

# **Title: Exploring social perceptions of youth toward biodiversity within protected areas and botanical gardens using local examples within the Durban Metropolitan Area**

**Author:** Dr JB Foley. Durban University of Technology. Horticulture Department.

## **1 Introduction**

### **1.1 Context and Overview**

South African youth between the ages of 15-34 comprise 36.2% of our population and can exert a powerful effect on society (Stats SA, 2016). A greater cognisance of their knowledge, attitudes and perceptions of local natural areas and botanic gardens is therefore influential in supporting and enabling conservation efforts. This paper highlights some of the findings from a recent doctoral study of university students visiting representative samples of an urban protected area (Pigeon valley) and the Durban Botanic Gardens. Drawing on a student sample group of 428 learners from the Durban University of Technology specific attitudes toward biodiversity conservation were examined using a range of evaluation tools such as statistical surveys and in depth focus groups. While a range of opinions were elicited overall a strong conservation ethic emerged with the majority of students having close ties to cultural traditions and African Traditional Medicine. The results have implications for environmental educators, natural resource managers and education practitioners in botanic gardens in the way that biodiversity messages are crafted and delivered.

### **1.2 Focus and aims**

The knowledge, attitudes and perceptions of South African youth toward protected areas and botanic gardens is still largely unknown and deserves closer scrutiny. Green outdoor spaces serve multiple functions in terms of biodiversity conservation, tourist destinations and opportunities to connect with nature on a personal level (Krasney *et al.*, 2013). This paper examines three particular facets of how young people connect with these spaces namely:

- a) Frequency of visit
- b) Ranking of preferred activities
- c) Identification of possible impediments to site visits

These findings may be used as a guide by conservation and biodiversity managers to further attracting greater numbers of South African young people to these special green spaces in both town and country since it is only through first hand experiences with the natural world that a love for conservation is developed and nurtured (Louv, 2005; Gould, 1991).

## **2 Literature Review**

### **2.1 Purpose and ethos of protected areas**

Protected areas (PA's) comprise 12.7 percent of the Earth's land surface and include National parks, wildlife preserves and nature reserves (Balmford *et al.*, 2015). In a world where biodiversity is under pressure from human development these remnants are critical to conservation efforts preserving gene pools of flora and fauna for future generation and preserving rare and endangered ecosystems (Weaver, 2008). Recent findings by University of Cambridge extrapolated the global visitor count to terrestrial PA's to

be 8 billion per year estimating direct tourist expenditure at \$600 billion (Balmford *et al.*, 2015). These figures dwarf current conservation spend of less than \$10 billion. Despite the fact that visitor numbers exceed that of world population it tends to be relatively wealthy North Americans and Europeans who do so. These continents account for four fifths of protected area visits — an estimated 3.8 billion occurring in Europe, and 3.3 billion in North America (Balmford *et al.*, 2015).

South Africa is considered to be one of the 17 most mega-diverse countries in the world yet only 6.5% of the country's surface area is included in protected areas (DEAT and SANBI, 2008). A National Protected Areas Expansion Strategy (NPAES) aims to increase the area under protection to 12% in the next twenty years (Driver *et al.*, 2011). In Durban there are about 46 'nature reserves' with a total area of approximately 5 430 ha. However, this represents only 2.3% of the entire city footprint (Boon, 2007).

It is clear that PA's have enormous potential to both generate funds and conserve biodiversity yet their visitor profiles are skewed in favour of the affluent North. Biodiversity richness however is largely distributed in LDC Southern Countries and conservation planners need to maximise these opportunities. Protected areas whether large or small still offer the visitor a relaxed venue in which to establish individual points of connection with wild nature and local biodiversity (Hemson, 2015).

## **2.2 Purpose and ethos of botanic gardens**

A botanic garden is far more than a public park, it provides a complex multi layered experience for the visitor, a restorative natural environment which improves human wellbeing psychologically, spiritually and physically (Ward, Parker and Shackleton, 2010; Ballantyne, Packer and Hughes, 2008). As a conservation agency Botanic gardens cultivate and propagate endangered plants as an *ex situ* conservation strategy whereby some of the plants will be displayed and allowed to grow as mother stock while seed will be harvested to propagate new plants in the nursery (BGCI, 2007; GSPC, 2012). Botanic gardens protect and foster plant biodiversity and subscribe to international conservation agendas such as the Global Strategy for Plant Conservation (GSPC) (Ward, Parker and Shackleton, 2010).

