives as being enhanced collaboration and networking, learning to each organisation, cross- training, interagency planning, and delivering results (Agranoff 2006).

- **Work to each other's strengths:** The strengths (and weaknesses) of each partner is fully understood to ensure a cost-effective use of time toward common goals (NPS). The single from the collective responsibility is also understood LGA NSW 2012), for example, The Eurobodalla Botanic Garden is limited by its Council Strategic Plan to conserving species within the Eurobodalla Shire Council area only, so the group leaves plant collection work in this LGA to Eurobodalla and provide assistance when asked. Likewise, the Mt Annan Plantbank has identified an opportunity for the Wollongong Botanic Garden to wind back its long term seed storage facility and instead send seed to the Plant Bank.

A significant benefit to inter government agency partnerships is it has the potential to avoid duplication of service. From an economic perspective, duplication, and overlapping in service between the Federal Government and the States has long been a concern (Twomey, Withers 2007) with some estimates costing duplication between tiers of government at $9 billion per annum (BCA 2006).
The SEBWG governance structure favours the delivery of outcomes opposed to processes, appears a contrast to the Australian Seedbank Partnership, which in its first 2.5 years of establishment focussed solely on developing a strategic plan and establishing governance arrangements (Sutherland 2013).

The difference between the two partnerships is obvious; one is focussed on a relatively small geographical area within SE NSW, whilst the Australian Seedbank partnership aims to take an ex-situ plant conservation lead within the entire country. Despite this the SE NSW Bioregion partnership still operates within the federated system of Government and needs to comply with State and Federal legislation and permit requirements, the same as the Australian seedbank partnership.

Similar to the SEBWG focus, Berkes, cites a number of examples where community based collaborative partnerships are critical for success in conservation projects as opposed to the central government national conservation agenda approach, and goes further to state that the top-down participation partnerships based on cooption and consultation are often the reason for failure in integrated conservation and development projects. Successes however have been achieved through partners having various roles that ensure capacity building within the partnership (Berkes 2007).

Rare Correa baeuerlenii at Eurobodalla Regional Botanic Garden (ESC)

Ex-Situ Conservation Seedbank for Eurobodalla Regional Botanic Gardens.

Established in 1988, under the management of the Eurobodalla Shire Council, the vision for the Botanic garden is '*To inspire the appreciation and conservation of our region's plants through Conservation, Education, Recreation'.* One of its principle objectives is to display only those plants which grow naturally in the Eurobodalla region (Eurobodalla 2013).

In 2012, The Botanic garden received a $370,000 grant to construct a regioonal seedbank to store a reliable source of native seed stock targeting high conservation value ecosystems, over-cleared landscapes and identified corridors of local and regional significance on the South Coast of NSW (Friends of ESC 2016)

Diagram 4 – Ex-situ conservation seedbank for Eurobodalla regional Botanic Garden.

2.5 Literature Review Findings

It is evident that there is an immediate need for action to protect the world's plant species from extinction, the impact of land clearing for agriculture, logging and development, combined with current and future climate change impacts places 20% of the worlds known flora at risk, and there is an established link that highlights a failure to do so will have significant impact on the most basic needs of the human race, including our reliance on plants for food, medicine and shelter.

There is a defined unique role on the International stage for Botanic Gardens as defined within the Convention on Biological Diversity's Global Strategy for Plant Conservation, for Botanic Gardens to lead ex-situ conservation of the worlds threatened plant species effectively holding them in seedbanks and living plant collections as 'insurance' against extinction.

There are an estimated 2,500 Botanic Gardens worldwide (Oldfield 2010) working toward the 2020 GSPC target of securing 70% of the worlds threatened flora in Ex-situ collections, however the contribution of 107, or almost 5% of the worlds Botanic Gardens are operated by the Australian Local Government Sector and the contribution of these gardens is not clearly known.

There is indicative evidence from the literature that suggests some Local Government Gardens are active in ex-situ conservation activity either working on their own or in collaborative partnerships, whilst others don't consider ex-situ plant conservation a core business objective. There is also evidence to suggest that the reliance on Local Government funding to operate gardens may result in a greater focus on visitor (ratepayer) satisfaction, preventing a plant conservation contribution.

3 DESCRIPTION OF SETTING

This research study focusses on Australian Local Government sector operated Botanic Gardens, and their contribution to Global Plant Conservation objectives. The purpose of this research is to establish a link between global plant conservation objectives and the role of Local Government, through identifying the current contribution of its Botanic Gardens to plant conservation.

In order to provide a clearer picture of the setting for this study, this section briefly describes botanic gardens, with as focus on those in Australia, and then provides greater detail on the South East New South Wales Bioregion Botanic Gardens Working Group (SEBWG).

The Australian Federal Government operates 2 Botanic Gardens, The various State and Territory Governments across the country (except the Queensland Government) operate a total of 12 Botanic Gardens, in addition to various Universities, Hospital Grounds and private land holdings listed as having Botanic Gardens. The remaining 107 gardens listed on the Australian Directory of Botanic Gardens (CHABG 2016) are operated by the Local Government Sector. Diagram 4 highlights the geographic distribution of Australia's Botanic Gardens.

3.1 Local Government Botanic Gardens

Within the Australian Local Government sector, its Botanic Gardens are very diverse in terms of funding, strategic purpose and performance. Ranging from small community volunteer run gardens on very limited funds such as The Illawarra Grevillea Park in Bulli NSW established on Council land however receiving no financial support, through to large established botanic gardens with clearly defined horticulture, conservation, scientific, education, recreation and tourism objectives such as the Brisbane Botanic Garden QLD, operating in essence as the Botanic Garden for the State of Queensland.

With no formal or legal Botanic Garden accreditation process in place (CHABG 2016) any site can be termed a 'Botanic Garden', and the Local Government sector Botanic Gardens as a result appear to reflect a diverse range of parkland layouts, horticulture display gardens, heritage landscapes, natural areas, living plant collections or often a mix of some or all of these.

Australia's Botanic Gardens geographic representation highlights the density of Botanic Gardens found on the East Coast and Victoria.

Diagram 5 – Australia's Botanic Gardens

3.2 The South East New South Wales Bioregion Botanic Gardens Working Group

Two Local Government operated Botanic Gardens from the New South Wales South Coast, the Eurobodalla Regional Botanic Garden (Eurobodalla Shire Council), and the Wollongong Botanic Garden (Wollongong City Council) have recently partnered with various State and Federal Government Agencies to form a collaborative partnership aimed at conserving threatened plant species via ex-situ actions within the identified area of the Sydney Basin and South East Corner bioregions of New South Wales (Dept. Environment and Energy 2016) extending the coastline of NSW from Newcastle in the North to the Victorian border in the South and bounded by the Great Dividing Range to the West. See Diagram 6

Named the South East New South Wales Bioregion Botanic Gardens Working Group (SEBWG), the partnership was established in 2013 with partners including Federal Government Agencies the Australian National Botanic Garden Canberra and The Booderee National Park Botanic Garden Jervis Bay, NSW State Government Agencies the Royal Botanic Garden Sydney and The NSW Office of Environment and Heritage (OEH) in addition to the two Local Government Botanic Gardens.

The partnership developed initially through informal networking has progressed into a formal partnership agreement developed in 2013 (ANBG 2013). In addition to its core plant conservation objective the SEBWG agreement also provides each partner with flow on benefits including the sharing of resources including intellectual knowledge, plant material, staff and equipment where appropriate, joint grant funding applications, and co-promotes plant conservation work within the Bioregion.

The rationale for exploring this partnership as part of this research is to determine the potential public value of this example of an intergovernmental partnership and its potential for application throughout the wider Local Government Botanic Gardens sector.

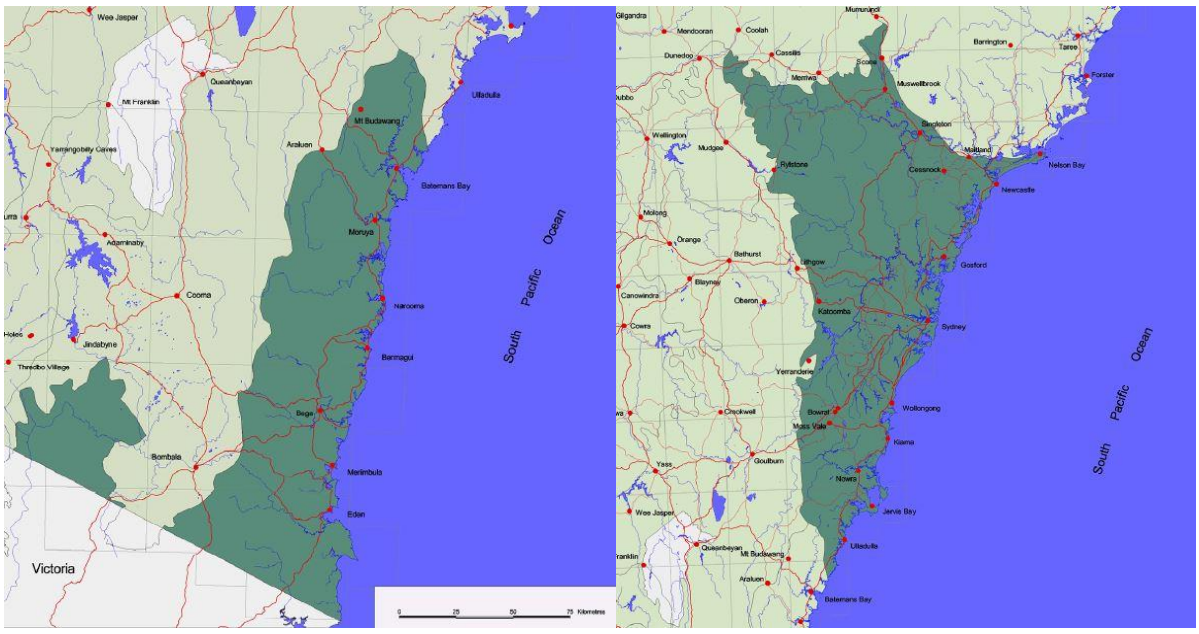

Diagram 6. The South East Corner and Sydney Basin Bioregions. (OEH 2016)

4 RESEARCH DESIGN AND METHODOLOGY

This study was designed as an exploratory research project primarily using qualitative methodologies supported by quantitative measures, including open-ended questionnaire and in-depth interview as methods in which to determine the research objective (Mertens 1998).

The researcher acknowledges a constructivist research approach, as the research questions attempted to seek an understanding of the world in which they live and work (Creswell 2003), and recognised that the researcher, as a Local Government Botanic Garden Curator, could not entirely remain independent of the research itself (Mertens 1998).

The researcher has attempted to reduce bias from the body of this research, by including a separate summation of the Wollongong Botanic Gardens and how it addresses the research questions as a separate appendix to this study. See Appendix 2.

4.1 Research Questions

As stated in the introduction, the study has been designed to answer two research questions:

1) What is the current contribution of Local Government operated Botanic Gardens in Australia to the global plant conservation effort?
2) Is a collaborative partnership model an effective method for Local Government Botanic Gardens to make a greater contribution to the global plant conservation effort?

The study used 3 different methods of data gathering instruments, namely the Literature review, questionnaires to two different cohorts and in-depth interview. The data gathering instruments used in this study and included as appendices of this paper, were successfully independently pre-tested by a former Local Government and State Government Botanic Garden Curator.

