



FYNBOS FORUM

Programme

THEME: “Working Together for a Living Landscape”

04 - 07 August 2009

GemeenskapSaal / Sports Complex

Off Recreation Road
BREDASDORP

Organised by the Fynbos Forum Committee.

Funded by

The Conservation and Management of Ecosystems and
Biodiversity Focus Area of the National Research Foundation



Table of Contents

Acknowledgments	2
Fynbos Forum Committee 2008-2009, Fynbos Forum Mission, and Previous Fynbos Fora	3
Programme Overview	4
Programme	5-10
Poster Titles and Poster Numbers	11-12
Field Trips	13-14
Workshop Descriptions	14-19
Paper Abstracts	19-53
Poster Abstracts	54-70
Pictures of some posters	71-92
Addresses of participants	Annexure
Blank pages for notes	

DEDICATION

Fynbos Forum 2009 is dedicated to the late Diana Durrant from Springfield who passed away earlier this year. Diana supported conservation in Bredasdorp district over many years, offering, amongst other things, accommodation and support to numerous scientists. Her farm has been incorporated into the Agulhas National Park.

ACKNOWLEDGMENTS

FYNBOS FORUM

04-07 August 2009

We wish to acknowledge with many thanks the following for their assistance this year!

1. National Foundation for Research Development (NRF) for sponsorship
2. The Botany Department of the University of Cape Town for facilitating the NRF funding
3. SAEON FYNBOS Node for sponsoring international researchers participation
4. The Botanical Society of South Africa for hosting the secretariat, the special offer of Field Guides, and donation of book prizes.
5. The Bredasdorp sub committee for organizing fieldtrips and helping with preparation for Fynbos Forum 2009
6. All other leaders of field trips for arranging such interesting trips this year
7. Africa Geographic for supplies of their magazines
8. The Plant Conservation Unit, UCT, for sponsoring The Theo Manual Award for Conservation Education
9. Ruth Parker for making a copy of her Renosterveld book available as a prize

COMMITTEE MEMBERS 2008 – 2009

Chairman:	Ms Julia Wood
Committee:	Mr Mark Botha Ismail Ebrahim Prof Karen Esler Onno Huyser Donovan Kirkwood Rupert Koopman Dr Connie Krug (Vice Chair) Mr Xola Mkefe Mr Matthew Norval Mr Guy Palmer Mrs Azisa Parker
Secretariat:	Ms Wendy Paisley Mr James Reeler (AV expert)

FYNBOS FORUM MISSION

The Fynbos Forum is an affiliation of researchers, planners, managers, landowners and a range of other stake-holders that meets annually to discuss management issues and research results, and to formulate priorities for future research and conservation management actions required to ensure the conservation and sustainability of Fynbos ecosystems.

In order to achieve this goal, we undertake to assess biological resources, ensure institutional capacity and consider socio-economic issues.

PREVIOUS FYNBOS FORA

1988	:	Avalon Hotel, Montagu
1989	:	ClanWilliam
1990	:	Stellenbosch, The University of Stellenbosch, Die Ark
1991	:	Bredasdorp, Potberg
1992	:	UCT, Cape Town
1993	:	16 & 17 March (Drosdy Museum, Swellendam)
1994	:	13-15 July (Bien Donné, Stellenbosch)
1995	:	5-6 December (Mispah Youth Centre, Grabouw)
1996	:	17-18 July (The Nekkies Dist. Worcester)
1997	:	16-18 July (Genadendal)
1998	:	22-24 April (Die Herberg, Waenhuiskrans, Arniston)
1999	:	September (Rein's Nature Reserve, Albertinia)
2000	:	7-9 June (Ganzekraal Holiday Resort & Conference Centre)
2001	:	01-03 August (Calitzdorp Spa)
2002	:	14-16 August (Goudini, Rawsonville)
2003	:	05-08 August (Hartenbos Resort, Hartenbos, Dist. Mossel Bay)
2004	:	10-13 August (Club Mykonos, Langebaan)
2005	:	01-05 August (Pine Lodge, Port Elizabeth)
2006	:	9-11 August (Goudini Spa, Rawsonville, Dist. Worcester)
2007	:	01-03 August (Club Mykonos, Langebaan)
2008	:	3-7 August Oudtshoorn –Interfaces, a joint Forum with Arid Zones Ecology Forum

FYNBOS FORUM 2009
4-7TH August 2009
BREDASDORP

Times				Tues 4 th August				Times				Wed 5 th August				Times				Thurs 6 th August				Times				Fri 7 th August											
								7h15				Late Registration				7h00				Late Registration				7h00				Late Registration											
								8h00				Welcome: Julia Wood				8h00				Parallel Session 7:				Parallel Session 8:				8h00				Keynote address: Mark Simmons							
								8h10				Opening Address – Invited Guest Chair: Xola Mkefe/ Julia Wood				8h.25				Sustainable Harvesting				Conservation/ Conservation Planning				8h30				Parallel Session 9: Ecology				Parallel Session 10: Education			
								8h30				Keynote address: Marcelo Aizen																											
								9h00				Parallel Session 1: Pollination Symposium				Parallel Session 2: Policy				9h30				Keynote address: Martin de Wit															
								10h00				Tea (& poster viewing)				10h00				Tea				9h45				Tea (& poster viewing)											
								10h45				Parallel Session 1: cont) Pollination Symposium				Parallel Session 2: (cont) Policy				10h30				Poster Session				10h30				Parallel Session 11: Ecophysiology				Parallel Session 12: Aquatics			
12h30				Registration & Light Lunch				11h15								Parallel Session 3: Environmental Management				11h30				Collect packed lunches and depart on field trips				11h30				Hot off the press!!!							
																												11h40				Sorting out of prizes etc....							
13h45				Brief Welcome: Julia Wood				12h30				Lunch																12h00				Closing Remarks, Prizes & Packed lunch							
14h00				Work shop 1				Work shop 2				Work shop 3				13h30				Parallel Session 4: Fire				Parallel Session 5: Stewardship															
																14h30				Parallel Session 6: Partnerships																			
15h45				Tea				15h10				Tea (& poster viewing)																											
15h30				Work shop				Work shop				Work shop				15h45				Workshop 7: 15h30 – 17h30				Parallel Session 6: (cont)															

	4	5	6			Partnerships			
18h00	Sean Privett		18h00	Fynbos Forum AGM					
19h30	Dinner		19h00	Dinner (& Film)		19h30	Dinner & Disco		

Fynbos Forum 4-7 August 2009
Programme

PLEASE NOTE: Presenters' names are in *italics*.

Time	Tuesday 4 August		
12h30	Registration & Light Lunch		
13h45	Brief Welcome – Julia Wood		
14h00	Workshop 1: Management of fragments and fragmented landscapes – filling the gaps <i>Connie Krug</i>	Workshop 2: Western Cape Conservation Stewardship Association <i>Di Marais, Nora Sperling Thiel</i>	Workshop 3: Fynbos stories: who should hear them? How should they be told? <i>George Davis</i>
15h45	Tea		
16h15	Workshop 4: Revisiting the Fynbos Forum Research Strategy <i>C Petersen</i>	Workshop 5: Landuse and biodiversity <i>Charl de Villiers and Jeff Manuel</i>	Workshop 6: Conservation communication support network for conservationists <i>Augustine Morkel</i>
18h00	Sean Privett: Presentation on the Agulhas Area		
	Possible Wine tasting		
19h30	Dinner		

Time	Wednesday 5 August	
7h00	Late Registration	
8h00	Welcome: Julia Wood	
8h10	Opening Address – Invited Guest Chair: Xola Mkefe/ Julia Wood	
8h30	Keynote address: <i>Marcelo Aizen: The global pollination crisis: myth and reality (SAEON International guest speaker)</i> Chair: Anton Pauw	
	Parallel Session 1: Pollination Symposium Chair: Anton Pauw	Parallel Session 2: Policy Chair: Rupert Koopman
9h00	<i>Ruan Veldtman, Mike Allsopp, Madele Rademan, Willen de Lange, John Donaldson</i> The importance of pollination related ecosystem services to the Western Cape deciduous fruit industry	<i>N Allsopp, C Laurent, J Baudry, F Burel et al.</i> Using evidence from environmental policy and management – a not so obvious choice