There are over 2500 botanic gardens around the world and together they receive over 300 million visitors a year (Williams, *et al.*, 2015: 1610). As a tourist destination Julia Willison director of Botanic Gardens Conservation International (BGCI) observes that 1 in 33 of all the people in the world visit a botanical garden each year (Chang, Bisgrove and Liao, 2008: 233). Kirstenbosch, a world heritage site and a showcase for South African flora received some 1 million visitors in 2014 (Brand South Africa, 2015). Kirstenbosch was voted the most popular garden in the world in 2015 an award bestowed by the presented by the International Garden Tourism Network (IGTN) (Brand South Africa, 2015). One of the stated roles of botanic gardens is communicating botanical knowledge to a wide audience. Surveys conducted by Botanic Gardens Conservation International (BGCI) indicate that 91% of botanic gardens worldwide include education in their mission statement (BGCI, 2007). Global concerns reflected the growing disconnect between young people and nature, 'plant blindness' and the general neglect of plant education in environmental programs (Louv, 2005; Wandersee and Schussler, 2001; Krasney *et al.*, 2013).

## **2.3 The Durban urban open space context**

Covering a spatial footprint of some 2 297 square kilometres, the city of Durban has a population of 3.44 million and is located within a global biodiversity 'hotspot' the Maputoland-Pondoland-Albany complex or MPA that gives rise to an extraordinary variety of plants and animals within an urban setting (Mattson, 2015: 38; Boon, 2015: 100). The Durban Metropolitan Open Space System (DMOSS) is the footprint which defines the environmentally significant land in the City (Durban: State of Biodiversity Report., 2014/15). This open space system of 76 000 hectares represents almost one-third of Durban's total area and includes river catchment areas and nature reserves (Boon, 2007: 10). Almost 9.5% of this land is under protection (Durban: State of Biodiversity Report., 2014/15). The system has created a series of green corridors or lungs throughout the city and a number of self-guided trails linking natural areas were established for members of the public to enjoy the natural fauna and flora of the Durban area (Boon, 2007:12).

## **3 Research methods and study sites**

### **3.1 Surveys and focus groups**

The study was carried out using both quantitative and qualitative methods. In the first approach a suitable survey was developed modelled along the lines of international biodiversity surveys carried out in Europe as well as a Danish biodiversity workshop conducted in a range of first and third world countries (EU Barometer, 2010, World Wide Views, 2012). The survey was adapted for South African young people and elicited a range of responses including their understanding of the term 'biodiversity' and their interaction with protected areas and botanical gardens. A cross section of 428 students were surveyed across the six Faculties of the Durban University of Technology. A non-probability or convenience sampling method was employed (Mouton, 2012). Statistical data was then analysed using social sciences software package SPSS V 24.00. Selected results pertinent to this paper are displayed graphically in Figures 1-6.

The second approach involved the use of focus groups as described by Roller (2011); Kress & Schoffner (2007). The focus groups involved guided discussion on the relevance of biodiversity, viewing of video clips and local field visits to either Pigeon Valley Nature Reserve or the Durban Botanic Gardens. Members of each focus group then produced A2 personal response posters that interpreted the urban green site that they visited. Four focus groups were convened at DUT gathered from three different Faculties and representing the departments of Video Technology (n=10), Horticulture (n=12), Child and Youth Development (n=15) and Maritime Studies (n=20). Such a selection ensured that the results were not skewed or biased in terms of favouring a conservation ethic.

### **3.2 Accessible study sites – living examples of local biodiversity**

Two urban green open spaces within the heart of the Durban were selected for this study, one protected area or nature reserve (Pigeon Valley Nature Reserve or PVNR) and the Durban Botanic Gardens (DBG). Pigeon Valley is a suburban nature reserve and remnant of coastal forest. The reserve provides an excellent sample of local biodiversity and is within walking distance from the Howard College Campus of UKZN. The Durban Botanic Gardens (DBG) is a world class botanic garden and arboretum containing specialist collections of indigenous and exotic plants and is within walking distance of DUT. Significant features of each site are briefly described.

#### **3.2.1 The Durban Botanic Gardens (DBG)**

Currently marketed as the oldest surviving botanic garden on the African continent and Durban oldest public institution the gardens were originally proclaimed in December 1849 as a botanic station for the trial of agricultural crops which included sugarcane, coffee, rubber, cinchona and arrowroot (McCracken, 1996:5). Today nestled at the base of the Berea ridge the landscaped grounds provide an urban green lung and a haven of tranquillity for city dwellers as well as a popular tourist destination for international and local visitors. Horticulturally the gardens are known for their fine collection of trees, palms, orchids and cycads. As an arboretum of exotic trees DBG is unsurpassed, its colonial curators having sourced and planted a variety of specimens from around the world (Mattson, 2015). A popular destination on the domestic and international travel route there is no entry charge and the gardens are visited frequently by the local student population at DUT.