4.2 Literature Review

The Literature Review focussed on informing the study through identifying what is the Global Plant Conservation effort, what are Botanic Gardens and how have they evolved, the specific plant conservation objectives of Botanic Gardens and in particular the contribution of the Australian Local Government sector through its Botanic Gardens toward Plant Conservation.

4.3 Questionnaires

Local Government Botanic Garden Questionnaire

This questionnaire (See Appendix 1) was specifically developed for Local Government Botanic Garden Managers to identify overall service delivery, current plant conservation activities, competing service delivery objectives, and attitudes generally to the role Local Government should have in global plant conservation.

Perceptions of the role of Local Government Botanic Gardens Questionnaire

This questionnaire (See Appendix 2) was developed with the purpose of seeking the perception of the Local Government Botanic Garden sector as viewed by selected State and Federal Botanic Garden Agencies, and Australian Botanic Garden Industry Associations, The Council of Heads of Australian Botanic Gardens (CHABG) and Botanic Gardens Australia and New Zealand (BGANZ).

Responses from the Royal Botanic Garden Sydney, Royal Botanic Garden Victoria, and the Australian National Botanic Garden Canberra were sought, as these agencies are within close geographical

proximity to the largest concentration of Local Government Botanic Gardens in New South Wales and Victoria as shown in diagram 5.

Open questions (Key 1997) were prepared as part of these two Questionnaires to facilitate free response as well as personal perspective from respondents (Creswell 2003).

4.4 Interview

The Interview Guide (See Appendix 3) was been developed as a data gathering instrument to be used within the Case Study component of the research. The interview subjects are the lead officers from agencies that form the South East New South Wales Bioregion Botanic Garden Partnership.

4.5 Research timeframe

The Literature review component of the research was completed in June 2016, The Case Study Interviews were undertaken in July 2016, and a 6 week timeframe was provided for participants from 4 July - August 2016 to complete the two questionnaires which were sent out via email.

4.6 Linking the Research Findings

The data gathering instruments have been developed to support the research synthesis as highlighted in diagram 1. Diagram 7 demonstrates how the findings answer interdependent questions firstly identifying the need for global plant conservation, then the unique role of Botanic Gardens in addressing plant conservation, then finally the role of the Australian Local Government Botanic Garden sector.

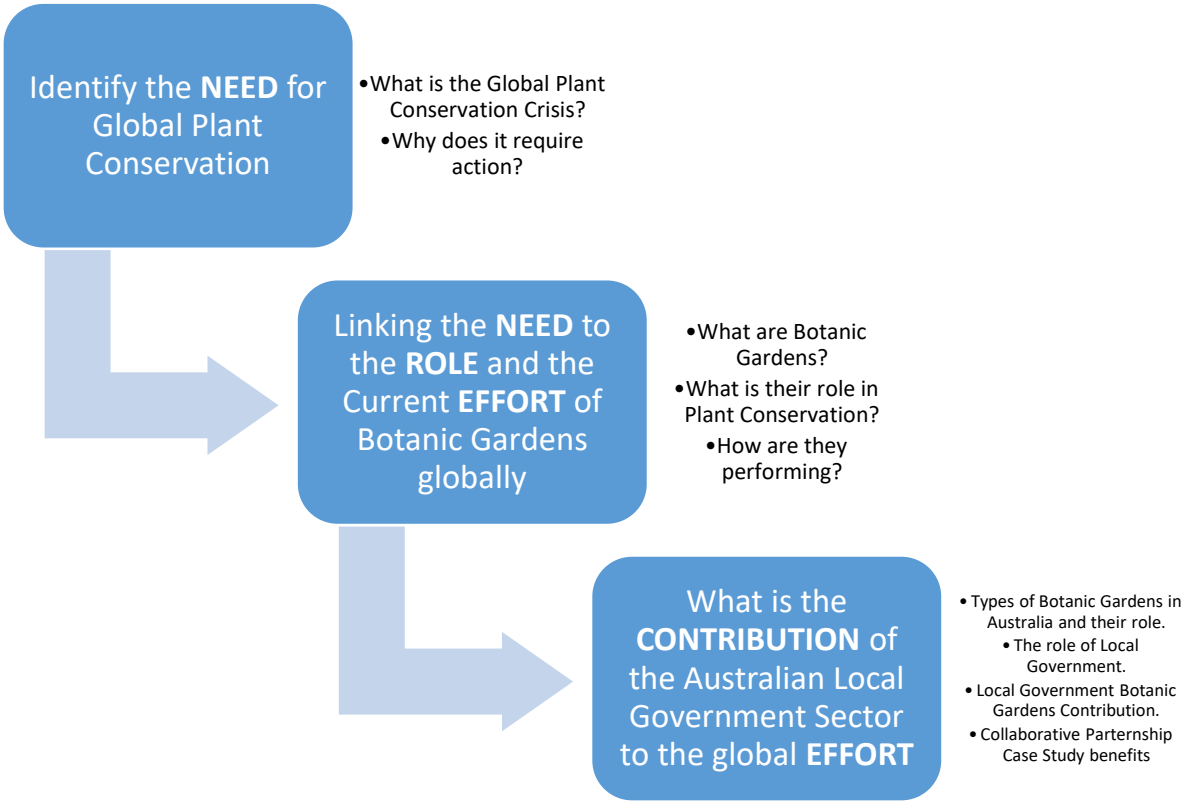

Diagram 7. Linking the Research Findings.

4.7 Research Ethics

De-identifying the research participants was considered critical to answering the research questions as the views and opinions of the people that work and manage these Botanic Garden facilities may have differed from the official views and opinions of their direct line of management or councillors. To further enhance the ability to capture participants views the use of open-ended questions was favoured (Creswell 2003).

4.8 Limitations

Several limitations were recognised through the design phase of the study with time being a significant factor. This limitation favoured an exploratory research approach as opposed to a more in-depth research methodology.

Secondly, the breadth of the study in attempting to reach a wide sample across many different Local Government Organisations and direct access to Curators within the timeframe was also considered as a limitation, questionnaires were often sent to generic Council addresses as direct contacts were not known.

The third limitation recognised prior to commencing the study was the questionnaire itself, expected to take approximately 20-30 minutes to complete which may have been a reason for non-returns, in addition to seeking the expressed opinion of respondents may have factored the response rate (Key 1997) Despite this limitation, it was the researchers view that a low response rate to the questionnaire would still form a valid purposive sample (Blackstone 2016) in determining the contribution of the Local Government Botanic Garden sector to Plant Conservation.

4.9 Analysis

The data collection within this project provided a vast breadth of quantitative and qualitative data collating knowledge, attitudes and practices of respondents (Asker and Pillora 2014) from multiple methods.

To answer the research questions, Analysis of this data consisted of documenting and collating the data, describing the research data, organising the data into theme clusters to show how one cluster may influence another, referring to the literature to compare, legitimise and support the findings, and then reporting the findings (Schutt 2011).

In Section 5 of this study, case vignettes of three botanic gardens have been provided to support the description of the research data found within the Local Government Curators Survey by including snapshots of entire individual Botanic Garden services.

Throughout Section 5, the use of direct quoting from the research respondents has been included to support the research findings. The use of direct quotes respects the studies exploratory focus primarily using qualitative methodologies supported by quantitative measures, including open-ended questionnaire and in-depth interview.

The use of the three data gathering instruments supported by a literature review enabled quality data validation via triangulation techniques (Asker and Pillora 2014) with the research instruments designed to cover many of the theme clusters.

The theme clusters used for the data analysis are presented in Section 5 of this study.

5 PRESENTATION AND ANALYSIS OF FINDINGS

5.1 Questionnaire to Local Government Botanic Gardens

The Local Government Botanic Garden questionnaire was sent to a total of 41 Local Government Botanic Gardens across Australia, with 13 responses received for a total 32% response rate.

The majority of gardens sought for questionnaire were from New South Wales, Queensland and Victoria on the basis of available contacts for which to send questionnaires.

Despite a relatively low response rate to the questionnaire, the sample for the purpose of identifying the Local Government sectors contribution to plant conservation is still considered representative of the sector based on the diversity of the organisations who responded resulting in an even distribution of States, management structures, staffing levels and operational budgets.

The 13 respondents represent an even distribution of the East Coast States with a 31% response from New South Wales, 38% Response from Victoria, and 31% from Queensland.

Of the 13 Gardens Surveyed, 4 Gardens are volunteer managed with Local Government funding support and/or provision of land, whilst 9 Gardens are fully funded Local Government institutions.

Local Government Botanic Gardens Contribution to Global Plant Conservation:

Snapshot: Botanic Garden 6 - Budget Range up to $250,000pa.

Botanic Garden 6 in the sample falls into the overall operating budget range of up to $250,000 per annum, and is a volunteer run organisation operating a garden on Local Government Land.

This 30 year old garden operates with a total of 8 active volunteers maintaining a site comprised of targeted collections of Australian native plant species mainly comprised of the family PROTEACEAE, and specialises in particular in growing Grevillea Species.

This garden is open to the public only on 16 days per annum and these days are used as fundraising days with entry fees, plant sales, and small gifts the main source of income for this Botanic Garden. Total visitation per annum is estimated at 5,500.

This garden identified its service delivery priorities as 'balanced' between Horticulture, Science, Education, Recreation, Volunteer Management and Plant Conservation with all equally as important as each other.

This garden undertake a range of Plant Conservation activities including collection of threatened species in the gardens living collections and as potted nursery specimens, the garden seeks out new Australian Native threatened species for the purpose of creating ex-situ collections, and maintains on site plant accessioning records. This garden also sends pressed herbarium specimens to the NSW Herbarium at the Royal Botanic Garden Sydney.

This respondent estimated 1% of its total operating budget is allocated toward plant conservation work, and views Local Government Botanic Gardens as suitable for addressing Global Plant Conservation with support from the State and Federal Botanic Garden Agencies.

The respondent felt there were no challenges to this Botanic Garden undertaking Plant conservation work, or to making an extra commitment stating the need to 'just do it'.

Funding for these gardens was also evenly distributed with 38% of gardens operating on an annual budget of less than $250,000, 31% of Gardens are budgeted between $250,000 and $1,000,000, and the remaining 31% operate on budgets of $1,000,000 or more. The Smallest budget from the sample was a volunteer run organisation with a $20,000 annual budget, whilst the largest garden has an annual operating budget of $5,000,000. For the purpose of this research questions relating to budget did not include an in-kind value for volunteer labour hours.

Staff structures varied greatly between the respondents with the 31% of gardens operated solely by volunteers drawing on an active participation membership of between 8 and 50 people, only 2 or 15% of the gardens surveyed with 2 and 13 full time staff respectively had no volunteer support whatsoever, whilst the majority of gardens 54%, had staff ranging between 0.5 – 50 full time equivalents, supported by a volunteer workforce ranging from 10 – 110 people.

5.1.2 Local Government Botanic Garden Service Delivery priorities

Respondents were asked a number of questions relating to overall service delivery priorities based on visitation, defining features of their Botanic Garden and delivery stream focus. 62% of the respondents track their annual visitation for an average visitation rate of 240,000 visits per annum. The lowest garden in the sample draws 5,500 visits annually (Garden is open to the public 16 days per annum only) whilst the garden with the highest visitation draws 1.7million visits per annum.

A broad range of service delivery priorities were explored with Recreation and Visitor Experience inclusive of events being the highest service delivery priority for 46% of the respondents, closely followed by Horticulture with 38% and 15% rated volunteer management as their number one service delivery priority.