9h15	<i>Madelé Rademan, Ruan Veldtman, Michael Samways, Mike Allsopp, Willem de Lange</i> Are pollination related ecosystem services comparable to managed honeybee colonies for apple production in the Western Cape?	<i>C B Krug</i> Keeping the Cape lowland archipelagos afloat: bridging the knowing-doing gap
9h30	<i>Mariette Brand, Michael Samways</i> The impact of managed Cape honeybee colonies on the forage behaviour of invertebrate anthophiles in fynbos habitat	<i>Sarshen Marais</i> Promoting intact ecosystems as part of the climate change solution: an overview from the climate action partnership (CAP)
9h45	<i>Rosanne Stanway, * , Pauw, C.A. ¹ and Combs, J. K. ²</i> High selfing rates in a Cape plant community increase resilience to pollinator loss	<i>A Parker and M Barnett</i> An overview of the C.A.P.E. Programme: where are we heading in the Fynbos Biome?
10h00 – 10h45	Tea (+ Poster Viewing)	
	Parallel Session 1: Pollination Symposium (continued) Chair: Anton Pauw	Parallel Session 2: Policy (continued) Chair: Rupert Koopman
10h45	<i>Sjirk Geerts and Anton Pauw</i> Can pollinator loss cause population extirpation in the candelabra plant, <i>Brunsvigia orientalis</i> – a demographic modelling approach	<i>D. Raimondo, M. Driver, K. Maze, M.F. Pfab & N.A. Helme</i> Applications of the Red List for conservation practitioners
11h00	<i>P. Wester and Anton Pauw</i> When mice meet Whiteheadias: first field observations of nocturnal rodent pollination in South Africa	<i>Kas Hamman & Jaco van Deventer</i> How not to communicate a new approach to the management of damage-causing predators
	(cont)	Parallel Session 3: Environmental Management Chair: Julia Wood/ Xola Mkefe
11h15	<i>Marinus de Jager, Leanne Dreyer and Allan Ellis</i> Pollinator mediated interactions determine the assembly of flower colour within co-flowering <i>Oxalis</i> communities	<i>Pierre de Villiers and Nompumelelo Thwala</i> A strategy aimed at establishing management plans for estuaries in the Cape Floristic Region
11h30	<i>Helen Curran, Francois Roets, Leanne Dreyer</i> Pollinator transmitted anther-smut fungal infection of South African <i>Oxalis</i> species: spatial distribution patterns and impacts on host fitness	<i>C C de Villiers</i> Putting the ecosystem approach to work: the Langtouw River pilot study, Southern Cape
11h45	<i>N. Theron, Francois Roets, Leanne Dreyer and Karen Esler</i> Mite (Acari) diversity in the infructescences of <i>Protea</i> species	<i>David le Maitre and Patrick O'Farrell</i> Water and soils: a call for an integrated approach to sustainable management
12h00	<i>J F Colville, S Ferrier, R M Cowling, M D Picker and P L Bradshaw</i> Partitioning explained variation in species composition of pollinating beetles – environment overrides host plant and geographic distance	<i>Greg Forsyth, David le Maitre and Brian van Wilgen</i> Prioritizing quaternary catchments for invasive alien plant control within the fynbos and karoo biomes of the Western Cape Province

12h15	<i>Vera Hofman, et al</i> Components of reproductive isolation and their role in speciation between <i>Jamesbrittenia racemosa</i> and <i>J. pedunculosa</i> (Manuleae)	<i>Rainer Krug, Nuria Roura-Pascual, David Richardson</i> Towards more efficient management of invasive alien plants: spatial prioritisations
12h30 – 13h30	Lunch	
	Parallel Session 4: Fire Chair: Pat Holmes	Parallel Session 5: Stewardship Chair: Ismail Ebrahim
13h30	<i>AnneLise Schutte-Vlok and J H J Vlok</i> Fiddling while Rome is burning – fire management in the Cape Mountains	<i>Glenda Raven</i> Working and learning with people working the land: a case study of a stewardship and extension professional development programme
13h45	<i>W Z Erasmus</i> The demand for resources to practice fire management in the protected areas of the Western Cape – South Africa	<i>Nora Sperling Thiel</i> Western Cape Conservation Stewardship Association
14h00	<i>W J Vermeulen , T Kraaij, A H W Seydach, C J Van der Merwe and J Britton</i> Towards an adaptive interference fire management system for the Outeniqua and Tsitsikamma Mountains	<i>Pamela Booth</i> The declaration of a Protected Environment: who, how, where, why and when?
14h15	<i>Augustine Morkel</i> Predictive modelling in conservation managers' decision making systems related to fire	<i>R M Smart and S Ralston</i> SHORT PRESENTATION The role of the Environmental Impact Assessment process in conservation gains: reactive stewardship
	(Cont)	Parallel Session 6: Partnerships <i>Chair: Onno Huyser</i>
14h30	<i>T Kraaij, R M Cowling, J H J Vlok and B W van Wilgen</i> 6+2mins Towards determining the ecological fire season for the Garden Route coastal mountains	14h30 <i>Paula Hathorn and Ntsiki Mlotywa</i> People and nature on the Cape Flats: experiments and lessons
14H38	<i>Val Charlton, Zane Erasmus and Leanne Mckrill</i> 5+2mins Introduction to Firewise South Africa	
14h45	<i>Leanne Mckrill</i> 8+2mins Firewise South Africa: community involvement	14h45 <i>Mark Ogilvie</i> The Nature Care Fund, the future of urban conservation!
14h55	<i>Christalene de Keller</i> 6+2mins Firewise South Africa: fire fighters and awareness	15h00 <i>Farha Ally</i> SHORT PRESENTATION Kenilworth Racecourse Conservation Area: partnerships and role-players
15h03	<i>Sam Cloete</i> 5+2mins Firewise South Africa: website	
15h10-15h45	Tea (+ Poster Viewing)	
	Workshop 7: 15h30 – 17h30 Important issues in fire research	Parallel Session 6: Partnerships (continued) Chair: Onno Huyser
15h45	<i>Nicky Allsopp, Tony Rebelo, Guy Palmer, Brian van Wilgen, Greg Forsyth et al.</i>	<i>T v Z Carinus</i> Agulhas Plains: together for a sustainable future

16h00	<i>Odette Curtis</i> People and renosterveld conservation: working together in the Overberg to conserve severely threatened lowland habitats
16h15	<i>Inge Kotze</i> Bottoms up! Viewing conservation challenges through the wine glass
16h30	<i>Maarten Groos</i> Tourism as a tool for the conservation of fynbos
16h45	<i>A W Odendal</i> Birding tourism to the Cape Floral Kingdom
17h00	<i>I Ebrahim and V Zikishe</i> The CREW programme: making volunteers work for conservation
17h15	<i>Rory Allardice</i> The Nuwejaars River Nature Reserve, a privately owned Special management Area
17h30	<i>Wilfred Chivell</i> Biodiversity Based Business - Dyer Island Cruises & Marine Dynamics
18h00	Fynbos Forum AGM
19h00	Dinner
20h30	Possible film show

Time	Thursday 6 August	
7h00	Late registration	
	Parallel Paper Session 7: Sustainable Harvesting Chair: Azisa Parker	Parallel Session 8: Conservation/ Conservation Planning Chair: Donovan Kirkwood
8h00	<i>Sean Privett</i> and Mirijam Gaertner Flower Valley's sustainable harvesting research programme on the Agulhas Plain	<i>Kate Snaddon</i> , Pat Holmes, Liz Day, Justine Ewart-Smith et al. City of Cape Town's Biodiveristy "Wetwork": prioritisation of City wetlands for conservation
8h15	<i>R V Bailey</i> , D Euston-Brown and S D J Privett Agulhas Plain: a resource base survey for wild fynbos	<i>Stephen Holness</i> and Peter Bradshaw What if everything is important? Identifying Critical Biodiversity Areas in the Overberg
8h30	<i>Joan Prins</i> and Lesley Richardson Agulhas Plain: Does the sustainable harvesting of fynbos have an impact on the lives of people?	<i>Ismail Ebrahim</i> and Rupert Koopman Conserving priority lowland areas: assessing the status of the Jarman sites
8h45	<i>H L Knoesen</i> and B Conradie Does wild fynbos pay?	<i>Ernst Baard</i> Conservation status updates for the Geometric Rortoises and Speckled Padlopers
9h00	<i>V Hudson</i> Sustainable harvesting in nature reserves: a case study	<i>M J D'Alton</i> The occurrence of the Cape Hare (<i>Lepus capensis</i>) on the Agulhas Plain and the questions it has raised

9h15	<i>G Forbes, S D J Privett and M Gaertner</i> Impacts of harvesting on reproduction of five commercially exploited fynbos species: recommendations for the flower industry	<i>B O Beukes</i> SHORT PRESENTATION <i>Amietophrynus gutturalis</i> , indigenous African...Cape Town invader
09h30	Keynote address: <i>Martin de Wit:</i> "After all those cosy years of working together, show me the money": From economic valuation to real-world investment in the fynbos biome Chair: Connie Krug/ Pat Holmes	
10h00 – 10h30	Tea	
10h30- 11h30	Poster Session	
11h30	Collect packed lunches and depart on field trips	
19h30	Dinner followed by disco	