#### **3.2.2 Pigeon Valley Nature Reserve (PVNR)**

Pigeon Valley Nature Reserve (PVNR) is a 10 hectare remnant of Coastal Forest on Durban's Berea, once part of an extensive forest tract (Boon, 1992: 3). Surrounded by a sea of suburbia this urban green space is now a refuge for birdlife and endemic forest plants bounded by busy motorways on each side. The reserve boasts a high level of local biodiversity richness with a current bird list of some 152 species and an indigenous tree list of 110 species (C, Hemson, personal communication, 15 July 2015). A central brick

paved path bisects the reserve in its valley into two distinct portions a cool moist south facing slope and a hotter drier north facing slope. These topographical differences influence the microclimate and plant distribution patterns of the reserve (Fairall and Nichols, 1992:69). Vegetation at PVNR consists largely of what Boon (2015: 106-107) describes as Northern Coastal Forest, a dense species rich subtropical forest of medium to tall height. The representative flagship forest species within the reserve are the Natal Elm (*Celtis mildbraedii*) and the Natal Loquat (*Oxyanthus pyriformis* subsp. *pyriformis*). The birding fraternity is active in the reserve on a regular basis under the auspices of Friends of Pigeon Valley and the Natal Bird Club. Red duiker are resident in the reserve, troops of vervet monkeys feed in the forest and various local snakes have been frequently spotted (Hemson, 2015).

In summation both DBG and PVNR sites provide excellent examples of urban green space that can act as 'arenas of learning' with their immense plant diversity, aesthetic appeal and cultural heritage. They served as useful host venues in which students were able to discover and express their own personal connections with local biodiversity.

## 4 Findings

The following results are presented from a statistical analysis of the 428 surveys conducted at DUT. Three survey questions were isolated that focus on a) Frequency of visit b) Ranking of preferred activities and c) Identification of possible impediments to site visits. Included are some comments derived from the four focus group transcripts that illustrate a particular perception or attitude.

### 4.1 Visits to Nature Reserves

#### Q1: How often have you visited a nature reserve in the last year?

Over a third of student respondents (36.2%) had never visited a nature reserve while 35% claimed to have visited at least once in the last year. A lower percentage visited more frequently (12.5%) once in the last 6 months and 11.3% once in the last 3 months. Of those who had not visited a reserve in the last year the greatest percentage were drawn from the city centre (50%) followed by rural areas (44%) and small towns (43%) The greatest number of student visitors were drawn from the suburbs (78%). This data corresponds with the literature where it is generally the affluent middle class that visit nature reserves (Foley, 2011). Whites are traditionally known for their zeal in developing, managing and visiting reserves (Cock and Koch, 1991). Since the total number of White respondents in this survey was marginal (11) their opinions on this topic need to be explored more fully in another survey. A cross tabulation test of this question with race in terms of those who had never visited a reserve indicated nearly 41% of these were Black learners, followed by Coloureds (22%) and Indians (19%). Focus groups revealed a substantial amount of resistance by Black students to visit nature reserves since they saw no need to pay cash on entry to view what was perceived to be common currency on the farm and bush.