In terms of the overall service delivery objectives for the respondents, 92% identified recreation and visitor experience as a delivery stream, 77% identified events, 62% identified Horticulture, 62% identified Conservation, 46% list education as a delivery stream, and 31% of respondents list Volunteer Management in their list of service delivery objectives.

Respondents identified a range of services, features and activities that defined them as a Botanic Garden. This part of the questionnaire drew the broadest range of responses from the questionnaire.

46% of the respondents identified their education programs, guided tours, signage and information booklets as defining features, 38% recognised their work with specific collections of plants including rare and endangered and scientific collections, and 38% also identified the labelling of plants within their collections as a defining feature.

To a lesser extent a wide range of responses from individual gardens included plant databases, climate watch programs, wild sourced plant collections, records, Indigenous gardens, Nursery, Seed exchange, ex-situ plant collections, herbariums, and plant species monitoring as factors associated with defining themselves as Botanic Gardens.

Local Government Botanic Gardens Contribution to Global Plant Conservation:

Snapshot: Botanic Garden 7 – Budget Range $250,000 - $1,000,000pa.

Botanic Garden 7 in the sample falls into the overall operating budget range of between $250,000 and $1,000,000 per annum, and is a fully funded Local Government Operation with 6 full time equivalent Staff and12 active volunteers.

This 139 year old garden operates with a total of 6 full time staff supported by a team of 12 active volunteers, with a strong horticulture and heritage landscape focus, with a particular focus on the gardens heritage tree collection and the associated challenges of its succession planning.

Annual visitation to this garden is estimated at 350,000 per annum, and in the past 25 years the garden has increased its focus on visitor experience to ensure this Botanic Garden remains 'viable and valuable to our local community'. Key events including the Music in the Gardens and Picnic in the Garden attract 10,000 extra visitors per annum. The recently installed Children's play garden attracts an estimated 50,000 visits per annum.

This garden is located within the centre of this regional City and as such has a high profile within the Local Government Area with Council and Senior Management placing high importance on staff resources being used to ensure consistent high levels of maintenance within the garden.

Despite resources being geared heavily toward maintenance and visitor experience, this garden is one of two within the sample that listed strategic links to the Global Strategy for Plant Conservation, and has listed short, medium and long term plant conservation objectives listed within the gardens Conservation and Management Plan.

This garden aims to address plant conservation issues in a number of methods including intertwining plant conservation messages into all of its events, and using National and International initiatives such as National Tree Day, World Environment Day and Earth Watch to promote local conservation within the community.

This respondent estimated 1.5% of its total operating budget is allocated specifically toward plant conservation work, and undertakes targeted ex-situ conservation of 2 x threatened plant species from the region, houses a wider collection of threatened species including living collections, nursery specimens, a small seed store, and all associated record keeping.

The respondent has established conservation partnerships with the Royal Botanic Garden Melbourne, Australian National Botanic Garden Canberra, and the NSW Office of Environment and Heritage for 1 x threatened species managed under ex-situ actions.

The respondent identified that the profile of the garden within the local community and the conservation of one threatened species is used by the Council to promote the wider importance of protecting natural bushland including its Endangered Ecological Communities (EEC).

The respondent felt that Local Government Botanic Gardens have a responsibility for Global Plant Conservation through education, research and ex-situ collections and the profile of Botanic Gardens in general can be used to promote the importance of protecting natural environments within the Local Government Area.

A limitation for this garden in increasing its plant conservation activity was identified as Staffing levels, and the need to ensure maintenance levels for visitors were not impacted, this was identified as a major challenge moving forward, as the garden is going through a period of high growth in annual visitation.

Only 2 Gardens representing 15% of the sample identified the strategic link of their work to contributing to the Global Strategy for Plant Conservation.

A further 3 gardens representing 23% of the sample actually questioned their status as a Botanic Garden at all, with one fully funded Local Government Botanic Garden labelling their garden more of a 'small country garden' as opposed to a Botanic Garden, whilst another recognised its 19th Century historical name as a Botanic Garden did not reflect the contemporary parkland planted with rare and unusual trees.

A Botanic Garden with 13 full time staff stated they did not meet the criteria for a Botanic Garden 'but were working toward documenting our collections' as a means to identify itself as a Botanic Garden.

5.1.3 Local Government Botanic Gardens work in Plant Conservation

Respondents were asked a series of questions relating to their Plant Conservation activity including budget, type of activity, how this work is reported and a gauge of individual Councils level of support.

A total of 8, or 69% of the respondents have collections of threatened species either in seed storage, potted nursery specimens, or growing in living collections. 7 of these gardens (62%) undertaking threatened species conservation activity keep formal records, and Botanic Gardens seeking new opportunities to collect threatened species however reduced to 54% of the sample.

Only 54% of respondents responded that they report on plant conservation within a formal framework, or have plant conservation objectives listed formally within corporate planning documents, annual plans, or job descriptions.

In contrast to the relatively modest number of gardens actually seeking new threatened species collections opportunities, a total of 77% of the sample gardens reported that they have support within their Council organisations to pursue plant conservation work.

A total 62% of Respondents reported an average 5% of total operational budget inclusive of labour is allocated to Plant Conservation work in their respective Botanic Gardens.

Grouping respondents into their respective States draws an observation of note in that 100% of Botanic Gardens from New South Wales and Queensland undertake some form of plant conservation activity, however 0% of Victorian Botanic Garden respondents currently undertake conservation activity.

5.1.4 Local Government Botanic Garden Partnerships

A total of 54% or 7 of the respondents reported that plant conservation activities undertaken are done so in some capacity through partnerships, with 4 gardens reporting partnership activity with other Botanic Gardens, 4 research partnerships with Universities, and 2 partnerships with land management agencies.

Local Government Botanic Gardens Contribution to Global Plant Conservation:

Snapshot: Botanic Garden 11 – Budget Range more than $1,000,000pa.

Botanic Garden 11 in the sample falls into the overall operating budget range of more than $1,000,000 per annum, and is a fully funded Local Government Operation with 50 full time equivalent Staff and more than 100 active volunteers.

This Botanic Garden organisation comprises three different geographical locations, the main Botanic Garden facility, a heritage Botanic Garden located within the centre of the City and an Arboretum all managed under the one Botanic Garden management structure.

These gardens combined draw a total annual visitation of more than 1,700,000pa, identifying itself as the city's 2nd most popular tourist attraction, with visitor experience, education, tours, horticulture displays and threatened species conservation work, and volunteer management all key service delivery priorities.

This Garden has broad Plant Conservation objectives including strategic links to the Global Strategy for Plant Conservation and focusses on ex-situ conservation of the threatened flora for the entire State through living collections, nursery specimens, trial horticulture beds and seed banking. A recent 2015 project includes a $14 million extension to the garden with the specific purpose of housing a Queensland Conservation Collection focussed on threatened species.

This respondent estimated 5% of its total operating budget is allocated toward plant conservation work, and views Local Government Botanic Gardens as having a suitable role in plant conservation by working under the guidance of the State and Federal Botanic Garden agencies to ensure a coordinated approach to targeted species for collection and conservation.

The respondent felt the main challenges for Local Government in commencing or increasing its plant conservation contribution came down to funding for dedicated Staff positions, and identified central coordination through a national database of Botanic Garden threatened species collections as a way of sharing the workload and giving local government a role in working towards the targets set by the Global Strategy for Plant Conservation.

5.1.5 Should Plant Conservation be a responsibility of Local Government Botanic Gardens?

Respondents views were sought on whether addressing global plant conservation was a suitable role for Local Government, and 92% of respondents stated that it was, with a range of options for the specific role that the Local Government sector should have.

"Our Councillors love the great media opportunities we provide them to promote our latest threatened species conservation work….. So long as that particular species in question doesn't have the potential of impacting on a new development or road construction…"
MA – Local Government Botanic Garden Curator.

One respondent in the sample felt that Local Government should play no role in plant conservation and 'should leave this as the responsibility of State and Federal Government as the focus for Local Government is meeting the recreational needs of the local community'.

Respondents were then asked what challenges their garden would need to address to either commence or make a greater contribution toward Plant Conservation activity, with the greatest barriers being Lack of Staff, or Lack of Staff expertise being a factor for 46% of respondents, and lack of financial resources available being the second most common barrier for 31% of the sample.

5.2 Questionnaire Perceptions of the Local Government Botanic Garden Sector

5.2.1 Perceptions Questionnaire Sample

The Perceptions of Local Government Botanic Gardens questionnaire was sent to a total of four respondents representing the Royal Botanic Garden Sydney, The Australian National Botanic Garden Canberra, The Royal Botanic Garden Victoria, The Council of Heads of the Australian Botanic Gardens (CHABG), and Botanic Gardens Australia and New Zealand (BGANZ).

Note: One respondent answered the questionnaire from two perspectives including this person's employed role with The Royal Botanic Garden Victoria in addition to their elected role as a Council Member of BGANZ.

This sample was pre-determined to be the most appropriate due to the likelihood of strong knowledge of, and potentially partnerships with Local Government Gardens due to these State and Federal Government Agencies having the closest geographical proximity to the highest concentration of Local Government Botanic Gardens in Australia.

5.2.2 Clearly defined plant conservation objective.

Each agency through the questionnaire identified clear organisational plant conservation objectives including identified State and National threatened species collections priorities, and activities where individual agencies appear to lead within a national context. Each agency sets their own strategic plant conservation focus, and these included State focussed threatened species conservation such as the Royal Botanic Garden Sydney's Australian Plantbank, a facility leading seed collection actions in Australia with a main focus on New South Wales flora and that links internationally with programs such as the Millennium Seedbank, The Royal Botanic Garden Melbourne has the Australian Research Centre for Urban Ecology, The Australian Orchid Conservation program, and Victorian Conservation seedbank, and the Australian National Botanic Gardens has an extensive nationwide collection of wild sourced plant material that can be accessed by other botanic institutions, and the Australian National Herbarium, managing the botanical plant list for the nation.

CHABG identified two plant conservation objectives, the Australian Seedbank Partnership as its most successful project with the state and federal Botanic Garden agencies along with Brisbane Botanic Garden (the only Local Government Partner) working in partnership on seed collection of Australia's flora, and this project is part funded through the Millennium Seedbank in the United Kingdom.

CHABG's other major goal is to develop a national collections database to ensure an understanding of the Nation's Botanic Garden collections, the purpose of this database is to support the coordination and prioritisation for threatened species focus into the future. The database is intended to set State and Regional plant collection priority listings that will then determine which gardens should be taking lead within geographic areas.

BGANZ Plant Conservation objective is focussed on building capacity throughout the Regional (Local Government) Botanic Garden network with its current focus to develop a uniform plant collections

database that is simple to use and cost effective to ensure small Botanic Gardens can accurately record the scientific data required for plant provenance information.

5.2.3 The Enormity of the Plant Conservation challenge

Respondents agreed that the task to conserve Australia's threatened flora through ex-situ conservation actions was too large for the State and Federal Agencies to undertake alone, as each organisation had limited resources and funding to commit to sourcing wild plant material.

In terms of seed collection alone, in New South Wales 50% of the 600 listed threatened plant species are conserved at the Australian Plantbank while in Queensland 20% of the 200 listed threatened

> *"In the past 200 years the globe has faced unprecedented change with a horrific extinction record. In Australia more than 60 plant species are now known to be extinct. Botanic Gardens play a key role in conserving plant species, holding locally, regionally, or internationally significant collections of threatened plants"*
> *JS – Botanic Garden Manager.*

species are held in the Queensland Conservation Garden and Victoria has 55% of the 800 listed threatened species held in the Victorian Conservation Seedbank.