Time	Friday 7 August	
7h00	Late registration	
08h00	Keynote address: <i>Mark Simmons: (SAEON International guest speaker)</i> Restoration of a Texas savanna: the different effects of prescribed fire on native and invasive species Chair: Donovan Kirkwood	
	Parallel Paper Session 9: Ecology Chair: <i>Guy Palmer</i>	Parallel Session 10: Education Chair:
8h30	<i>Anne Horn, Cornelia Krug and Karen Esler</i> In ditches and dongas: but down and out? The value of conservation corridors in West Coast Renosterveld	<i>Mswazi M</i> Institutionalisation of the Eco-Schools Programme within the SANBI Biodiversity Education and Empowerment Directorate
8h45	<i>Robin Jangle</i> Renosterveld – not always what it seems	<i>Larissa Smit</i> The Eco-Schools Programme as a model for whole-school development – a case study of Morgenson Primary School
9h00	<i>T S Hoffman and M J O'Riain</i> Is space a limiting factor for the Chacma Baboons (<i>Papio h. ursinus</i>) of the Cape Peninsula?	<i>A N Ashwell</i> How do teens feel about nature?
9h15	<i>I R Olivier</i> Habitat suitability of Helderberg Nature Reserve for Geometric Tortoise, <i>Psammobates geometricus</i>	<i>Phakamani Xaba</i> Horticulture as a catalyst for biodiversity conservation, skill development and sustainable income generation: lessons from SANBI's Overberg Useful Plants Project

9h30	<i>R B Colyn</i> Using bird species diversity as an indicator of habitat alteration in the Kogelberg Nature Reserve	<i>Victoria Wilman, Matthew Zylstra, Dieter Van den Broeck</i> A learning village for working together to restore living landscapes
9h45	<i>Z A Ketley, M D Picker, C C Reed and H F Dallas</i> SHORT PRESENTATION Aquatic invertebrates – potential indicators of thermal stress	
9h55 – 10h45	Tea (+ Poster Viewing)	
	Session 11: Aquatics Chair: Connie Krug	
10h45	<i>P Buwa</i> and M Pandelani Vegetation assessment of the riparian zone on the Breede River Catchments	
11h00	<i>T A Bellingan, F C de Moor</i> and M Villet Biotic signatures of rivers in and around the Tsitsikamma National Park based on Trichoptera	
11h15	<i>Martine Jordaan</i> and Dean Impson An assessment of the ichthyofauna of the Breede River System in the Western Cape Province as part of the National River Health Programme	
11h30	<i>Dean Impson, Denis Tweddle, Ryan Weaver</i> and Louise Stafford Is river rehabilitation involving alien fish eradication about getting the alien fish out or getting the anglers on your side? Four CFR rivers as a case history	
11h45	Short Keynote Address (Hot of the Press!): Richard M. Cowling, Andrew T. Knight, <i>Sean D. J. Privett</i> and Gyan Sharma Invest in Opportunity, Not Inventory in Hotspots Chair: Connie Krug	
12h00	Sorting out of prizes etc....	
12h15	Closing Remarks, Prizes & Packed lunch	

POSTER PRESENTATIONS FYNBOS FORUM 2009

Viewing daily

MAIN SESSION 5TH AUGUST @ 10h30-11h30

No	Title	Author
	Conservation / Conservation Planning:	
1.	Conservation of the relict fragments of Renosterveld on the Napier Commonage	Cameron McMaster ¹ and Odette Curtis ²
2.	Phytogeographical Centres of Endemism in the Cape Floristic Region: location, endemism richness and levels of protection	Peter Bradshaw, SANPARKS
3.	Evaluating anthropogenic land-use changes in two vegetation biomes using crane population trends as an indicator	Mark H van Niekerk ^{1,2*} ; Johan Baard ² , Kevin Shaw ³
4.	The Investigation of Measuring Vocalization as a Method for Monitoring the <i>Microbatrachella capensis</i> (Micro Frog) population at Kenilworth Racecourse Conservation Area (KRCA)	Tatiana de Rezende
5.	Impact of Sand Mining on Biodiversity within the Drakenstein Municipality	Victoria Tucker
6.	Determining the conservation integrity of Lourensford Alluvium Fynbos in the Harmony Flats area.	Rachel Botes
	Environmental Management:	
7.	Determining the net benefits of clearing invasive alien vegetation on the Agulhas Plain	Nowell, M.S. ^{1*} , Le Maitre, D.C. ² and Esler, K.J. ¹
8.	Carbon Sequestration & Alternative Energy = Sustainable Agriculture & Conservation	Napier, V. R. ¹ and Barnard, B.
9.	Natural capital restoration on the Agulhas Plain: a value adding endeavour	Helanya Vlok ¹
10.	Valuing the City of Cape Towns Biodiversity and Natural Assets	Arne Purvis
	Fire:	
11.	Integrated Wild Fire Management at local Municipal Level 2008/09	De Roubaix, L.L. ¹ , Lewis, L.
12.	Developing an ecological burning regime for Kirstenbosch National Botanical Garden (KNBG) using serotinous Protea as Key Fire Response Species	Dabusch., Julia
	Restoration:	
13.	The restoration of fynbos old fields using seed	Holmes, P.M. ^{1*} and Cowell C
	Policy:	
14.	A Review: Protected Areas and Climate Change	Dabush, J
	Partnerships:	
15.	Social Benefit of Community Exchanges to Community Conservation: The Interns Experience (Cape Flats Nature)	Shahieda Davids, Neliswa Sihawu
16.	Walks for Biodiversity and Wine on the Schapenberg	Heather Epstein, Di Marais and Andreas Groenewald
17.	The Liesbeek Maintenance Project	J Cooper

18.	Edith Stephens Wetland Park: an Example of a Nature Reserve as Social Space	Sven Ragaller
19.	The Greater Cederberg Biodiversity Corridor. A Landscape Initiative making a difference	Basson, S. ,Coetzee, J., ,Henning, S. , Steinberg, A.
	Ecology:	
20.	Toads sharing secrets of migration; unravelling how western leopard toads survive in an urban environment	Feldman, F. ¹ and Measey, G.J.
21.	The effects of wildfires on small mammal diversity and abundance at Kogelberg Nature Reserve	Sommers, Andrie
22.	Effects of climatic warming on lichen populations in South African ecosystem	Maphangwa, K.W ¹ , Musil, C.F ¹ , Raitt, L ² and Zedda, L ³
23.	Differential effects of fog and dew on the hydrology of succulents displaying CAM and C ₃ photosynthetic modes in a Mediterranean-type ecosystem of South Africa	Matimati, I., Musil, C.F., Raitt, L., February, E.C.
24.	Empirical and model derived respiration responses to Climate in Different Soils of an Arid South African Ecosystem	Nyanga, Justin, & Musil C
25.	Does sucrose addition inhibit plant growth by depleting soil N?	S Ruwanza, C F Musil and K J Esler
26.	Survivor South Africa: an island of chacma baboons amidst a sea of humanity	Esmé K. Beamish ^{1*} , M. Justin O'Riain ¹
27.	Determining Factors for the successful recruitment of <i>Leucodendron Argenteum</i> at Silverboomkloof Natural Heritage Site	Julie Gane
28.	Invasions in the fynbos: research at the Centre for Invasion Biology with management implications	S. Kritzinger-Klopper
	Pollination:	
29.	Insects on rare plants	Muhammed Gardee
	Sustainable Harvesting:	
30.	Impacts of ploughing and introduction of commercial fynbos species on the diversity of sandstone fynbos on the Agulhas Plain, South Africa.	Treurnicht, M. ^{1*} ; Esler, K.J. ¹ and Gaertner, M. ²
	Education:	
31.	Environmental education and early childhood development	Gabbi Jonker
32.	The Redevelopment of the 'Pelargonium Koppie' at Kirstenbosch NBG	Karen Wall (Student , Kbosch)
33.	A learning village for working together to restore living landscapes	Victoria Willman
	Aquatics:	
34.	The Affect of Water and Microbiological Quality on Fish in the Lourens River, Western Cape, South Africa	Leandri Gerber

FIELD TRIP OPTIONS

6TH August 2009

Leave @ 11h30 with packed lunches

1. Walker Bay Fynbos Conservancy (No costs)

Focus: Sustainable utilisation of fynbos and ecotourism in a Conservancy setting
Leaders: Sean Privett and Roger Bailey
Route: Bredasdorp – Elim – Baardskeerdersbos – Flower Valley – Grootbos and other eco-sites of the Conservancy (possible return route via Stanford and Kleinrivier Valley)
Features: harvesting of flowers, thatch, wildevye; Flower Valley packshed; environmental education in the Early Learning setting; Green Futures Foundation; Platbos (southernmost afro-montane forest); Grootbos/ Mosaic Lodge

2. Renosterveld Stewardship in the Overberg (No costs)

Focus: Challenges and results of renosterveld conservation in the Overberg
Leaders: Odette Curtis, Ismail Ebrahim, Rupert Koopman, Caitlin von Witt, & Flora Cameron.
Route: Bredasdorp – de Hoop- Bredasdorp
Features: Visit the largest, most contiguous area of extant lowland renosterveld left in the world: an area of >3500 ha close to the border of De Hoop Nature Reserve, which presents incredible conservation opportunities, but serious challenges, in terms of sustainable long-term conservation action. We will discuss the TMF-funded Renosterveld Research Project, the challenges and interesting results yielded thus far. Also the stewardship initiatives in the area and their successes and failures. We will then break into smaller groups, lead by various local botanists / CREW volunteers and look for specials on the slopes and quartz koppies, which this Eastern Ruens Shale Renosterveld is so famous for.