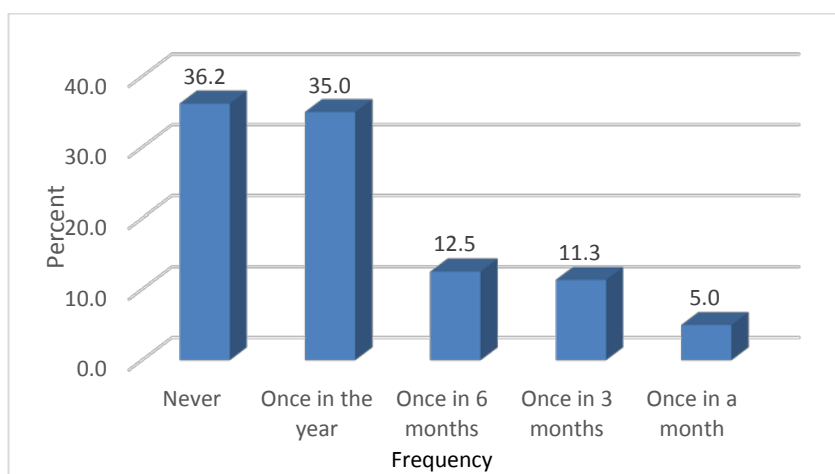
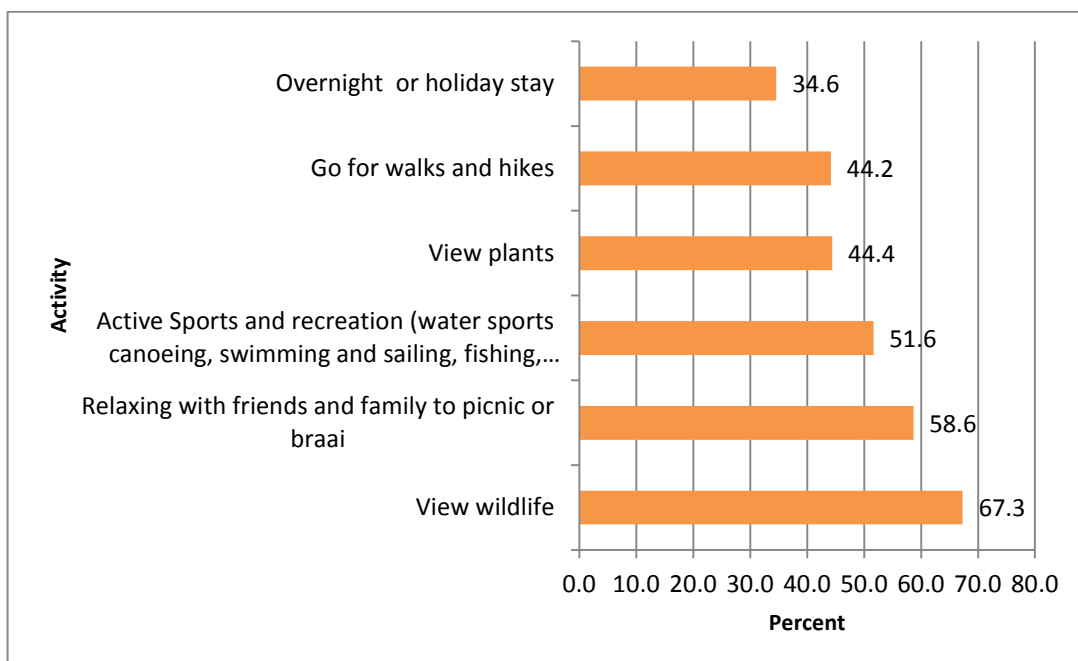


Figure1: Frequency of visits of to Nature Reserves

**Q 2: What activities would you like to engage in at a nature reserve? You may circle MORE THAN 1 OPTION**

The most popular activity was Wild life viewing (67.3%) followed by relaxing and picnicking (58.6%), active sports (51.6%), walks and hikes (44.2%) and viewing of plants (44.4%). This follows evidence from previous surveys (Foley, 2011) where visitors prefer to relax and unwind rather than engage in hiking and trail activity. Animals feature more prominently than plants in public popularity polls (Weiler and Smith, 2009; Wandersee and Schussler, 2001) and this is also confirmed in the television viewing preferences of this survey. Active sports were favoured by the younger students 17-21 years which accounted for 58% of the 221 respondents that ticked this option.

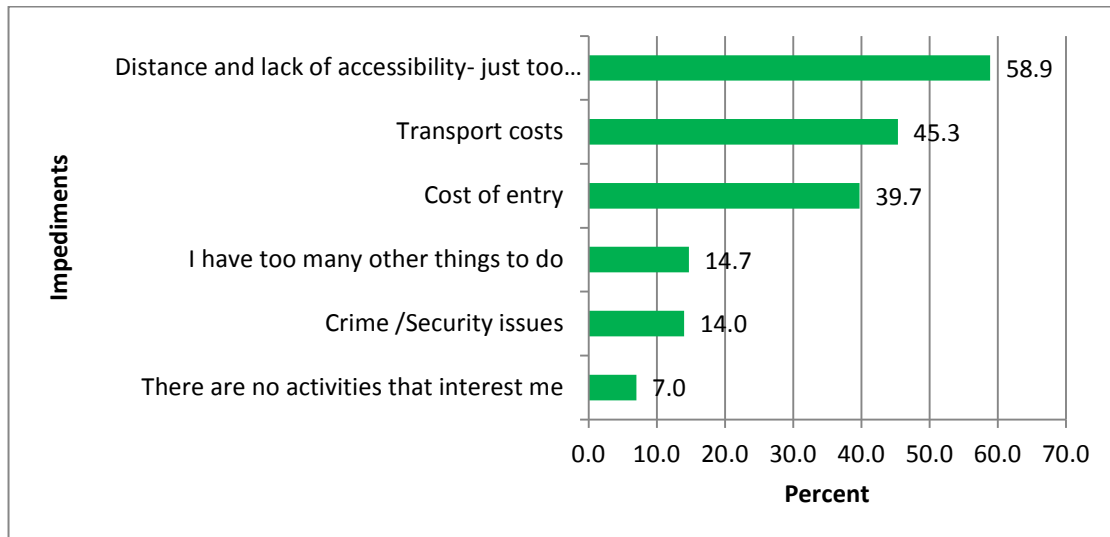
Older students proved more sedentary with 36 % favouring active sports in the 22-25 years and only 5% participating in the 26-30 year bracket. Hiking activities followed a similar trend. The black students were divided in their attitude toward Nature Reserves some questioning as to why they should visit at all ... “I don’t need to go to a nature reserve as I live on a farm.” and “why should we pay money to see wild animals anyway?” with others enjoying the outings “I have been to Croc World where I saw the oldest crocodile about 400 years old!”