One respondent identified that time, due to the large geographical scale of Australia and the relatively small number of Botanic Gardens available to undertake plant collection was a significant impediment in meeting the Target 8 of the Global Strategy for Plant Conservation to have 75% of all threatened species in ex-situ holdings by 2020.

Another respondent highlighted the irreversible impact on natural habitat, including climate change was forcing conservationists to look not only at ex-situ actions but also 'assisted migration' where threatened species are translocated into non-natural habitat areas which presents broader ecological challenges where plants may be moved but the biological factors that assist growth, and the pollinators that produce viable seed may not be present.

The respondents all identified lack of funding as a limiting factor, however strongly highlighted a need to be more efficient through coordination of existing resources, and avoiding duplication of effort as a more desirable outcome.

Another respondent identified a global botanic garden issue that limits plant conservation works, is that many gardens are tasked with being tourist, recreational and event spaces, to drive income and boost visitation. The respondent identified the large Botanic institutions in the United States that as private institutions all have a very strong focus on raising revenue, whilst many other gardens are often tied to historic roles which limits their contemporary role to display gardens and recreational sites.

5.2.4 Perceptions of current Local Government Botanic Gardens participation

Respondents presented a number of views on the role of Local Government Botanic Garden's, and their existing plant conservation activity.

Botanic Gardens as tourism destinations in regional areas, sites that educate people about plants, sites which are valued by local communities for their high horticulture and presentation standards, and provision of recreational outcomes were all common responses.

The diversity of service delivery within Local Government Botanic Gardens was also highlighted with 'some gardens having clear conservation focus as opposed to others that are basically small gardens run by plant enthusiasts'.

Respondents provided numerous examples of individual Local Government Botanic Gardens undertaking ex-situ threatened species conservation work, and also identified the associated specific education and interpretation activity that is generated due to this work.

The respondents all felt that Local Government Botanic Gardens were restricted more so than their own agencies due to low financial capacity to undertake conservation work, and in addition to available resources, identified staff expertise as an issue with many staff trained in Horticulture but perhaps not conservation.

One respondent however, was aware of a particular State Government Botanic Garden Agency refusing to work with Local Government Botanic Gardens in the past due to their perceived inability to undertake conservation work in accordance with the state agencies protocol.

5.2.5 Perceptions of Limitations within the Local Government Sector

Respondents identified a number of limitations that would impact the Local Government sector's contribution to plant conservation including awareness, funding, resources, expertise, focus, and operating within the realms of the wider legislative and Local Government political and service delivery environment.

Respondents identified that a 'some not all approach' would apply to Local Government Botanic Gardens contributing to conservation activity as some sites operate as Botanic Gardens in name only and are more consistent with the characteristics of a parkland.

Resourcing including financial, Staff, knowledge and Infrastructure were all identified as factors that would limit Local Government Botanic Gardens. Expertise in natural areas, plant provenance data and plant collection methods, are considered outside the skills sets of Horticulturists, and the need for each Botanic Garden to have access time, budget and nursery facilities to grow plants are all limiting factors.

The lack of a national agenda for plant conservation collection priorities is also a current limiting factor that affects all levels of Government. The Australian National Botanic Garden Canberra has a national plant collections focus, but there is no coordination with the State agencies on developing a national agenda that applies to all levels of Government.

The disparity between the ruling Federal government parties and State ruling parties often determines wavering support for conservation and the environment, further impacting the chance of developing a common national plant conservation agenda.

At a Local Government level, there are further challenges within the Political environment as Botanic Gardens tend to be valued for the Horticulture and Recreation benefits they provide to the local community, and as one of a myriad of services Local Government delivers to that community Botanic Garden Managers have to compete for funding and recognition with plant conservation often not considered. 'The overarching question is really whether there is a level of political interest at the Local Government level in contributing to a national agenda'.

Linked to the political challenge within Local Government respondents identified the long term commitment required for plant conservation as being a challenge within organisations with wavering political support.

One respondent identified a major factor limiting the plant conservation work of Local Government Botanic Gardens as being where they are placed in Council organisation structures, most likely Parks or Infrastructure Divisions 'where the Botanic Gardens are held in high esteem for their higher level of presentation and value for recreation – but have limited conservation focus'. The respondent identified knowledge of 2 of 26 Local Government Botanic Gardens within the State of Queensland that have a strong plant conservation focus.

Within Victoria, the respondent felt that the 42 Regional Botanic Gardens with the majority established as pleasure parks in the early 20th century had little to no conservation focus due to their age, local communities value these gardens for their established gardens and setting meaning conservation activity for new species would not be a high priority.

5.2.6 Potential Value of the Local Government sector

Respondents identified a range of opportunities where the Local Government Sector could play a greater role in global plant conservation with a focus on preserving species found within the local area through participation in ex-situ actions, to seeking assistance from larger Botanic Gardens for ex-situ action on local plants these gardens have knowledge of, down to smaller gardens with very limited capacity only promoting consistent messages from the Global Strategy for Plant Conservation, CHABG and BGANZ, and larger Botanic Gardens.

A Queensland specific opportunity is the recently completed Queensland Conservation Garden at the Brisbane Botanic Garden which has been built to collect and display the 202 listed threatened species within Queensland. Completed in 2015, the facility currently houses 40 species, but it is known that 50 of the total number of threatened species come from tropical climates and are not suited to the sub-tropical Brisbane climate, providing an opportunity for Local Government Botanic Gardens in far North Queensland to target collection and display of these species.

> *"Lots of Botanic Gardens Staff – and I'm not just referring to Local Government Gardens are not even aware the Global Strategy for Plant Conservation exists!"*
> *DA – Botanic Garden Curator.*

In Victoria, The Royal Botanic Garden Victoria is working through BGANZ to develop a Victorian conservation garden collection titled 'Care for the Rare' where they are working with a number of Local Government Botanic Gardens to house and grow suitable threatened species, with RBG Victoria deciding on distribution of plant species to gardens, propagation, and placement within individual gardens and a secondary benefit identified by the respondent is this collaboration intends to build capacity within the Local Government Gardens to further increase their own conservation effort.

Respondents from these agencies all agreed that Local Government Botanic Gardens are able to connect with audiences within their communities a lot better than the State and Federal Botanic Gardens can, so there is an opportunity for Local Government Botanic Gardens to disseminate consistent plant conservation messages through local audiences.

An advantage identified by a number of respondents for Local Government Botanic Gardens within the questionnaire is they often have colleagues undertaking land management actions through areas such as environmental assessment, and natural area restoration resulting in access to local knowledge on the location of threatened species. Access to this form of practical knowledge is not available within the larger Botanic Garden Agencies.

The need to partner was common amongst respondents and relates back to the enormity of the challenge in attempting to secure 25,000 Australian plant species, undertaking this work within partnerships, coordinates species focus, allows for information, skills and experience sharing amongst the group and most importantly avoids duplication of effort.

5.2.7 Addressing the key issues

The key issues to emerge from the perceptions of Local Government Botanic Garden Survey indicate that the Local Government sector managed Botanic Gardens are viewed as a potential contributor by the State and Federal Botanic Garden Agencies, and have the support of the industry bodies BGANZ and CHABG.

It is evident from the views of the respondents that the task at hand in conserving Australia's threatened species is too large to not consider the resources within the Local Government sector to make a contribution.

Significant limitations including staff numbers, staff expertise, budget and infrastructure, and the recreational role Local Government Botanic Gardens have within their local communities, in addition to an added level of politics are recognised.

The respondents all identified partnerships with the State and Federal Botanic Gardens as the model that will provide the greatest plant conservation outcomes, with the benefit of resource sharing and information exchange and avoiding duplication of plant species collection all key considerations.

The respondents also identified a partnership model would be mutually beneficial, with Local Government Gardens considered more connected to the local community and able to disseminate conservation messages better than the state and federal gardens located in capital cities, the expanded geographic range of all Botanic Gardens results in the ability to conserve threatened species in different gardens within appropriate climates, and Local Government Gardens have ready access to staff undertaking land management actions with knowledge of the location of threatened species.

The aim of the industry bodies including CHABG's limited success to date to develop a national plant collections database, and BGANZ's ongoing work to develop generic plant record keeping software for regional Botanic Gardens will only further enhance a coordinated effort in the future.

5.3 A Case Study of a Local Government Plant Conservation Partnership.

The case study of the South East New South Wales Bioregion Botanic Gardens Working Group (SEBWG) is presented to determine the potential benefit a collaborative partnership approach to plant conservation may have to the wider Local Government sector and in particular for Local Government Botanic Gardens to either commence or enhance their work in plant conservation.

Respondents were interviewed and asked a series of questions based on their own agencies plant conservation objectives and service delivery priorities, and the current level of communication between different botanic gardens generally.

Respondents were then asked a series of questions relating to their views on the SEBWG partnership, including strengths, benefits and key achievements, Local Government as a partner, and then the benefits and challenges of the partnership as an expanded model.

The description of this research is presented as follows:

5.3.1 Partner Agencies individual Plant Conservation Objective.

The Partners have equal Government representation with two from Local Government, two from the New South Wales Government, and two from the Australian Federal Government. Each Partner identified a range of Plant Conservation Objectives consistent with the previous responses within section 5.2 of this report.

The Local Government partners had very specific plant conservation objectives with Eurobodalla Botanic Garden (EBG) able to collect and conserve threatened species within the Eurobodalla Local Government area only, and Wollongong Botanic Garden (WBG) having broader approval to participate in appropriate threatened species conservation projects within the Sydney Basin and South East Corner Bioregions.

The New South Wales Government Agencies consist of the Royal Botanic Garden Sydney (RBG Syd) and the NSW Office of Environment and Heritage (OEH).

RBG Syd identified its Science and Conservation branch overseeing the NSW Herbarium, the plant disease and diagnostic unit, and the Australian Plantbank as its main plant conservation objectives, and OEH is charged with a legislated responsibility for threatened species conservation within NSW which includes preparing threatened species recovery plans, threatened species listings, and managing reserved lands including National Parks and State Conservation Areas.

The Australian Government Agencies include the Australian National Botanic Garden Canberra (ANBG), and the Booderee National Park Botanic Garden (Booderee) located at Jervis Bay.

The ANBG identified its plant conservation objective to have a representative collection of all Australian flora, and setting short and long term local, regional and national collections targets, while Booderee undertakes in-situ and ex-situ conservation of threatened species found within coastal areas between Sydney and the Victorian border.

5.3.2 Partner Agencies - individual service delivery priorities

Each agency presented a broad range of service delivery priorities in addition to plant conservation objectives with meeting visitor expectations the most common response, all gardens identified the diversification of their service which means that these Botanic Gardens are not just about plants.

Passive recreational activities such as picnics, bbq's, visiting the café in the garden and the associated support services including cleaning and amenities provision were a service delivery priority for all of the Botanic Garden agencies, as were reporting visitor numbers as a performance indicator.

'Visitor numbers are very important for us. We have to increase visitation and revenue to ensure the garden isn't a sinkhole for ratepayers, I am only asked by Council for these two figures as that is what Council cares about'.
SEBWG Partner

Other respondents identified specific service delivery priorities such as commercial events for raising revenue, education programs, and in one instance a mountain bike track as part of the overall service provision.

All agencies identified that balancing the need for a Plant Conservation focus with meeting visitor expectations as a major challenge. Respondents identified that there is currently not enough effort to conserve threatened species, however this time is further limited when resources are allocated to cleaning of amenities and ensuring provision of passive recreation.