3. Nieuwejaars Wetland Landowners Association's Special Management Area (SMA) and the Agulhas National Park (No costs)

Focus: Private-public collaborative mechanisms for conservation of priority landscapes
Leaders: Mick Dalton, Rory Allardice and Malcolm Temmers
Route: Bredasdorp – Agulhas National Park – Elim – Nieuwejaars wetlands system
Features: 40,000 ha area under various conservation models including stewardship and the new Special management Area under NEM-PA; forests and 5 fynbos types: vleiland-, coastal-, lowland- mountain- and Elim fynbos; land-use decisions for sustainability covering carbon credits, game reintroduction, alien clearing, wetlands rehabilitation; "Geelkop"; Biodiversity and Wine Initiative (BWI) members.

4. Agulhas National Park (no costs)

Focus: Park strategy for expansion and off-reserve engagement
Leaders: Willem Louw, Etienne Fourie and Tertius Carinus
Route: Bredasdorp – Agulhas National Park – Moddervlei – Voelvlei – Nieuwejaarsrivier wetlands system
Features: landforms, marine and heritage features and biodiversity and ecosystem value of the Park; collaboration with private land-users and stakeholders; sustainable use policy

5. History of land-use and conservation on the Agulhas Plain (No costs)

Focus: Impact of people - past and present - on landscapes of high biodiversity- and ecosystem value
Leaders: Andre Marais with support from Pieter Albertyn, Janice Albertyn, Dirk Giliomee and Kevin Shaw
Route: Bredasdorp – Nachtwacht – De Mond – Soetendals - Bredasdorp
Features: the Bontebok story and the old Bontebok camp; impacts on wetlands and the estuary of re-routing the Droerivier; Nachtwacht historical farmstead; De Mond estuary and Ramsar site; Prinskraal canal system; Vogelgesang

6. Eco-tourism and Heritage on the Agulhas Plain (lunch costs = R100)

Focus: local land- and seascapes – their influence on settlement, cultural history and eco-tourism opportunities
Leaders: Overberg and Agulhas Tourism, local historians and residents
Route: Bredasdorp – Arniston/ Waenhuiskrans - Bredasdorp
Features: 4 km beach walk to the Arniston wreck and back; Waenhuiskrans cave and nature reserve; Kassiesbaai Fishing Village and harbour

WORKSHOPS

4th August 2009

WORKSHOP 1:

Management of fragments and fragmented landscapes - filling in the gaps

Cornelia B. Krug, Department of Zoology, University of Cape Town, Private Bag X3, Rondebosch 7701, Tel 021 650 4793, Fax 021 650 3301, cell 073 218 7977, email connie.krug@uct.ac.za or c.b.krug@krugs.de

Proposed theme and justification (why the topic is appropriate and significant for Fynbos Forum 2009)
In a workshop held in 2007, we identified the "burning questions" managers and decision makers have for the conservation and management of fragments and fragmented landscapes, as well as the tools required to assist in decision making. A desired tool is a decision support framework that will help in assessing the health as well as the conservation priority of a fragment. The framework is available, but needs to be filled with "soft" and "hard" data, i.e. expert opinion / knowledge as well as scientific results. It is envisaged that, during the workshop, the decision framework will be introduced, and, through group sessions, be populated with the relevant data, information and knowledge.

Expected outcomes and, if appropriate, plans for communication of results
Expected outcome of the workshop will be decision support framework that is ready to use to assess the health and conservation priority of a fragment.

Maximum number of participants that can be accommodated
40 - the more heads, the better.

Method of selecting participants (invited, open registration, or a combination). If any participants will be invited, include a tentative list of individuals and indicate whether each has agreed to participate. Selected participants will be invited ahead of the workshop, and fynbos forum attendees are welcome to join. Workshop invitations will be communicated through the fynbos forum network.

Additional costs for workshop materials (e.g. printed matter, etc?)
Costs for the workshop are provided for in the project budget, and will not be at the Fynbos Forum's expense.

WORKSHOP 2:

]Western Cape Conservation Stewardship Association (WCCSA)

Di Marais, **Nora Sperling Thiel**, & others

We want to have a workshop to report back to landowners who had CEPF funded veld type assessment etc done by Nature Corp (Robin Jangles) and who we want to support going forward.

Thanks

With CEPF funding, the Western Cape Conservation Stewardship Association appointed consultants from the Nature Conservation Corporation to assess conservation practises on 50 identified farms for the purposes of developing best practise guideline, management plan templates and management effectiveness assessments and to inform the consideration of stewardship status.

The result was a fantastic wealth of data which needs to get back to the relevant land owners. We thought the workshop would be a good way of doing this AND getting these landowners to the FF. The FF needs the private landowner to participate!!

WORKSHOP 3:

Fynbos Stories: Who should hear them? How should they be told? -- a workshop to explore biodiversity narratives in and beyond the conservation sector

Co-ordinated by George Davis
Urban Nature Programme, South African National Biodiversity Institute
davis@sanbi.org

This workshop will provide space for exploring questions about why and how we go could share knowledge and information in the biodiversity business. There is a growing, but still limited, appreciation that biodiversity values need to be part of the dialogue in mainstream society, not only according to the well-established conservation ethos, but also in terms about its quantifiable value to society. Biodiversity facts, that inside the conservation sector are seen as compelling and irrefutable indicators of humanity's dependence on the natural order, are often brushed aside as externalities in a world driven by commerce and the consumer economy. It is not enough anymore for the conservation of nature to be represented primarily by aesthetic, high-minded and heartwarming stories – the new challenge is to alter the behaviour of the despoilers. Making a compelling case for biodiversity protection, is the focus of this workshop. Some of the questions we might ask are: Are there key handles missing from our current stories? Where are the entry points into the minds the biodiversity-blind? Are we using appropriate media appropriately? The education sector is a leader in tailoring high impact stories for target audiences – can we learn from the way teachers prepare their lessons?

This workshop aims to draw together different initiatives currently at work in the field (eg the CAPE/SKEP communications task team, the EE sector, community-centred conservation, as well as interested practitioners skilled in different types of media).

A facilitated plenary session, informed by existing projects and known hurdles, will identify key areas of concern to guide group discussions. Group insights will be shared in a final plenary, and ideas about a route forward sketched.

WORKSHOP 4:

Revisiting the Fynbos Forum Research Strategy

Caroline Petersen, CAPE Learning Network Manager, Tel 021 799 8804, petersenc@sanbi.org

Proposed theme and justification

In August 2007 the Fynbos Forum Research Working Group commissioned the document titled "Research Strategy and Funding Priorities for the Cape Floristic Region". Although the research priority themes set out in the document have been an important guiding resource for researchers and stakeholders, the specific suggestions in the document around institutional arrangements for implementing the strategy have not been taken up.

It is proposed that this workshop session at Fynbos Forum revisit the strategy, assess its impact and reconsider potential institutional arrangements for implementation. Possible key questions for discussion could include:

1. Is there a need for better coordination of research activities by Fynbos Forum, Table Mountain Fund, SANBI, SAEON, BIOTA, SANParks, CapeNature, other CAPE partners and landscape initiatives to address the priorities outlined in the strategy?
2. Is there a need for improved communication around research priorities with tertiary institutions, government departments and research bodies (e.g. DST, CSIR, NRF, ARC, HSRC)?
3. Is there a need to align the fynbos research strategy with other national strategies, particularly those of SANBI's bioregional programmes?
4. Is there a need to mobilise a new pool of long-term funding to tackle a fynbos biome-wide research strategy and priorities? How feasible is this and is the institutional location proposed in the strategy still appropriate?
5. Depending on the answers above, what kind of institutional arrangements are needed – e.g. an expanded Fynbos Forum Research Working Group, the Fynbos Research Partnership Committee proposed in the strategy? Might more than one structure be needed? Who should be involved?
6. In addition, are dedicated post(s) needed for research coordination and/or fundraising, and how should these be overseen and resourced in the medium and long term?
7. What action plan can we decide on to give effect to our discussions?
Other questions for discussion, perhaps at another date, could include the following:
8. Is there a need for an international conference on the science of fynbos conservation?
9. How are we addressing the need recognised in the research strategy to tackle the social dimension of conservation research as a separate exercise?
10. How can we more effectively communicate research results to conservation managers, political and administrative decision-makers and the broader public?