**Figure 2: Ranking of preferred activities in Nature Reserves**

**Q3 What are the possible reasons that might prevent you from visiting a nature reserve?**

Issues of distance and lack of accessibility were ranked first (58.9 %) followed by Transport costs (45.3%) and Cost of entry (39.7%), all very real challenging obstacles for potential visitors without disposable income and a personal car. Crime and security issues were seen as a problem by a small percentage (14%) while other competing activities accounted for the same value.

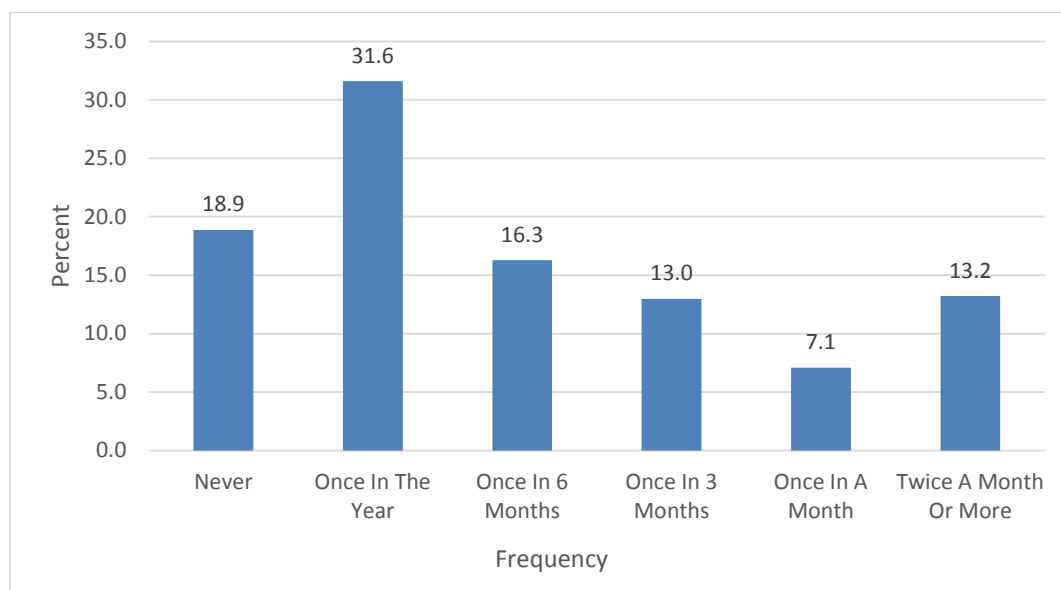


**Figure 3: Impediments for visiting Nature Reserves**

## 4.2 Visits to botanic gardens

### Q 1 How often have you visited Durban Botanic Gardens (DBG) in the last year?

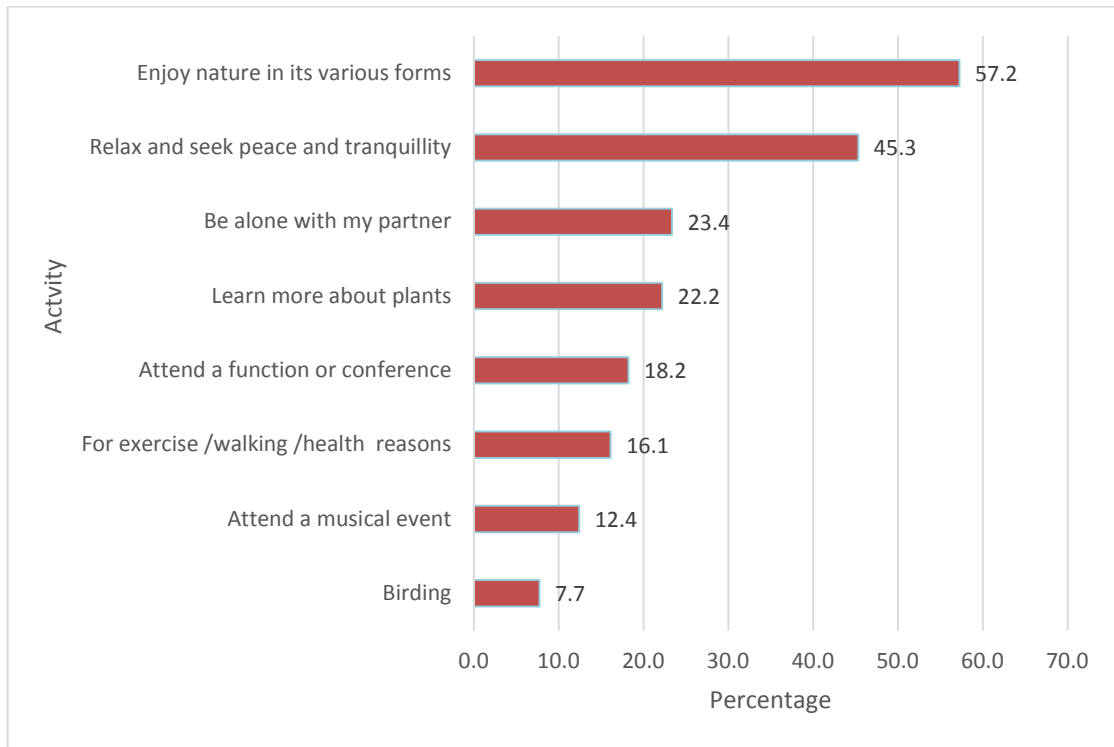
Less than 20% of respondents had never visited the gardens while the remaining 80% had visited at least once or more in the last year. The high use of the facility by students is encouraging since it forms a point of actual contact with nature.