'A lot of our visitors I feel do not appreciate they are in a Botanic Garden. We have more of a Parkland reputation and I will give you an example, we now have 34 BBQ's across the site and our visitors expect them to be free, they expect them to be clean and that adds up to a lot of money out of our budget each year at the cost of our plant conservation work – but it is our reality as a public institution'.
SEBWG Partner

5.3.3 The South East New South Wales Bioregion Working Group

Formally established in 2013, SEBWG partners identified a range of issues that they feel contribute to the partnership being an effective and worthwhile plant conservation model.

The formal partnership agreement is based on achieving a number of outcomes including mutually beneficial resource sharing, developing a regional plant species collections focus, links to partners involved in plant conservation, cross-promotion and joint project initiatives (Taylor 2013)

Interviewees were asked to expand on these desired outcomes and outline the benefits, achievements, added value, and challenges as a result of the partnership and identified the following:

5.3.4 SEBWG Benefits

Partners recognise a coordinated approach to threatened species collections priorities as a key benefit, with the group developing a consolidated list of threatened species collections within each garden, then working with OEH have listed the threatened species not yet collected that have ex-situ

conservation actions listed within recovery plans for priority collections action. This list has formed the basis of what is now a targeted scope for action within the partnership.

'The long term benefit for our partnership is it now has a clear scope, and it is flexible so different partners can take lead on issues that are relevant to them, but in turn have the backing of the partner agencies – and this is essential and what I think makes this fairly unique. It means a small group can achieve great results with limited resources'.
SEBWG Partner.

All interviewees recognised funding and resources for ex-situ collections work as very limited, and stated that working in the partnership shares these limited resources creating significant efficiencies in service.

Avoiding duplication of effort was an issue all interviewees felt was a strong benefit of the partnership. This specifically refers to collecting actions in natural habitat which are very time consuming due to travel costs and actually finding plants in often remote areas. The partnership advises each other of collecting actions and collects plant material on behalf of the other agencies if they require it.

I think it is a breath of fresh air that gardens are working together to prioritise collections actions because I have first-hand experience where I have seen different Botanic Gardens turn up to a National Park to the same spot, on the same day, to collect the same species of plant – collaboration and communication avoids this type of duplicated effort.
SEBWG Partner

Duplication was identified as a benefit however where partner agencies are using each other to back up threatened species collections in multiple garden sites as a risk management measure to avoid isolated plant loss due to issues such as disease or irrigation failure.

Sharing expertise was also recognised as a benefit of the group, with each agency having different strengths that add value to the partnership as a whole. Partner representatives at SEBWG meetings are generally management level roles, however partners have encouraged communication between agencies at the technician level for specific activities.

The promotional benefits of the partnership were also identified as a benefit, with a strong focus on promotion of the partnerships activities through media releases, with the aim of making the public more aware about the state of threatened species within the bioregion.

Changing perceptions was also seen as a benefit, with multiple agencies promoting ex-situ conservation actions as an important and valid conservation action within the Bioregion.

Internal promotion was also seen as a benefit with individual agencies identifying benefit in making internal management within individual organisations aware of the calibre of the partner agencies involved.

Partners were asked their views on the Governance structure of the partnership including what they liked and disliked about it and overwhelmingly the lack of formality was identified as a benefit, as were the rigid scope of the partnership, the flexibility for different partners to lead different projects, the objective of working to each other's strengths, the non-binding commitment for each partner, and the lack of a clear leader or hierarchy within the group was also a benefit.

Interviewees offered experiences to support this view from different partnerships they had been involved in where they felt the governance structure prevented achievement including that the 'commitment had been too great and too hard', Policy compliance and abiding by terms of reference were more important than outcomes, and the focus on reporting achievements was where partners spent too much time trying to compete with other agencies within the group.

5.3.5 SEBWG Achievements

When asked their view on key achievements for the partnership to date, Interviewees identified 4 different projects or collaborative achievements.

1) NSW Environment Trust Saving our Species Program Grant Funding 2016.

'The Pomaderris Project' is regarded by the majority of interviewees as the highest achievement of the group with successful grant funding received for the group to undertake a 3 year funded ex-situ conservation project for up to 15 threatened Pomaderris plant species within the bioregion.

One interviewee held a particularly strong view that the most important outcome of this grant was not the funding, but the validation of the partnership as a conservation entity.

2) NSW Environment Trust Saving our Species Program Grant Funding 2015.

'The Partnerships Protecting Shoalhaven Plants' lists the partner agencies as project partners for all ex-situ conservation actions for threatened species as part of this project. The SEBWG partnership has an extensive genetic set of the critically endangered Zieria bauerelenii, which is being scientifically trialled for translocation back into the wild.

The partnership leading the conservation of an entirely new Banksia species – *Banksia vincentia* with only 5 individual plants remaining in the wild at Jervis Bay. Each SEWBG partner is undertaking different ex-situ actions including seed storage, vegetative cuttings, and grafting of this species onto stronger Banksia rootstock to boost stock for long term translocation actions to ensure the species survival.

3) Collective Field Trips

Interviewees identified the willingness of partner agency to undertake collective field trips as a benefit. Sharing access to natural areas, finding species in the wild, and developing a consistent record keeping protocol have all been achieved.

4) Bringing the NSW OEH Threatened Species Unit into the Partnership

One Interviewee felt that having the NSW OEH Threatened Species Unit as an active and engaged SEBWG partner has been a significant achievement as it legitimises Ex-situ conservation actions. The Interviewee felt that traditionally the relationship between Botanic Gardens and Land Management agencies on conservation issues has always been 'us and them' with land managers strongly preferring in-situ conservation actions with little regard for ex-situ conservation as a legitimate action to save a species.

'There is still reticence from some threatened species officers for translocation type activity in terms of conservation actions which leads to ex-situ collections of threatened species, however we are slowly turning individuals with that strong view around simply because the situation for many species is too critical – the impact in our natural environment is such that without these interventions some species will not survive – we have lost in the past 5 years 2 mammal species in Australia – so ex-situ conservation is becoming more at the fore of the thinking of threatened species officers'.
SEBWG Partner.

5.3.6 Added value

Interviewees identified a number of added benefits since the establishment of the partnership including the networking opportunities or human contact element, where individuals from different agencies have built rapport and can now seek advice on general issues such as budget, staffing and visitor experience issues.

Staff development exchange opportunities are also considered added value by the interviewees, with future leaders / career development opportunities within organisations offered opportunities to work short term with different agencies. These exchanges are considered a cost effective training opportunity for staff.

The final added benefit identified through the interview is participants through the dialogue are exposed to knowledge they may not get within their own organisations.

5.3.7 Challenges

When asked the challenges moving forward, or negative issues experienced within the partnership, relatively few items were identified by interviewees.

The Scientific Licence Permits issued by OEH for agencies to collect threatened species material, and some legislative constraints such as different Workplace Health and Safety compliance systems when working collectively were identified, however it was acknowledged that the partnership allowed the potential for joint permits to be explored which effectively will reduce administration.

A challenge raised by one interviewee regarding the Local Government Partners was a concern as to whether their individual management plans had a strong plant conservation focus and this may restrict participation at some point, whilst one Local Government interviewee identified ratepayer perceptions within the Local Government Area (LGA) as a concern, with a need to ensure visitor services were not disrupted as a result of staff working on partnership projects out of the LGA.

5.3.8 The Value of Local Government Partners

Interviewees were asked a series of questions regarding their general knowledge of Local Government Botanic Gardens in Australia, their work in plant conservation, and then specifically about the Local Government Botanic Garden partners within SERBWG both their strengths and weaknesses.

Overall, the interviewees had specific knowledge of some Local Government Botanic Gardens they had dealt with professionally including those that undertake plant conservation work, with examples provided of the work of the Gold Coast, Cairns and Mackay Botanic Gardens in Queensland and Albury, Burrendong Arboretum and Coffs Harbour Botanic Garden in NSW, and the interviewees also had strong knowledge of the plant conservation work of both Local Government Botanic Gardens in the partnership.

Interviewees felt the Local Government Botanic Gardens were more 'diverse' than other Botanic Gardens with some Councils operating small gardens for volunteers plant enthusiasts, through to others that are parkland style facilities, while others are recognised Botanic Institutions with a range of horticulture, conservation, education and recreation objectives.

'I love the accessibility I get with the Local Government Partners. You have people with the technical skills, know the local area backwards, are easier to talk to than the state government gardens, and I know the people involved in the work at the local garden – I love that I can pick up the phone and talk direct to the person growing our ex-situ collection of threatened plants in your nursery – I can't do that anywhere else'.
SEBWG Partner

Interviewees had very limited knowledge of any Local Government Botanic Gardens working in similar partnerships to SEBWG with only one respondent aware of the work the Royal Botanic Garden Victoria is currently planning with some Local Government gardens in shared plant conservation collections.

Interviewees felt that the Local Government Botanic Gardens within the SEBWG partnership offered a number of benefits including local knowledge, local focus, connection to the community, accessibility, and cost effective management practices.

All interviewees recognised the benefit of having a local plant focus, and knowledge of the local natural areas as a key benefit when compared to their own agencies charged with collective responsibilities for an entire Region, State or Country.

'Because our gardens mean so many different things to our local community and our staff have to wear so many hats in regard to service delivery, we are often more creative in our solution making'
SEBWG Partner
'In terms of the partnership, the regional gardens simply don't have the resources of the ANBG and Mt Annan, but we find ways to still make a significant contribution and perhaps do it without spending millions to achieve it'
SEBWG Partner

Interviewees felt that the Local Government sector including Botanic Gardens have better connections with their local communities, and in this instance can promote the plant conservation message to a wider audience that the state and federal agencies cannot access. Local Government

gardens are recognised as community hubs with strong visitation from local communities and this provides the opportunity to promote plant conservation to a captive audience.

Creative decision making, and cost effective outcomes were also identified by the interviewees as a strength of the Local Government SEBWG partners, with these agencies having less financial resources often coming up with different methods to achieve outcomes.

Interviewees were asked for any negative experiences with the Local Government Botanic Gardens within the partnership and only one specific issue relating to a Local Government Partner was raised where a batch of threatened plants held in one of the nurseries failed due to an irrigation breakdown.

5.3.9 Partner agency views on wider application of this model.

The Global Strategy for Plant Conservation presents unified targets for Botanic Gardens agencies around the world, leads to the assumption that communication between Botanic Gardens would be strong. The interviewees however, still felt that communication between Botanic Gardens was generally poor, citing isolated examples of good communication including the Millennium seedbank partnership, and the SEBWG partnership where conservation objectives were being achieved by multiple Botanic Gardens.

Each interviewee provided an overwhelming response in favour of the SEBWG partnership and felt within an Australian context should be applied to other Bioregions as a model for Botanic Gardens to work together in achieving conservation outcomes. Species specific partnerships were also offered as a plausible outcome and as an example a Banksia species conservation partnership could consist of gardens from all parts of the country in accordance with this species natural distribution being so wide spread.

The Bioregion model however was considered by the group as the best way forward as it provided relative ease for agencies to meet without too much travel, and the Local Government Gardens involved could argue the benefit of participation based on the work being restricted to a close geographical area that aligned with their Local Government Area.

The key rationale identified in favour of the partnership model was based on creating efficiencies, avoiding duplication of effort, sharing expertise and resources, linking Botanic Gardens more closely with land managers, which in turn recognises ex-situ conservation as a valid action.