WORKSHOP 5:

LANDUSE WORKSHOP FOR FF 2009

Jeff Manuel & Charl de Villiers, DEA&DP

DEA&DP are interested in making quite a few presentations at the Fynbos Forum this year - on both internal projects as well as stakeholder-related projects, and I would like to request the Committee to consider putting a "Landuse and Biodiversity" workshop on the Programme.

I anticipate that a 120- 150 mins slot will be required. I am willing to take responsibility for arranging the workshop.

We plan on giving presentations on both new Guidelines that DEA&DP have completed recently that have biodiversity importance (e.g. Guidelines relating to Climate Change and Rural Development), as well as some of the projects that the department is running (An EMF in the Sandveld); reports from EIA consultants working in the agricultural sector, etc. I also plan to liaise with the Department of Agriculture and CapeNature to contribute to the session.

I am anticipating a format for the workshop that includes both Powerpoint presentations, but room for a lot of discussion following the presentations, including short (5 mins) presentations.

WORKSHOP 6:

Conservation Communication Support Network for Conservationists

Key words: Communication, Mentoring, Support

Morkel, A.T. Kirstenbosch National Botanical Garden, South African National Biodiversity Institute.
amorkel@sanbi.org, cell: 0833247877, tel: 021 7998899, fax: 021 7976570.

In 2008, an online communication network, in the form of a blog, was formed for the following reasons:

- To provide a single portal information network for Conservation managers, Environmental managers, Technicians, Consultants and researchers to access where they are located away from City Centres for them to become more efficient and effective in the execution of their plans.
- To provide developing conservationists access to researchers and more experienced managers who can provide an independent perspective on conservation issues increasing their efficiency and effectiveness.

- The expected result is a blog in the form of "question and answer" from which local, regional and national trends will be monitored, as reported from the field. These topics will form the basis of communication interventions at the Forums, like the Fynbos Forum, CAPE Conferences and other inter-organisational forums.

The expected outcome of the workshop is to obtain input on the following issues:

- 1) Is there a need for this type of service / network?
- 2) If yes, then what are the needs?
- 3) Is a blog medium the best way to go for many to access?

The outcomes will be compiled into a report and emailed to those that participated in the workshop for further comment. Once comment has been received, the report will be posted on the blog site for others to view and comment. Once sufficient discussion has taken place, the recommendations will be reviewed, ratified and adopted for implementation of this proposed communication network.

To be run as a short presentation and then open to question, answer and discussion. Open invite: the objective is to gauge interest from the Fynbos Forum community to support the ad hoc interest shown by others.

5th August:

WORKSHOP 7:

WORKSHOP ON IMPORTANT ISSUES IN FIRE RESEARCH

Coordinators: N. Allsopp, G. Palmer, A. G. Rebelo
Chair: M. McGeoch

SANParks/SAEON/SANBI/CapeNature and others feel the need to revisit Fires in Fynbos, perhaps with Fire Workshop later in 2009/2010. Broad themes would be monitoring, research and management of fire. Invasive aliens and threatened species loom large as crosscutting themes.

There is a belief that the Fynbos Biome Research Programme of the 1980s and 1990s answered all the important questions in Fynbos. The truth is that it did not! Just on the issue of fire there is a huge need for more, much more detailed, field studies. Quite apart from the fact that the analytical and modelling techniques of 20 years ago are now primitive, and we do have more data!

This Fynbos Forum workshop will set a way forward by using the wide range of stakeholders at the Fynbos Forum to prioritize issues. This input would inform the need and scope of working groups at the proposed Fire Workshop. Some Issues:

FIRE RETURN INTERVALS

It is well-documented that Fynbos burns at 15-20 year intervals. But is this true all round? What is the interval for Grassy Fynbos? Granite Fynbos grows much faster than Sandstone Fynbos – might it naturally not burn more often? Would Sandstone Fynbos in the Cedarberg burn at the same interval as on the Peninsula, or Swartberg or Tsitsikamma? Are fires more prevalent at higher altitudes, or are lightning strikes a local phenomenon? What about Renosterveld? What would the natural cycle be there? How often were the hunter gatherers and early pastoralists burning Renosterveld to maintain grazing for wild animals and livestock?

- ◆ Does Fynbos really burn at 15-20 year intervals? Do we not now have better data and better analytical tools to revisit these initial estimates based on data 30 years ago?
- ◆ How do these intervals vary between wet and dry cycles that are typical of the region? Assuming that results from the current fire databases are not due to inaccurate older data, how much of the changes observed may be due to these cycles? How do we separate these wet and dry cycles from global climate change and will climate change accentuate these or ameliorate them?

HOW GOOD ARE THE EXISTING FIRE DATABASES

TMNP and CapeNature have electronic fire databases capturing all available data on fires. However, older data are less complete and most data are confined to nature reserves and do not extend into other areas of extensive (or once extensive) veld.

- ◆ How much work is being done on checking the CapeNature and TMNP Fire databases. Older data are less complete.
- ◆ How can we improve these data, either capturing missing data (e.g. MODIS) or at least putting confidence intervals on them?

- ◆ A sensitivity analysis is required: how might results be changed if there are missing fires? Any analysis of data with more incomplete data earlier will definitely result in the conclusion that fire frequencies are increasing: are these results robust enough to be believed at all?

THRESHOLDS OF CONCERN

Managers use “Thresholds of Concern” to make decisions on veld management. These guidelines are backed by good science and statistics. But how do we convert on-off thresholds that managers find easiest with more meaningful statistical distributions.

- ◆ Thus the mean fire interval is 15 years, but what is the distribution of acceptable fires around the mean? Any fire potentially includes veld of many different ages. But what is the acceptable range of veld ages that can burn. If 1% (or 5% or 10% or 30%) of the total burned area in any year burns at 2 years old given a mean of 15 years, is this a problem or perfectly acceptable? *Or to rephrase:*
For a mean veld age of 15 years, half of areas must burn before 15 years? But what proportion should burn before 10 years, before 5 years, before 2 years, etc. – is there an unacceptable lower limit?
- ◆ Proteaceae are used to determine acceptable “age to burn” veld, using the 3 years of more than 50% of plants with seed”. But what proportion of fires should be burned before these species are ready to burn? After all we don’t want to convert all veld into Proteoid Fynbos!
- ◆ Parent seedling ratios based on Proteaceae. The purpose is to ensure that for a good fire Proteaceae will not be lost from the system. But what is the proportion of fires that parent to seedling ratios should exceed 1.00, or how often should Proteaceae populations be increasing versus decreasing?
- ◆ Senescence. Veld should not be allowed to become moribund. When more than 50% of plants have become senescence, something must be done! But surely this is aerially based: if < 10% of veld is moribund does it matter? How does one measure senescence (seedheads, growth length, dying plants, dead plants, previously dead plants, etc?), and is 50% (25%, 75%?) of plants senescent realistic.
- ◆ What about plant families other than Proteaceae and guilds other than serotinous plants? How are these best monitored?

◆

EXTINCTION BY TOO FREQUENT FIRE

Continually we are being told in the press about species going locally extinct due to too-frequent fire. Every fire has caused dozens of species to become extinct according to conservation spokesmen. However, despite approaching each person ever to have made such a statement, not one has ever been able to provide a list of species so affected. The best they can do are generalized guilds and supposition based on general theories. Too-frequent fire is also the third biggest threat to Proteaceae according to the Red Data list. But there is no good hard data to substantiate this: it is all inference and supposition.

- ◆ What solid scientific evidence is there that too-frequent fires are a problem or a cause for declining species?
- ◆ What research and monitoring programmes do we need to set up to obtain data to test this widely held belief?
- ◆ What existing data can be used as a seed for long-term monitoring of susceptible populations to quantify this threat?

ARE CURRENT FIRE-FIGHTING TECHNIQUES WORTHWHILE? Despite expensive use of helicopters big fires do not seem to be controllable. There is no evidence, for instance, that where water was bombed on the fires that it actually stopped the fires at Helderberg, Devils Peak, Stellenbosch Paarl, r Drakenstein. Despite tons of water the fire continued until it ran out of veld to burn.

- ◆ Do we need to reinstate firebelts and backburns as fire management options?
- ◆ How much post-fire evaluations are being done to determine the effectiveness of fire-fighting actions during the fires?