**Figure 4: Frequency of student visits to the DBG**

### 2.2 If you have visited the DBG what is the purpose of your visit ?

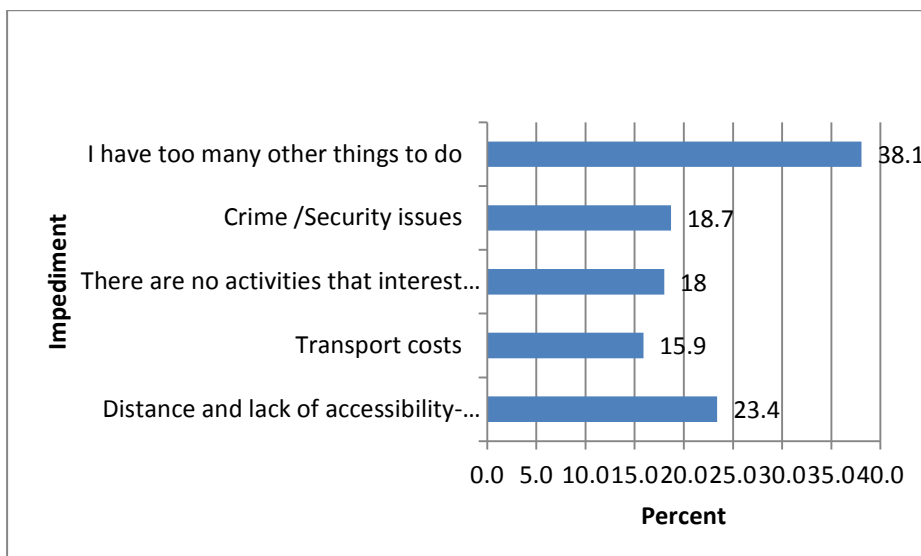
Respondents indicated the prime purpose was to enjoy nature in its various forms (57.2%) followed by the need to relax and seek peace and tranquillity (45.3%). This confirms the literature concerning visitor activities in botanic gardens (Weiler and Smith, 2009; Ballantyne, Packer and Hughes, 2008; Ward, Parker and Shackleton, 2010; Williams, *et al.*, 2015) as well as findings from a local think tank concerning physical development of the DBG precinct hosted by the Ethekewini architectural department in 2012. Students cited other reasons such as finding privacy with their partner (23.4%) and learning about plants (22.2%). Exercise and health reasons scored 16.1% while attendance at conferences scored 18.2% and musical function 12.4%. Birding was the least popular activity at 7.7%.