Partners also identified the structure of the group as a critical factor for success. The 6 partners at times draw in other agencies only when needed to ensure the group maintains focus. Two examples of this provided include the links to the Bomaderry Creek Landcare Group and Yallah TAFE college that work with SEBWG on the *Zieria bauerelenii* conservation project, and the Illawarra Grevillea Park that contributes to the *Banksia vincentia* project.

When asked what changes or improvements to a broader partnership model respondents would recommend, the need for a leader was the most common response.

The perception of who leads the SEBWG group differed between partners. The majority however do not identify any leader which fits with the intention of the partnership, however the Australian National Botanic Garden Canberra is viewed as the ‘champion’ of the group driving the flow of information and discussion (and motivation) in between the 6 monthly meetings.

This equal partnership model works for SEBWG as each agency is motivated to be a partner, however interviewees felt that in establishing new bioregion partnerships, a defined leader would

be required to drive the establishment of the group, and this role most likely would fall onto the State Botanic Garden agencies due to them having administrative resources to support the group.

5.4 Analysis of Findings.

The three research instruments created valuable data to support the research synthesis as highlighted in diagram 1. The questionnaires and interview all sought respondent's views on the Global Plant Conservation Crisis, and clearly identified the role of Botanic Gardens in the global plant conservation effort. Furthermore, the research instruments have drawn a great deal of information on identifying the current contribution of the Australian Local Government sector to the global plant conservation effort, and the factors that conflict, restrict and prevent a greater plant conservation contribution.

To address the findings the data was grouped in clusters to answer the research questions including Botanic Garden Identity, Funding and Resources, Botanic Garden Service Delivery Priorities, Current Plant Conservation Effort, Barriers and Attitudes toward Plant Conservation, National Collections Agenda, Building awareness and capacity.

5.4.1 Findings from the Local Government Botanic Garden Curators Questionnaire

There was a significant breadth from respondents as to how Botanic Gardens operated from volunteer run facilities with a $20,000 budget per annum through to fully funded gardens with up to 50 staff and a $5 Million operating budget.

Respondents generally identified a range of activities that identify them as Botanic Gardens including but not limited to education programs, guided tours, and plant collections, however only 15% of the sample identified a strategic links to the Global Strategy for Plant Conservation, and furthermore 23% of the sample felt their site did not warrant to be called a botanic garden. These findings are consistent with the literature review findings see Wyse-Jackson, Sutherland (2000) that identifies the lack of accreditation for Botanic Gardens as being an identity problem globally.

Within this sample, the highest service provision priorities were based on meeting the recreation and visitor experience activities of local communities. This finding is further supported by a number of Botanic Gardens within the sample identifying that their plant conservation activities were supported as long as recreation service delivery priorities were not impacted.

A total of 69% of the sample identified they currently undertake work in plant conservation, with 77% of the sample identifying that they have support within their Councils to undertake this work.

Interestingly, the analysis of this data shows no direct correlation between Botanic Garden funding and resource models (inclusive of full time Staff), and service delivery priorities as impacting gardens participating in plant conservation work.

The 62% of respondents who identified budget allocations that are spent directly on plant conservation work highlighted a very conservative average of 3.7% of total spend. All Botanic Gardens in the sample highlighted an estimated spend between 1 and 7.5%, with only one Queensland garden identifying an estimated 25% of budget is spent on plant conservation work.

One key finding within the sample found that none of the Victorian Botanic Gardens currently undertook any plant conservation work, compared to all of the Queensland and New South Wales Botanic Gardens that did. This supports the views identified within sections 2.3 by Britton (1896) and 5.2.5 of this report that these gardens are primarily still focussed on ornamental horticulture, relating to the period of their establishment.

Approximately half (54%) of the sample Botanic Gardens indicated they work in a range of partnerships with other land management agencies, Botanic Gardens and Universities, however only two gardens (15%) currently had established partnerships with other Botanic Gardens specifically focussed on the conservation of threatened plant species.

The research data found that 92% of the respondents felt that addressing Global Plant Conservation targets was a role for Local Government Botanic Gardens however limits in staff numbers, staff capacity and lack of financial resources were the largest barriers to participation or increasing their effort.

In Summary, the Local Government Botanic Garden Curators survey found that the Local Government sector is contributing to the Global Plant Conservation effort, despite a lack of these gardens identifying a strong plant conservation focus through corporate and strategic plans.

Curators of these Botanic Gardens however feel Global Plant Conservation is a valid role for the Australian Local Government sector but the effort is constrained with the demand of meeting local community demand for recreation, limited staffing numbers and capacity and a lack of financial resources the key factors.

Despite gardens identifying funding as a constraint, many of the Gardens actively participating in plant conservation work were only spending an average 3.7% of total operational budget on this work focus which suggests that minimal funding can achieve positive plant conservation outcomes.

The survey indicates that much of the current threatened species plant conservation work is done in isolation with minimal evidence of a coordinated effort through partnerships.

5.4.2 Findings of the Perceptions of Local Government Botanic Gardens Questionnaire

In comparison to the Local Government Botanic Gardens, the State and Federal Government Botanic Gardens and Industry Bodies identified they all operate clearly within a strategic framework that lists plant conservation objectives.

The Botanic Gardens involved in this sample however were found to be similarly impacted in their plant conservation effort to the Local Government sector, having to balance this effort with meeting recreational and tourism service delivery priorities within their Botanic Garden sites.

The research found unanimously that each of the Botanic Garden agencies were not currently resourced or felt they were achieving GSPC targets with between 20 and 55% of threatened species within each state currently held in ex-situ collections, well short of the 75% target listed within the GSPC for the year 2020.

The research found that whilst the Local Government sector was perceived to present a number of challenges including funding, staffing, resourcing, and political domains that affect the sectors contribution within a Global Context, the research also identified potential value within the sector.

The ability for Local Government to connect with its local community, expert local knowledge of natural areas and access to natural area management colleagues were all considered Local Government strengths that the larger agencies did not have.

In addition, the wide geographic spread of Botanic Gardens was also identified as a strength with greater capacity to grow threatened species ex-situ in desirable climatic conditions.

The states of Victoria and Queensland identified two threatened species conservation projects were being considered and planned but not yet commenced, to distribute threatened plant species into Local Government Botanic Gardens.

In addition to these two planned state wide projects, the industry bodies CHABG and BGANZ identified projects underway but not yet completed including a national collections database (CHABG) and a plant collections record software package for regional botanic gardens as plant conservation priorities.

All respondents identified collaborative partnerships as the most appropriate approach not only for Local Government Botanic Gardens, but their own agencies to commence or make a greater plant conservation contribution.

In Summary, the data from this questionnaire finds that despite recognised limitations, the Local Government sector has an identified role in Global Plant Conservation however this effort should be done in partnership with other Botanic Garden agencies. State and Federal agencies have identified strengths within the Local Government sector that adds potential value to the Plant conservation effort including ability to connect with local communities, and expert area knowledge.

Two threatened species conservation projects are being considered from Victoria and Queensland that will enhance the involvement of Local Government agencies under the lead of the State agencies, however a significant gap identified is the lack of completion of a National collections list which currently sits with CHABG, and software support to build capacity within the Local Government sector.

5.4.3 Findings of the Case Study of a Local Government Plant Conservation Partnership.

In contrast to the proposed Victorian and Queensland threatened species plant conservation partnerships, the already operating SEBWG partnership in NSW identifies a number of clear achievements that highlight the Local Government sector as a player in Global Plant Conservation.

This inter-governmental agency partnership identifies a number of factors for success based on each partner considered to be equal, a governance structure that promotes an outcomes over process focus, working to individual strengths, creating efficiencies in service and avoiding duplication of effort and allowing each agency to take lead on specific projects with the support of the other agencies.

The research has found that the partnership has demonstrated capacity in achieving plant conservation outcomes including numerous species being managed in ex-situ conservation programs, grant funded projects, and the establishment of a strong working relationship with the NSW Office of Environment and Heritage the peak land management agency responsible for threatened species conservation.

The leadership structure, clear objectives and working to each other's strengths identified through the interview are congruent with the literature review see section 2.4.

SEBWG partners all identified the impact of limited resources within their own organisation combined with the enormity of achieving the GSPC Target 8 within Australia and the current examples of duplication of effort as being reduced or nullified within the partnership.

As identified in perceptions questionnaire findings, the case study identified the partnership as recognising and utilising the strengths of the Local Government agencies through promotion of plant

conservation objectives within the local communities, and access to strong local knowledge within local areas.

The lack of a National collections list has been overcome within the group by identifying a geographic bioregion in which to focus, then creating a priority collections listing based on knowledge of existing collections, and focussing on threatened species collection where none of the partner agencies yet have them. The key factor for success here is the inclusion of the NSW OEH Threatened Species Unit that lead the identification of species requiring ex-situ conservation action.

The success in identifying a targeted collections plan within a geographic area is congruent with the successes of the UK plant network project Blackmore et al. (2010), and the approach adopted by SANBI to place its gardens in important bioregions, Willis (2013).

Finally, the SEBWG partners are realising value added benefits as a result of working in a collaborative partnership including strong networking that allows for discussion on general Botanic Garden management issues, staff development and exchange, and increased knowledge realised through discussion. The Local Government partners also identified increased internal kudos on the relevance of their plant conservation work as a result of partnering with the larger State and Federal Government Botanic Garden agencies. The benefits of wider application of this partnership are clear, with SEBWG partners identifying new Botanic Garden bioregion partnerships would benefit from having an identified leader to drive outcomes most likely a representative of the State Government Botanic Garden Agency.

In Summary, the SEBWG partnership is clearly demonstrating benefit in delivering a plant conservation objective and is overcoming common Botanic Garden agency issues such as limited funding and resources, expertise in some but not all areas, working toward a targeted plant collections focus and in the process avoiding a duplication of effort.

5.4.4 Synthesis of research findings.

The research has found that Local Government Botanic Gardens in contrast to the State and Federal agencies do not have a strong plant conservation focus identified within a strategic or corporate framework, and a general lack of awareness of the GSPC is a common issue for Botanic Gardens globally as identified by Williams et al. (2001) in section 2.2.2 of this report.

Local Government Botanic Gardens are required to focus on meeting the recreational outcomes of local ratepayers, and while this is viewed as a factor in preventing or limiting a greater plant conservation effort, the findings in the literature, refer section 2.3.1, and the views of the State and Federal agencies in this study find that balancing plant conservation work with meeting recreational / tourism objectives is a common challenge for Botanic Gardens worldwide, and as such should not be a factor preventing plant conservation work, but will be a limiting factor to varying degree.

Local Government Botanic Gardens are currently undertaking ex-situ conservation of threatened plant species using a very small percentage of total operational funding, and a near consensus view from the sector is that addressing global plant conservation objectives is a role suited to the Local Government sector, however limitations in staffing, resources, capacity and political interest were reasons for not yet commencing work in this area.

While it is preferable to always protect plants in-situ, building capacity of Local Government Botanic Gardens to contribute to ex-situ conservation actions presents a practical means by which to make a plant conservation contribution. When considering the limited funding and political interest in Australia for relatively inexpensive ex-situ conservation actions, the argument presented by Press et

all (1996) for Local Government acquiring land for species protection presents a much greater, and perhaps less realistic challenge. The SEBWG Partnership as shown in the findings of this study also overcomes the challenges highlighted by Press et al, where Local Government in the United States are limited geographically which prevents holistic management of some species for habitat protection, and advocacy of land protection outside of the county. The other major implication for land acquisition is that not all land where rare and endangered species are found is available for purchase.