IS THE CURRENT “FIRE AND FORESTS ACT” VIOLATING THE ECOLOGY OF OUR NATURAL ECOSYSTEMS

According to the Fire and Forests Act, fires may not be burned during the natural fire season. This is because fires are prohibited and must be put out on all Orange and Red Fire Days. All such fires must be put out, unless an IPA has as part of its management plan to allow some fires to burn out, or to burn until a certain condition is met (e.g. a designated boundary). These aspects of this act have been adopted by for instance the local City of Cape Town bylaw on air pollution.

- ◆ Do we need to challenge the act and make an allowance for ecological burns?
- ◆ How can we ensure that ecological burns (i.e. during the fire season of Orange and Red days) occur in the largest areas of natural veld, especially where these border on multiple landowners who have no interest in biodiversity.

OTHER ISSUES

- ◆ What other issues need to be addressed?
- ◆ The role of aliens in exacerbating fire?
- ◆ The role of fire in managing aliens?
- ◆ The role of fire in managing threatened species?

PAPER ABSTRACTS

PARALLEL SESSION 1: POLLINATION SYMPOSIUM

The importance of pollination related ecosystem services to the Western Cape deciduous fruit industry

Key words: conservation, Fynbos, managed honey bees, pollination

Ruan Veldtman¹, Mike H. Allsopp², Madelé Rademan^{1,3}, Willem J. de Lange⁴ and John S. Donaldson¹

¹ Applied Biodiversity Research, South African National Biodiversity Institute

² Plant Protection Research Institute, Agricultural Research Council

³ Dept of Conservation Ecology & Entomology, Stellenbosch University

⁴ Environmental and Resource Economics Group, Council for Scientific and Industrial Research

Ecosystem services have received much attention as a means to promote biodiversity conservation. World wide reports of declines in the diversity and number of pollinators in agro-ecosystems and the effect on crop production are poorly understood. SANBI is participating in a global initiative funded by the Global Environmental Facility to address the sustainable management of pollinators in agro-ecosystems. In 2007 a collaborative project on pollination related ecosystem services used by the Western Cape deciduous fruit industry was initiated. Although the importance of insect pollination to agriculture is unequivocal, whether this service is largely provided by wild pollinators (genuine ecosystem service) or managed pollinators (commercial service) remains contested. On top of this, current methods either under-estimate or over-estimate the pollination service value, and make use of criticised general insect and managed pollinator dependence factors. Using pollen dusting and hand pollination as suitable replacements, we value pollination services significantly higher than current market prices for commercial pollination, although lower than traditional proportional estimates. Also questionnaire data on managed pollination in the Western Cape showed the contribution of wild pollination to be slightly more than the managed component. This data also revealed that more than 40 % of all managed honeybee colonies in the Western Cape are intentionally placed on apiary sites (usually March to June) which are fully or partially natural vegetation forage. In addition beekeepers replace managed colonies with wild bee colonies. This is also an ecosystem service from the natural environment with an estimated 20% turnover in the number of colonies. A more holistic view of pollinator service management, including both the wild and managed components, is required. Arguing over which group of pollinator is declining will not result in halting the loss of human derived benefit (crop pollination) due to a general loss of biodiversity dependent ecosystem services.

Are pollination ecosystem services comparable to managed honeybee colonies for apple production in the Western Cape?

Key words: pollination, ecosystem services, honeybee, apple production

Rademan, M.^{1,2}, Veldtman, R.¹, Samways, M.J.², Allsopp, M.³, De Lange, W.⁴

¹ Biodiversity Ecosystem Services Program, South African National Biodiversity Institute

² Dept of Conservation Ecology & Entomology, Stellenbosch University

³ Agricultural Research Council, Stellenbosch

⁴ Centre for Industrial and Scientific Research, Stellenbosch

Apple production in the Western Cape is reliant on pollination by the honeybee, *Apis mellifera capensis*. Most deciduous fruit farmers hire managed honeybee hives from beekeepers to pollinate their crops. Alternatively, farmers, who have near pristine natural vegetation next to their orchards, rely on wild bees from the adjacent vegetation to provide the pollination services. This is regarded as an ecosystem service. In selected cases, farmers who have natural vegetation next to their croplands still hire managed hives, creating a combined system where they have access to both managed and wild pollination services. We made a comparison between these three pollination systems to assess if the pollination ecosystem services are important and comparable to hired pollination services in commercial apple production or not. A pollinator exclusion experiment was done in thirteen different orchards across the Western Cape representing these three different pollination systems. On the same tree a branch was enclosed in mesh and an open/control branch selected to standardise for between-tree variation. We sampled twenty five trees per orchard. The contribution of honeybees to apple pollination was determined by looking at the difference between the open and closed branches. Pollinator visitation rates, fruit-set, fruit size and seed-set was measured. The results indicated that honeybee contribution was significant to apple pollination. Further initial results show little or no difference among the wild, managed and combined pollination systems, indicating that pollination ecosystem services is comparable to managed honeybee services. It is regarded that managed bees is essential to support apple production and farmers incur a high cost to hire them. We show that wild honeybees are sufficient to support apple production, provided the orchard is close to near pristine natural vegetation. An incentive for conservation on privately owned land is implied.

The impact of managed Cape honeybee (*Apis mellifera capensis* Esch.) colonies on the forage behavior of invertebrate anthophiles in fynbos habitat

Key words: pollination ecosystem service, Cape honeybees, forage behavior

Brand, M.R.^{1,2} and Samways, M.J.^{2,3}

¹ Biodiversity and Ecosystem Services Programme, Applied Biodiversity Research, South African National Biodiversity Institute

² Department of Conservation Ecology and Entomology, Faculty of Agrisciences, Stellenbosch University

³ Centre for Agricultural Biodiversity, Stellenbosch University

Many crops grown in the Western Cape are dependent on the pollination services of managed honeybees. However, pollination as an ecosystem service – whether from managed honeybees or wild pollinators – has certain area requirements in the form of conserved natural habitat, as is the case with other ecosystem services like carbon sequestration and water purification.

In the Western Cape, managed honeybee colonies depend on forage supplied by alien Eucalyptus trees (*Eucalyptus cladocalyx*) and natural fynbos vegetation. But since 1995 the Working for Water program has targeted Eucalypts along with several other alien species in an attempt to eradicate them to restore water flow in catchment areas; while the restriction of managed hives from protected areas only helps to militate a situation becoming more desperate for the future of beekeeping and the growing demand for pollination ecosystem services.

The exclusion of managed hives from protected fynbos habitat is justified by the uncertainty of the impact of a group of hives placed on one collective spot. Honeybees, as fierce competitors for floral resources, might out-compete and suppress populations of other anthophile species. This study aimed to identify any negative impact of such a gathering of honeybees on the foraging behavior of wild anthophiles and hence, to detect a potential negative impact on their populations.

Honeybees were the most abundant foragers on the three focal plant species and also made the most visits to flowers during all treatments. The introduction of eight managed hives per site had no significant influence on the foraging behavior of anthophiles and thus did not bring about changes in competition for available resources. The study established that a stocking density of eight managed hives introduced at a site for a short period of time (~ 1 month) could safely be employed for sustainable floral resource harvesting within fynbos vegetation.

High selfing rates in a nested Cape plant community increase resilience to pollinator loss

Keywords: pollination web, breeding system, extinction risk

Stanway, R.¹, Pauw, C.A.¹ and Combs, J. K.²

Department of Botany and Zoology, University of Stellenbosch, Private Bag X1, Matieland, 7602, South Africa.
²College of Forest Resources, University of Washington, Seattle, WA 98195, USA.

Ecological implications of the decoupling of plant-pollinator interactions are not well understood. Anthropogenic-induced extinctions of pollinators are predicted to result in plant species decline. Using observations of plant-pollinator interactions from a Cape Floristic Region plant community we constructed a pollination web, determined breeding system of 68 plant species, and modelled the affects of random pollinator removal on these species. Model results indicate that despite high levels of specialization, plant species do not exhibit increased vulnerability to extinction. This resilience to pollinator loss is due to high selfing rates in the community as well as a nested web structure which links specialists with generalists. By incorporating ecological data into a model of pollinator loss this study demonstrates that Cape plant species are relatively tolerant to pollinator loss, and reiterates that generalist species are of greatest conservation importance for community maintenance.

Projection matrix analysis of the demography of the long living *Brunsvigia orientalis*: Linking pollinator service and population growth.