**Figure 5: Preferred activities at the DBG**

### 2.3 What are the possible reasons that might prevent you from visiting the Botanic Gardens?

Similar questions were posed for Nature Reserves but the responses were quite different with 38% of students stating they had too much else to do and there were no activities in the gardens to interest them (18%). These sentiments represents a common challenge to Botanic Gardens around the world and in response the DBG has developed a vibrant musical programme including local South African artists such as Mafikizolo, Prime Circle and Freshly Ground which attract all cultures and ages to the gardens (Woodiana, 2013:2). Distance is not an issue for DUT students yet this was cited as the second reason not to visit the gardens (23.4%). Respondents may have meant taxi costs to travel from off campus residences such as the Beachfront and Alpine Road. Security and crime concerns scored 18.7%.



**Figure 6: Impediments for visiting DBG**

## 5 Analysis and discussion

In terms of actual contact with Nature Reserves DUT students had mixed reaction with some challenging the concept and others enjoying their visit and making favourable comments. The ranking of desired activities at reserves were congruent with the literature on protected areas and visitor activities (Weaver, 2008; Foley, 2011). Historically nature reserves were initiated by the colonialists and have not been fully embraced by mainstream black culture (Burnett and waKang'ethe 1994; Cock and Koch, 1991). This is not to say they do not value plants and animal diversity it's just that they are viewed in a different light and for a different pragmatic purpose. With over one third of respondents never having visited a nature reserve one has to consider the effect of skewed income distribution, poverty and lack of access and opportunity which are real challenges facing institutionalised reserves and private game reserves. While entry fees at private reserves outside the city may be high there is no entry cost attached to the twenty – five municipal owned nature reserves in the city (including PVNR). The only thing lacking are meaningful opportunities and champions to facilitate connections between students and these open spaces. Once DUT students from the focus were exposed to wild urban green spaces their delight was clearly evident and reflected in their poster feedback.

Thembinkosi Ngcobo, eThekweni Municipality- Head: Parks, Recreation and Culture Service Unit points out the value of placing horticulture within its social context for the benefit of all citizens and wishes to see the Durban Botanic Gardens evolving into a “multi-cultural constituency... with no limit to the number of interests, aesthetics and activities the Gardens can cater to.” (Woodiana, 2013: 2). While the DBG enjoys good support from DUT students due in part to its close proximity to the campus offering a tranquil green lung in the heart of the Berea there is definitely scope for creativity in attracting and connecting young people in a more meaningful way to the gardens. The author supports this vision and believes that a melding of Colonial and African cultural values would be a progressive step for both local horticulture and biodiversity awareness.

In summation it is evident that environmental managers need to explore ways to attract more South African young people to protected areas and engage them in constructive dialogue and participatory workshops as to the value of these spaces. While Botanic gardens appear to enjoy more popularity botanical outreach programs should be specifically extended to appeal to the youth in an exciting and relevant way. As film maker Richard Attenborough (2010) remarked ‘No one will protect what they don't care about; and no one will care about what they have never experienced.’

## 6 References

- Attenborough, D. (2010). *Keynote speech at the British Natural History Consortium 'Communicate' conference, 'Connecting with Nature', 2010, Bristol.*
- Ballantyne, R., Packer, J. and Hughes, K. (2008). Environmental awareness, interests and motives of botanic gardens visitors: Implications for interpretive practice. *Tourism Management*, 29(3), 439-444.
- Balmford, A, Green JMH, Anderson M, Beresford J, Huang C, Naidoo R, et al. (2015) Walk on the Wild Side: Estimating the Global Magnitude of Visits to Protected Areas. *PLoS Biol* 13(2): e1002074. <https://doi.org/10.1371/journal.pbio.1002074>
- BGCI (2007). *Conclusions from the 3<sup>rd</sup> Global Botanic Gardens Congress. Wuhan China.* Botanic Gardens Conservation International, Richmond, UK: Botanic Gardens Conservation International.
- Boon, R. (1992). *An avifaunal study of Pigeon Valley Park as a biogeographic island in an area with special reference to the Natal Robin.* Unpublished M.Sc.thesis. University of Natal, Durban.
- Boon, R. (2007). *EtheKwini Biodiversity Report 2007.* Durban: eThekweni Municipality.