The research identified a consensus view that the current plant conservation effort in an Australian context was not meeting the GSPC Target 8 objective, and this finding is consistent with the global views as identified by CBD (2007) within section 2.2.2 of this report. Limited individual organisational resources were a key factor in this, as were a lack of a coordinated plan via a national threatened species collections list, and yet to commence State Government coordinated conservation projects.

The role of the industry bodies CHABG and BGANZ are considered crucial in developing a national collections priority list, and supporting regional and smaller Botanic Gardens through provision of support for plant conservation records systems. The industry bodies can also address the lack of knowledge within the botanic gardens sector regarding the Global Strategy for Plant Conservation through focussed training programs and conferences.

The research has found that the Local Government sector is considered a value added resource in a coordinated plant conservation effort, sharing the workload, using expert local area knowledge, ensuring wider geographic distribution of ex-situ threatened species collections in regional gardens with suitable climate.

Local Government gardens have the ability to educate local communities and communicate the importance of plant conservation much more effectively than the larger agencies.

The research has found that consensus view regarding the most effective way for Local Government to commence or play a greater role in plant conservation is via establishing partnerships with examples of established or planned partnership projects identified for New South Wales, Queensland and Victoria highlighting that global plant conservation is a role for Local Government.

As highlighted within the case study, Local Government Botanic Gardens through partnerships, will benefit from exposure to similar yet different skill sets from different organisations, networking, establishing and working within a coordinated work plan, access to grants and funding, and importantly supporting the findings of Twomey and Withers (2007) avoiding a duplication of intergovernmental effort, particularly the time and resources required to collect species in isolated natural areas.

6 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The motivation for this study arose from the researcher's observations as a Botanic Garden Curator, and member of the Botanic Gardens Australia and New Zealand (BGANZ) Council that the Local Government sector Botanic Gardens in Australia were a very diverse group of entities delivering a range of services within their local communities, which appeared a direct contrast to the Global Strategy for Plant Conservation that presents a unified plant conservation plan for all Botanic Gardens (CBD 2012).

The lived experience of the researcher as a partner agency member of the South East Bioregion Working Group SEBWG as shown in Appendix 2, led to the development of the case study to better understand the merits of this relatively unique collaboration for wider application within the Local Government sector in developing partnerships to undertake ex-situ plant conservation.

The exploratory study has identified the current contribution of the Local Government sector to ex-situ plant conservation is relatively conservative, and meeting the recreational needs of local communities is, and will continue to be a very important service delivery priority for these gardens.

The words of David Suzuki in stating 'The environment is so fundamental to our continued existence that it must transcend politics and become a central value of all members of society' highlights the real public value benefit for the Local Government sector in focussing more effort on meeting global plant conservation objectives. The enormity of the challenge in conserving threatened plant species, the fact that the State and Federal Government agencies are currently struggling to meet the GSPC targets, and most importantly human's reliance on plants for food, medicine and shelter and the role they play in our environment is too important for the Local Government sector to not make a contribution.

The SEBWG partnership has identified exceptional Local Government practice in an intergovernmental relationship focussed on achieving real plant conservation outcomes within a specific bioregion and has strong merit for wider application throughout Australia.

The study could have benefitted further from exploring the budget allocation for plant conservation activities by the State and Federal agencies and comparing this with the conservative budget allocations identified by the Local Government Gardens, to justify further to the Local Government sector that limited budget and resources should not necessarily be a factor for not undertaking plant conservation work.

The study has also identified emerging research questions that would benefit further research including looking at the Local Government sector managed Botanic Gardens from a national needs perspective including:

What Local Government Botanic Gardens are currently under-funded, or not resourced to undertake threatened species conservation work, but lie within geographically isolated yet important bioregions with a need for ex-situ conservation of species found within that area?

What bioregions in Australia have no Botanic Garden representation for undertaking ex-situ conservation of plant species – essentially, where are the priority areas for new Botanic Gardens to be established?

6.2 Conclusions

What is the current contribution of Local Government operated Botanic Gardens in Australia to the global plant conservation effort?

The key issues to emerge from the perceptions of Local Government Botanic Garden Survey indicate that the Local Government sector managed Botanic Gardens are viewed as a potential contributor by the State and Federal Botanic Garden Agencies, and have the support of the industry bodies BGANZ and CHABG.

It is evident from the views of the respondents that the task at hand in conserving Australia's threatened species is too large and too important to not consider the resources within the Local Government sector making a contribution.

Significant limitations including recognising the importance of plant conservation within a strategic framework, staff numbers, staff expertise, budget and infrastructure, and the recreational role Local Government Botanic Gardens have within their local communities, in addition to an added level of politics are recognised.

In summary, considering the situation in Australia, it appears the role of Local Government Botanic Gardens are varied however:

- It is clear that some do make a contribution to Plant Conservation
- Some don't do any plant conservation work but all recognise its importance
- All would like to do more
- Accreditation or lack thereof is a factor in understanding the capability of some Botanic Gardens

There is a lack of research into the role of Local Government Botanic Gardens and their role in Plant Conservation. Additionally, there is a lack of research into their capacity and how they can work with other Botanic Gardens in a coordinated effort.

Is a collaborative partnership model an effective method for Local Government Botanic Gardens to make a greater contribution to the global plant conservation effort?

- Partners recognise a coordinated approach to threatened species collections priorities as a key benefit
- Avoiding duplication of effort was an issue all interviewees felt was a strong benefit of the partnership.
- Sharing expertise was also recognised as a benefit of the group, with each agency having different strengths that add value to the partnership as a whole.
- Changing perceptions was also seen as a benefit, with multiple agencies promoting ex-situ conservation actions as an important and valid conservation action within the Bioregion
- The promotional benefits of the partnership were also identified as a benefit, with a strong focus on promotion of the partnerships activities through media releases, with the aim of making the public more aware about the state of threatened species within the bioregion.

6.3 Recommendations:

Based on the findings of this study, the following recommendations are presented:

1 Local Government Sector Botanic Gardens need to strengthen their strategic plans to ensure plant conservation objectives are identified to ensure it is a valid service delivery stream.

2 Local Government Botanic Gardens to seek collaborative partnerships with other Botanic Gardens and land management agencies within a practical geographic proximity to undertake shared ex-situ conservation work as based on the SEBWG model.

3 State and Federal Botanic Gardens agencies when partnering with Local Government need to focus on a mentoring and training role to increase ex-situ conservation capacity within the sector.

4 Present the research to BGANZ and CHABG to highlight the importance of pursuing the national plant collections priority listing (CHABG) and plant database system for regional Botanic Gardens (BGANZ) in addition to pursuing professional development and conference themes focussed on awareness of plant conservation, capacity building, and enhancing the reputation of Local Government Botanic Gardens to the wider industry.

5 Recommend further University research into the emerging themes identified in this study including identifying Botanic Garden resources that are underfunded or absent within important Bioregions within Australia for the purpose of ensuring ex-situ plant conservation outcomes are achievable across the country.

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Appendice 1 – Research Instruments

Research Instrument 1 – Questionnaire to Local Government Botanic Gardens

Research Instrument 2 – Questionnaire perceptions of Local Government Botanic Gardens

Research Instrument 3 – Interview Guide

UTS:CLG
CENTRE FOR LOCAL GOVERNMENT

UTS
UNIVERSITY OF TECHNOLOGY, SYDNEY

Australian Local Government Botanic Gardens contribution to the global plant conservation effort.

This Questionnaire forms part of a research project being conducted By Paul Tracey, a Masters student at the Centre for Local Government of the University of Technology, Sydney.

The purpose of this research project is to explore the current contribution of Australia's Local Government Botanic Gardens toward global plant conservation objectives, and to what extent competing service delivery factors in meeting the needs of local rate payers perhaps prevents a greater contribution.

A specific focus of the research will aim to explore the contribution of the Australian Local Government sector to achieving *Target 8 of the Global Strategy for Plant Conservation which aims to secure at least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programs by the year 2020.*

Your participation is sought as a responsible officer for a Botanic Garden operated by a Local Government organisation in full, or supported by Local Government through avenues such as funding and/or the provision of land.

The research questions rely on some quantitative responses, but also the views and opinions of the respondent. As such, all research data gathered from this project will be published in a form that does not identify participants or individual gardens in any way.

If you have any complaints or reservations about any aspect of your participation in this research please contact Research Supervisor Ronald Woods on (02) 9514 1112. You are also free to withdraw your participation from this research project at any time without giving a reason.

Please email your completed questionnaires to Paul Tracey at ptracey@wollongong.nsw.gov.au preferably by 8 August 2016, and please feel free to contact me via email or phone 0417477203 if you have any questions.

Your participation will involve the completion of a questionnaire that is expected to take approximately up to 30 minutes of your time.

Note:
Studies undertaken by the Centre for Local Government and Australian Centre of Excellence for Local Government have been granted program approval by the University of Technology, Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact *Paul Tracey 0417 477 203* or the UTS Ethics Committee through the Research Ethics Officer, [tel: 02 9514-9772]. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Responsible Officer Name:	
Garden Name:	

Question 1 – Is your Garden funded by Local Government?
Does Local Government fund your garden in full, in part, through grants, or in-kind? (Eg - provision of land, or other support).
Please write your response here:

Question 2 – How is your Garden managed?	
Please answer in the column to the right.	
Local Government funded Garden Manager / Curator?	Yes / No
Volunteer Managed Garden?	Yes / No
Number of Full Time (equivalent) paid Staff?	Number
Number of active Volunteers?	Number
What is your annual operating budget?	$

Question 3 – What is your gardens estimated total annual visitation?
Total Visitors

Question 4 - Botanic Gardens *generally* focus on one or more of the following delivery streams - Horticulture, Science, Recreation, Events, Visitor Experience, Volunteer Management and Plant Conservation.

In your own words please explain the service delivery priorities in your garden from most important to least important?

Please write your response here:

Question 5 - Again in your own words, what is it about your garden that you feel actually defines it as a Botanic Garden?

Please write your response here:

1

Question 6 - Does your garden undertake conservation activities of threatened plant species?	
Collection and storage of threatened species as living potted specimens?	Yes / No
Collection and storage of threatened species in seed storage?	Yes / No
Display of threatened species within your living collections?	Yes / No
Are your threatened collections Local Native, Australian Native, Exotic or a mix?	
Please write your response here:	
Any additional comments?	
Please write your response here:	
What would you estimate (as a %) the total expenditure budget (inclusive of labour time) that your garden allocates specifically to Plant Conservation work?	%
Does your garden actively seek opportunities to collect new species of plants with a threatened status for the specific purpose of creating ex-situ collections?	Yes / No
Does your Council support Plant Conservation activities within your Garden?	Yes / No
If you answered yes to the previous question, Are Plant Conservation objectives listed within a (but not limited to) Strategic Plan, Master Plan, Supporting Document, Management Policy, Annual Plan, group / individual Work Plan, Job Description, Budget line item, or other?	
Please write your response here:	

1

Question 7 - Do you record or report your plant conservation work in any formal capacity?	
Through your own plant data records	Yes / No
Through formal reporting (ie Annual Report) within your organisation	Yes / No
As part of Scientific Licencing (or similar) requirements?	Yes / No
Through any other methods?	
If so, please explain:	

Question 8 – Does your garden undertake any plant conservation work in partnership (formal or informal) with other land management agencies, Botanic Gardens, educational institutions or other?
If yes, please write your response here:

Question 9 – In your own words, do you feel that addressing Global Plant Conservation is a suitable responsibility for a Local Government Botanic Garden?
Please write your response here:

Question 10 - In your own words, what would be the biggest challenges to your garden commencing plant conservation work / or expanding your commitment?