Key words: *Brunsvigia orientalis*, demography, sunbird pollination

Sjirk Geerts and Anton Pauw

Department of Botany and Zoology, Stellenbosch University, Private Bag X1, Matieland, 7602,

The demographic dynamics of *Brunsvigia orientalis* (Amaryllidaceae) were studied using projection matrix modeling to determine the strength of the link between pollination and population persistence. A long term (8 year) dataset from a Rondevlei population was used to construct a life cycle and determine population dynamics. Elasticity analyses showed that stasis followed by growth were the most important demographic process in the mean matrix analysis. In pollinator deficient environments few seeds are produced but population growth rate (λ) is still greater than 1. This model was then used to predict demographic population structure at differing abundances of pollinating sunbirds. These predictions were verified against observed population structure in small conservation areas differing in sunbird abundance. We conclude that pollination rate has impacts on the demographic population structure of *B. orientalis*, suggesting that pollination is a vital component of the life history of this species.

**Nightlife: When Mice meet Whiteheadias ...
First direct field observations of nocturnal rodent pollination in South Africa**

Key words: rodent pollination, *Whiteheadia bifolia*, *Aethomys namaquensis*

Wester, P and Pauw, A.

Department of Botany and Zoology, University of Stellenbosch

For the first time in South Africa nocturnal rodent pollination was observed and photographed under natural conditions. In the Northern Cederberg area of the Western Cape field studies and experiments showed that flowers of the 'Pagoda Lily' *Whiteheadia bifolia* (Hyacinthaceae) are visited at night by the Namaqua Rock Mouse *Aethomys namaquensis*. The mice were observed licking nectar while being dusted with pollen and touching the stigmas. No other visitors were observed during the day or night. *W. bifolia* pollen was found around the snouts and in the faeces of live-trapped mice, the latter likely as a result of grooming their fur, since they visited the flowers without eating or destroying them. *W. bifolia* has characters of the rodent pollination floral syndrome, that have likely evolved as adaptations to rodent pollinators: visually inconspicuous, bowl-shaped flowers close to the ground, with stiff stamens as well as easily accessible, very viscous nectar and a weak sourish scent. Furthermore, these findings support the hypothesis that pollination syndromes can be used to make testable predictions about floral trait evolution due to pollinator selection.

Pollinator mediated interactions determine the assembly of flower colour within co-flowering *Oxalis* communities.

Key words: Community assembly, facilitation, interspecific pollen transfer

De Jager M.L.^{1*}, Dreyer L.L.¹, Ellis A.G.¹

¹ Botany and Zoology Department, Stellenbosch University, Private Bag X1 Matieland 7602, South Africa.

* mdj@sun.ac.za

Pollinator mediated interactions between co-flowering sympatric species can be antagonistic (e.g. competition for pollinators, interspecific pollen transfer) or facilitative (e.g. increased community level attractiveness to pollinators) and the balance of these forces may dictate which species can co-occur and how traits will be distributed amongst them. We investigated the assembly of flower colour within 24 communities of co-flowering *Oxalis* species and the mechanisms by which pollinators may influence it. All investigated *Oxalis* species were entirely reliant on pollinators for seed set. Interspecific pollen transfer significantly reduced seed set and pollinators were more likely to switch between species with more similar flower colours. Although these results point towards the predominance of antagonistic interactions driving divergent flower colours, we found that flower colour is in fact significantly clustered within *Oxalis* communities. This is not due to historical constraint as flower colour is not evolutionarily conserved within *Oxalis* and communities are randomly structured with respect to phylogeny. Instead facilitation of pollinator attraction may drive the similarity of flower colour between co-flowering species pairs. Many *Oxalis* species were pollen limited and low abundance species were significantly more similar in flower colour to congeners than common species, suggesting that in certain ecological contexts increasing pollinator attraction may take precedence over interspecific pollen transfer avoidance. This study highlights the importance of indirect interactions in the assembly of plant communities and to our knowledge is the first to demonstrate a role for the facilitation of pollination as an ecological filter or selective pressure governing community assembly.

Anther-smut fungal infection of South African *Oxalis* species: spatial distribution patterns and impacts on host fitness

Key words: *Oxalis*, smut fungi, sexually transmitted diseases

Helen R. Curran^a, Francois Roets^b, Léanne L. Dreyer^a

^aDepartment of Botany and Zoology, Stellenbosch University, Stellenbosch, South Africa

^bDepartment of Conservation Ecology and Entomology, Stellenbosch University, Stellenbosch, South Africa

The smut fungi (phylum Basidiomycota) contain various economically important virulent plant pathogens and may infect only specific plant organs such as flowers. Fungi may replace pollen of infected flowers with their own fungal spores, creating potential study systems for sexually transmitted diseases. An anther-smut fungus, *Thecaphora capensis*, was recently rediscovered infecting *Oxalis* flowers in the Greater Cape Floristic Region. This study aimed to provide insight into the ecological impact, spatial distribution patterns and effects of *T. capensis* on host morphology. Eight new *Oxalis* hosts were discovered over a wide geographic area. Two insect species were collected from infected flowers and both carried fungal spores, implicating them as fungal vectors. Host morphology and reproductive success of infected plants differed significantly to that of healthy *Oxalis* individuals. Nearest neighbour and Gabriel connectedness analyses revealed diseased plants to be spatially clumped, although this non-random distribution could be ascribed to clonality. All three floral morphs were found to be equally susceptible to infection by *T. capensis*. This preliminary assessment has demonstrated the future severity of *T. capensis* infections on *Oxalis* host population dynamics and evolution.

Mite (Acari) diversity in the infructescences of *Protea* species

Key words: Acaridae, population dynamics, Proteaceae

N Theron^{1,3}, F Roets^{1,3}, LL Dreyer^{2,3} and KJ Esler¹

¹Department of Conservation Ecology and Entomology

²Department of Botany and Zoology, University of Stellenbosch, Private Bag X1, Matieland, 7602, South Africa

³Forestry and Biotechnology Institute (FABI) and DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB), University of Pretoria, Pretoria 0002, South Africa.

Mites are the primary participants in complex *Protea*-ophiostomatoid fungi symbioses. They affect host population dynamics as either disease dispersal agents, as fungivores protecting seeds against pathogens or as predators

that act as bio-control agents. Mite systematics and ecology, in general and particularly in fynbos, is understudied. Virtually nothing is known about their interaction with *Protea* species. The present study sets out to investigate the diversity of mites associated with *Protea* species in the Fynbos Biome by addressing the following key questions a) What environmental and ecological factors influence mite communities within *Protea* infructescences?, b) Are there any co-evolutionary patterns between these two groups and finally, c) Implications for biodiversity conservation. Results show that infructescence architecture has a significant role in determining humidity and temperature within infructescences and ultimately influences mite communities within these. A seasonal trend in mite richness and abundance was detected with mite numbers peaking during the summer. Preliminary data show that host-associations in specific mite guilds correlate with *Protea* morphological groupings and may thus indicate co-evolution between these taxa. Two mite genera were recorded from South Africa (Hottentots Holland Mountains) for the first time and a further five new species await description. Mite diversity data obtained in this study is central to determining the key elements of fungus-*Protea*-mite symbioses and may aid informed conservation decision-making in the fynbos biome.

Partitioning explained variation in species composition of pollinating beetles –environment overrides host plant and geographic distance

Colville, J. F.^{1&2}, Ferrier, S.³, Cowling, R. M.⁴, Picker, M. D.¹ and Bradshaw, P. L.⁵

¹Zoology Department, University of Cape Town

²Biodiversity Ecosystem Services Programme, South African National Biodiversity Institute, Cape Town

³CSIRO Entomology, Black Mountain Laboratories, Australia

⁴Department of Botany, Nelson Mandela Metropolitan University, Port Elizabeth

⁵ Park Planning and Development, South African National Parks, Port Elizabeth

The change in species composition (replacement and losses of species) along ecological and geographic gradients (beta diversity or species turnover) is a complex property of species communities and is a key concept to understanding regional diversity patterns. Studies focusing on beta diversity patterns within South Africa are limited, especially so for insect groups, due to the noted lack of data. Here I use generalised dissimilarity models (GDM) to model the spatial turnover in beetle community composition between pairs of sites as a function of environmental (rainfall, temperature, altitude, soil fertility) and plant (host species, vegetation types, and bioregions) differences between these sites. Data sets at two different spatial scales were used: (i) regionally, across biomes using quarter degree grid cells (QDS) (ca. 25 km x 25 km) with presence-only data; and (ii) using presence/absence data from field survey sites (ca. 100 m x 100 m), focusing specifically on patterns within the beetle rich winter rainfall biomes. Results from both data sets indicated that beetle beta diversity is most strongly correlated with environmental variables, less so with plant variables, and least correlated with geographic distance between sites. These findings are explained by steep ecological and environmental gradients, combined with poor dispersal abilities of some monkey beetles. Individual gradients of high importance were associated with rainfall, altitude, vegetation type habitat proportions, and ecological dissimilarities across bioregions. Physiological and morphological adaptations were linked to these gradients highlighting the role of divergence and isolation of populations through ecological specialisations and weak dispersal.