- Boon, R. (2015). The Durban Forest. Past, Present and Future? in; Mattson, M. (ed.) *The Durban Forest*. Durban: Durban Botanic Gardens Trust.
- Brand South Africa (2015). *Kirstenbosch is world's Garden of the Year*. Available at: <https://www.brandsouthafrica.com/tourism-south-africa/travel/kirstenbosch-200315>. [Accessed on 13 September 2016].
- Burnett, G.W., and waKang'ethe, K. (1994). Wilderness and the Bantu Mind. In: Baird Callicott, J., and Palmer, C. (Eds.) *Environmental Philosophy. Critical concepts in the Environment, Vol 5 History and Culture*. Oxford, UK: Routledge.
- Chang, L. S., Bisgrove, R. J., and Liao, M. Y. (2008). Improving educational functions in botanic gardens by employing landscape narratives. *Landscape and Urban Planning*, 86(3), 233-247.
- Cock, J., and Koch, E. (1991). *Going Green. People, Politics and the Environment in South Africa*. Cape Town: Oxford University Press.
- DEAT and SANBI (2008). *National Protected Areas Expansion Strategy for South Africa*. Draft for Mintech. September 2008.
- Durban: State Of Biodiversity Report (2014/2015). Durban: Environmental Planning and Climate Protection Department.
- Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. *National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report*. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.
- EU Barometer (2010). *Flash Eurobarometer 290 – The Gallup Organisation Attitudes of Europeans towards the issue of biodiversity. Analytical report Wave 2*. Available at: [http://ec.europa.eu/public\\_opinion/flash/fl\\_290\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl_290_en.pdf). [Accessed on 13 September 2016].
- Fairall, M. and Nichols, G. (1992). *Day Walks in and Around Durban and Pietermaritzburg*. Cape Town: Struik.
- Foley, J.B. (2011). *Enhancing the ecotourist experience at Shongweni Reserve through the use of appropriate interpretive strategies*. Unpublished Mtech thesis. Durban University of Technology.
- Gould, S. J. (1991). Enchanted Evening. *Natural History* September 1991, 14.
- GSPC (2012). *Global Strategy for Plant Conservation: a Guide to the GSPC: All the Targets, Objectives and Facts*. London, U.K.: Botanic Gardens Conservation International.
- Hemson, C. (2015). How it grows on us. Human interaction with the Durban Forest. In: Mattson, M. (Ed.) *The Durban Forest*. Durban: Durban Botanic Gardens Trust
- Koch, E. (1997). Ecotourism and rural reconstruction in South Africa: reality or rhetoric. *Social change and conservation*, 214-38.
- Krasney, M., Lundholme, C., Shava, S. Lee, E., and Kobari, H. (2013). Urban Landscapes as learning arenas for Biodiversity and Ecosystem Services management. In: Elmqvist, T., et al. (eds.), *Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities: A Global Assessment*.
- Kress, V., and Schoffner, M. (2007). Focus groups: A practical and Applied Research Approach for Counsellors. *Journal of Counselling and Development*. 85, 189-195.
- Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. North Carolina: Chapel Hill.
- Mattson, M. (ed.) (2015). *The Durban Forest*. Durban: Durban Botanic Gardens Trust.

- McCracken, D.P. (1996). *A new history of the Durban Botanic Gardens*. Durban: Durban Parks Department.
- Mouton, J. (2012). *How to succeed in your Master's and Doctoral Studies*. Pretoria: Van Schaik.
- Roller, M. (2011). Focus Group Research: A Best Practices Approach. *Qualitative Research Design: Selected Articles from Research Design Review*. Available at: <http://www.rollerresearch.com/MRR%20WORKING%20PAPERS/Qualitative%20Research%20Design.pdf> [Accessed on 21 December 2014].
- Stats SA, (2016).
- Wandersee, J.H., and Schussler, E.E. (2001). Toward a theory of plant blindness. *Plant Science Bulletin*, 47(1), 2-9.
- Ward, C., Parker, C., and Shackleton, C. M. (2010). The use and appreciation of botanical gardens as urban green spaces In South Africa. *Urban Forestry and Urban Greening* 9, 49–55.
- Weaver, D. (2008). *Ecotourism*. 2<sup>nd</sup> ed. Brisbane: John Wiley and Sons.
- Weiler, B., and Smith, L. (2009). Does more interpretation lead to greater outcomes? An assessment of the impacts of multiple layers of interpretation in a zoo context. *Journal of Sustainable Tourism*, 17(1), 91-105.
- Williams, S., Jones, J.P., Gibbons, J. and Clubbe, C. (2015). Botanic gardens can positively influence visitors' environmental attitudes. *Biodiversity Conservation* 24:1609–1620.
- Woodiana (2013). Directors Cut. *Journal of the Durban Botanic Gardens Trust Fund*. November 2013.
- World Wide Views (2012). *Results report. From the world's citizens to the biodiversity policymakers. Copenhagen*. Published by The Danish Board of Technology Foundation, October 2012. Available at: [biodiversity.worldviews.org/wp.../2012/10/WWViewsResultsReport\\_WEB\\_FINAL.pdf](http://biodiversity.worldviews.org/wp.../2012/10/WWViewsResultsReport_WEB_FINAL.pdf). [Accessed on 15 September 2016].