Please write your response here:

Question 11 – Do you have any final comments that you feel would be useful to this study?

Please write your response here:

That concludes the Questionnaire.

Thank you for participating.

Please return your completed questionnaire to Paul Tracey via email ptracey@wollongong.nsw.gov.au

Preferably by 8 August 2016.

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UTS
UNIVERSITY OF TECHNOLOGY, SYDNEY

Australian Local Government Botanic Gardens contribution to the global plant conservation effort.

This Questionnaire forms part of a research project being conducted By Paul Tracey, a Masters student at the Centre for Local Government of the University of Technology, Sydney.

The purpose of this research project is to explore the current contribution of Australia's Local Government Botanic Gardens toward global plant conservation objectives, and to what extent competing service delivery factors in meeting the needs of local rate payers perhaps prevents a greater contribution.

This short questionnaire forms a part of the research project and has been devised to gauge the perceptions of State and Federal Botanic Garden Agencies, the Commonwealth Heads of Australian Botanic Gardens (CHABG), and Botanic Gardens Australia and New Zealand (BGANZ) on the current and future contribution of Local Government Botanic Gardens to the Global Plant Conservation Effort.

The Royal Botanic Garden Sydney (NSW Government), Royal Botanic Garden Melbourne (Victorian Government) and the Australian National Botanic Garden Canberra (Australian Government) have been selected for this sample as geographically these gardens have the highest concentration of Local Government Botanic Gardens within close proximity.

Your participation is sought as a responsible officer of one of these agencies, with specific emphasis on seeking your views and opinions on the subject. As such, all research data gathered from this project will be published in a form that does not identify participants or individual agencies in any way.

If you have any complaints or reservations about any aspect of your participation in this research please contact Research Supervisor Ronald Woods on (02) 9514 1112. You are also free to withdraw your participation from this research project at any time without giving a reason.

Please email your completed questionnaires to Paul Tracey at ptracey@wollongong.nsw.gov.au preferably by 8 August 2016, and please feel free to contact me via email or phone 0417477203 if you have any questions.

Your participation will involve the completion of a questionnaire that is expected to take approximately 30 minutes of your time.

Note:
Studies undertaken by the Centre for Local Government and Australian Centre of Excellence for Local Government have been granted program approval by the University of Technology, Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact *Paul Tracey 0417 477 203* or the UTS Ethics Committee through the Research Ethics Officer, [tel: 02 9514-9772]. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Responsible Officer Name:	
Agency Name:	

Question 1 – In your own words, broadly explain the current global plant conservation challenge for Botanic Gardens?

Please write your response here:

Question 2 – What are the plant conservation objectives for your agency, and how do you undertake this work?

Please write your response here:

Question 3 – From a global perspective do you feel Botanic Gardens are doing enough to address the threat to plant species? If so please explain, or if not what are the key limitations for Botanic Gardens?

Please write your response here:

Question 4 - What do you perceive to be the broad contemporary role of Local Government managed Botanic Gardens in Australia?

Please write your response here:

Question 5 - Do you know of Local Government Botanic Gardens in Australia participating in plant conservation activities? If yes, please explain below.

Please write your response here:

Question 6 – Do you feel Local Government Botanic Gardens in Australia are capable, and should they play a role in global plant conservation or do you feel this is the responsibility of State and Federal Botanic Gardens?

Please write your response here:

Question 7 – Does your agency currently work on plant conservation projects with Local Government Botanic Gardens?

Please write your response here:

Question 8 – What would you see as the greatest limitations for Local Government Botanic Gardens either commencing Plant Conservation work or expanding the effort?

Please write your response here:

Question 9 – How would you recommend these limitations could be addressed?

Please write your response here:

That concludes the Questionnaire.

Thank you for participating.

Please return your completed questionnaire to Paul Tracey via email ptracey@wollongong.nsw.gov.au

Preferably by 8 August 2016.

UTS:CLG
CENTRE FOR LOCAL GOVERNMENT

UTS
UNIVERSITY OF TECHNOLOGY, SYDNEY

Australian Local Government Botanic Gardens contribution to the global plant conservation effort.

This Interview forms part of a research project being conducted By Paul Tracey, a Masters student at the Centre for Local Government of the University of Technology, Sydney.

The purpose of this research project is to explore the current contribution of Australia's Local Government Botanic Gardens toward global plant conservation objectives, and to what extent competing service delivery factors in meeting the needs of local rate payers perhaps prevents a greater contribution.

A specific focus of the research will aim to explore a case study of the South East New South Wales Bioregion Botanic Gardens Partnership to determine the potential benefits this model may have for wider application throughout the Local Government sector.

Your participation is sought as a responsible officer for one of the partnership agencies, the interview questions rely on the views and opinions of the respondent. As such, all research data gathered from this project will be published in a form that does not identify participants or individual gardens in any way.

If you have any complaints or reservations about any aspect of your participation in this research please contact Research Supervisor Ronald Woods on (02) 9514 1112. You are also free to withdraw your participation from this research project at any time without giving a reason.

Your participation will involve the completion of an interview that is expected to take approximately 1 hour of your time.

Note:

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Interview theme 1 – Botanic Gardens and Plant Conservation
Q. On a broad level, what is your agencies plant conservation contribution?
Q. What are the other key objectives / service delivery issues for your agency?
Q. Do you find that balancing these competing priorities limits your plant conservation effort?
Q. The Global Strategy for Plant Conservation presents a unified role for Botanic Gardens around the world, so do you think that generally Botanic Garden agencies communicate and work well together?

Interview theme 2 – SE NSW Bioregion Group
Q. The South East NSW Bioregion Group was established in 2013. Tell me what you think about the partnership?
Q. What would you say are the key benefits for your agency in participating in this partnership?
Q. What are the key achievements of this group to date?
Q. What strengths and resources does your agency bring to the partnership?
Q. Do you view this partnership as having long term benefits for plant conservation objectives in SE NSW?

Interview theme 3 – Local Government as a partner
Q. What is your broad view of Local Government Botanic Gardens in Australia?
Q. Are you involved, or aware of other partnerships similar to the SE NSW Group which involve Local Government Botanic Gardens?
Q. Are you aware of Local Government Botanic Gardens working on Plant Conservation projects?
Q. What strengths do you feel the Local Government Botanic Gardens in the partnership offer?
Q. Have you experienced any negative issues from the Local Government Agencies through this partnership?

Interview theme 4 – The Partnership Benefits / Challenges
Q. What do you like or dislike about the governance structure for the SE NSW Bioregion partnership?
Q. Would you recommend this collaborative approach as an ideal way for Local Government Botanic Gardens to make a plant conservation contribution?
Q. What changes or improvements would you make in recommending a broader partnership model throughout the country?

Appendice 2 – The Wollongong Botanic Garden.

Local Government Botanic Gardens Contribution to Global Plant Conservation:

The Wollongong Botanic Garden – Budget $3,800,000pa.

The Wollongong Botanic Garden (WBG) is a fully funded Local Government Operation with 24 full time staff and 30 active volunteers who operate the Friends of the Wollongong Botanic Garden group.

Established in 1970, the Wollongong Botanic Garden is very diverse when compared to most Botanic Gardens, with a range of exotic and native livings collections including an exotic threatened species Palm Collection, Indigenous Bush Tucker garden planted completely with plants local to the Illawarra Region, rare and endangered native collections, succulents, roses and camellia's. The garden also contains heritage listed landscape elements associated with the Gleniffer Brae Manor House.

WBG also maintains three natural areas as annexe sites to the Botanic Garden including Puckey's Estate Nature Reserve located along Fairy Meadow Beach, Korrongulla Wetlands a tidal tributary of Lake Illawarra, and the Mount Keira Summit Park at the top of the escarpment. The three natural areas are listed as annexes as they represent geographically the City of Wollongong – the City where the mountains meet the sea, and contain endemic plant species collections, and endangered ecological communities.

WBG also operates 'Greenplan' a rate payer subsidised nursery, with local residents able to purchase discounted plants that are local to the Illawarra, supplies plant material to more than 60 bushcare groups, and donates plants annually to local schools. The nursery is operated as a biodiversity initiative for the City and grows and distributes more than 80,000 plants per annum.

Annual visitation to the garden is currently 520,000 per annum, and events and activities boost these numbers significantly with events such as the Sunset Cinema attracting 30,000 visits alone, the 2016 Sculptures in the Garden increased average attendance by 25,000 over its six week period, and more than 30,000 students attend WBG education programs. The Wollongong Conservatorium of Music is located at WBG and draws an additional 100,000 estimated visits per annum in addition to garden visitation.

This garden has a high profile within the Local Government Area and scores consistently high for satisfaction and importance within Councils Biannual community satisfaction surveys, listed within the top 5 services the Council provides.

WBG like the sample within the study, gears the majority of its funding and resources to maintaining a strong visitor experience, but has identified plant conservation objectives listed within the Strategic Plan 2010, and Conservation Policy 2010.

Sustainability is the key education deliverable within WBG, with education programs, quarterly magazines, and online presence all biodiversity (plant conservation) and waste focussed.

Local Government Botanic Gardens Contribution to Global Plant Conservation:

The Wollongong Botanic Garden – Continued

WBG allocates and estimated 7.5% of its total operating budget specifically to conservation work undertaking targeted ex-situ conservation of (currently) seven threatened plant species from the region, and maintains rare and critically endangered exotics including Palms, Camellia's and a range of South African plants belonging to the genus Haworthia.

WBG also has a dedicated Living Collections Curator, with 30% of this role allocated specifically to working within the South East Bioregion of NSW on ex-situ conservation projects.

WBG has extensive plant conservation partnerships, with the Janet Cosh Herbarium and Sustainable Buildings Research Institute at the University of Wollongong, Burnley College Melbourne University, TAFE Illawarra Yallah Horticulture Campus, Conservation Volunteers Australia, Bushcare, and the NSW National Parks and Wildlife Service.

WBG is also a founding member of the SEBWG working the partners within this group on various ex-situ plant conservation projects throughout SE NSW.

Plant Conservation is a role for Wollongong Botanic Garden, and the garden is termed 'the backbone of sustainability' within the Council due to it not only providing the Botanic Garden itself, but the subsidised plant sales, and supply of plants to more than 60 natural area restoration groups across the city.

WBG recognises its limitations in increasing its focus on plant conservation activity, and views the establishment of the SEBWG partnership as a fundamental success, based on the exposure it has provided to staff in learning from the Australian National Botanic Garden, and Australian Garden Mount Annan.

The establishment of the relationship with the NSW OEH Threatened Species Unit has been a critical factor for success of the partnership, effectively making ex-situ plant collections a valid conservation action.

The areas of expertise that WBG takes lead within the partnership, include ex-situ collections of living plants, knowledge of local natural areas, lead in the Pomaderris walshii conservation project, and media and promotion of SEBWG activities.

Many species particularly from rainforest communities cannot be stored long term in seedbanks, due to fleshy based seeds non-viability once it is dried, hence the need to keep live ex-situ collections. WBG has a large production nursery with space to grow live specimens.

Sourcing local plant material for 30 years to supply the Greenplan nursery has ensured WBG staff have expert knowledge of the local area within the Wollongong, Shellharbour, and Kiama LGA's and where to locate a vast range of species.

WBG leads conservation of the *Pomaderris walshii* with a current restriction of 41 known plants left in the wild.

Wollongong has its own regional newspapers, radio, and print media and as such WBG has been able to garner significant media support for projects on behalf of SEBWG