Components of reproductive isolation and their role in speciation between *Jamesbrittenia racemosa* and *J. pedunculosa* (Manuleae)

Keywords: floral divergence, peripatric speciation, pollination

Hoffmann, V.¹, Verboom, G.A.¹ and A.G. Ellis²

¹Department of Botany, University of Cape Town, Private Bag XI, Rondebosch 7701, South Africa.

²Department of Botany and Zoology, University of Stellenbosch, Private Bag X1, Matieland, 7602, South Africa.

Reproductive isolation is essential not only for the integrity of closely related species occurring in sympatry, but also plays an important role in the evolution of morphologically distinct entities. Studies based within a framework of historical relationships and species interactions as observed today may therefore provide novel insights into processes underlying speciation events in the past. Pre- and post-zygotic isolating barriers between the florally distinct species *Jamesbrittenia racemosa* and *Jamesbrittenia pedunculosa*, which occur in Namaqualand, South Africa, were investigated with a particular focus on floral isolation as a reproductive barrier. Based on two independently segregating DNA loci, the species pair was found to be monophyletic and nested within the

Namaqualand *Jamesbrittenia* clade. Despite being morphologically distinct, *J. racemosa* and *J. pedunculosa* are not reciprocally monophyletic, suggesting that they diverged recently. Striking divergence in corolla tube length, flower mouth width and flower colour between the two species emphasizes the importance of floral isolation as an isolating barrier. The absence of a distinct hybrid zone despite partially overlapping pollinator guilds, potential for interbreeding and limited geographic isolation, suggests that other post-pollination isolating barriers, such as asymmetric hybridization, play an important role in maintaining integrity of the two species. Based on current patterns of isolation, it is postulated that the two species diverged in response to a depauperate pollinator fauna in a peripheral partially self-compatible population, coupled with an annual life history which imposes strong selection on assuring reproduction.

PARALLEL SESSION 2: POLICY

Using Evidence in Environmental Policy and Management – A Not So Obvious Choice

Key words: Evidence Based Policy

Allsopp, N. ¹, Laurent. C. ², Baudry, J. ², Burel, F. ³, Corroyer, P. ², Matose F. ⁴ and EBPBiosoc project team ⁵

¹ SAEON Fynbos Node, South African National Biodiversity Institute

² INRA (Institut National de la Recherche Agronomique), France

³ CNRS (Centre National de la Recherche Scientifique), France

⁴ Institute for Poverty, Land and Agrarian Studies, University of the Western Cape

⁵ http://www.inra.fr/biosoc_sciences/

Science is often viewed as being the foundation on which environmental management policy should be built. However, it is only in the last decade that systematic use of evidence has been increasingly promoted in conservation management and policy. Research in several countries suggests that decision makers use a variety of sources, ranging from common sense to expert advisors, rather than scientific outputs. Two South African case studies, the Working for Water programme and rangeland policy, are used to examine the complexity of decision making. Our investigations show many decision makers are looking for scientific evidence to support their decisions but that it is often difficult to take evidence into account. These difficulties stem from two main reasons; the first is that policy makers need to consider a range of social, economic and political factors to make political decisions, the second is that the interactions between the social realm and the dynamics of natural resources are complex, hence a need for interdisciplinary knowledge. However, many institutions fail to promote the interdisciplinarity required to overcome this problem. We also find that the hypothetical basis that underpins disciplines constrains the range of scientific enquiry that a proponent of a particular school of thought will explore. In pursuing evidence based decision making care must be taken not to reject an alternative scenario merely because no research has been undertaken in that area. Case studies dominate much of research and cannot provide the rigour that many decision makers demand of science. Despite the weaknesses of the evidence based policy approach, it highlights the necessity to inventorise available scientific evidence and assess its reliability with regard to desired objectives, whilst other forms of decision making may rely on consensus building with no strategy to test the validity of the knowledge mobilized to support decisions.

Keeping the Cape Lowland archipelagos afloat: bridging the knowing-doing gap

Key words: conservation, fragmentation, decision-making, science - application gap

Krug, C.B.

Department of Zoology, University of Cape Town, Private Bag X3, Rondebosch 7701

The lowlands of the Cape Floristic Region (CFR) are highly transformed, and the remaining natural vegetation exists mostly in small, isolated fragments. These remaining vegetation fragments have been declared irreplaceable, i.e. they have to be conserved at all costs. However, this is easier said than done, as, amongst other things, information on how to appropriately manage fragments is either not available, or not easily accessible, to landowners, conservation managers and decision makers. In order to facilitate the information transfer from scientific research, a work shop was held to identify "burning questions" managers and decision makers have for the conservation and management of fragments, and to identify potential tools required to assist in decision making. In this talk, the "burning questions" as well as the answer science can currently provide will be outlined, and suggestions made on how to make research results more accessible and relevant to conservation.

Promoting intact ecosystems as part of the climate change solution", an overview from the climate action partnership (CAP)"

Keywords: Ecosystem health, climate change, adaptation

Sarshen Marais

Climate Action Partnership Coordinator

Healthy, intact ecosystems are critical to our life on earth. They regulate our climate, provide food and fresh water, buffer people against the impacts of floods and droughts, and support the well-being of our communities. Ecosystems are also a critical line of defense against the impacts of climate change, building resilience and enabling us to adapt.

The Climate Action Partnership is a group of conservation NGOs who have partnered around climate change to work together and enhance the enabling environment and action that supports intact ecosystems as part of the solution for mitigating and adapting to climate change.

The Action projects involve:

- Education about ecosystems, biodiversity and adapting to climate change;
- Adaptation projects include creating corridors which link protected areas and allow species to move under the threat of climate change;
- Mitigation projects where natural ecosystems are restored such as forests in Kwazulu Natal, thicket in the Eastern Cape and Riverine vegetation in the Karoo. Again these assist in building resilience to climate change as they restore or maintain intact systems which provide critical services and can protect us against serious climate change risks.

The enabling environment requires:

- Research that supports our actions, such as understanding the details of the links between climate change resilience and people, also to understand the potentials that our vegetation types hold in terms of carbon sequestration etc
- Bringing lessons from our action projects into the policy arena both internationally and nationally
- Communicating these messages to key decision-makers, policy makers, within the conservation sector and government, business, industry and eventually the general public

Ecosystem approaches need to be embedded in agreed principles, policies and action plans, through knowledge sharing and 'learning by doing', in technology transfer and through institutional arrangements. CAP feels they provide an institutional support for the enabling environment and manage action projects that help support our mitigation and adaptation approaches in South Africa.

CAP would like to share some of their insights on their action projects and how we need to work together to create a suitable enabling environment to promote healthy intact ecosystems as part of the climate change solution

An overview of the C.A.P.E. Programme: Where are we heading in the Fynbos Biome?

Key words: C.A.P.E., Fynbos Biome, Partnerships

Parker, A and Barnett, M.¹

¹ C.A.P.E. Coordination Unit, Fynbos Programme, South African National Biodiversity Institute

The CAPE programme was created in 2001. We had a vision, a strategy and an MOU with 14 original signatories; as well as some significant investments (GEF; CEPF, TMF) and many dedicated implementers. So, nine 9 years on...what have we achieved? And where are we heading?

At the end of 2008, the C.A.P.E. Partnership embarked on a 'pathfinder' exercise to help us understand our strengths and weaknesses, and how to build on our successes and address the challenges. The aim of this presentation is to share some of these findings with you and to set out what we think needs to be the focus for the next five years.

The 'pathfinder' process has highlighted that the C.A.P.E. partnership has collaborated and cooperated, built a community of practice, strengthened institutions, enabled a learning network, enabled behaviour that protects biodiversity, and most importantly learned that conservation is about people. We have learned that the partnership has succeeded in involving people and building a community of practice as well as enabling technical and intellectual innovation, while key challenges remain securing political buy-in and building capable institutions.

During the next five years the C.A.P.E. programme will focus on: consolidating what we have done well and scaling up successful pilots, further developing areas that require more attention while moving into some new areas of work; revisiting the governance arrangements for the programme; continuing to strengthen civil society participation; mainstreaming our work and making the case for biodiversity conservation.

Applications of the Red List for conservation practitioners

Key words: Red List, Threatened Plants, EIA, Conservation Planning

D. Raimondo¹, M. Driver¹, K. Maze¹, M.F. Pfab¹ & N.A. Helme²

¹ South African National Biodiversity Institute

² Independent Botanical Consultant, botaneek@iafrica.com

The recently completed Red List of South African plants provides a powerful tool for enabling protection and sustainable use of plants of conservation concern. This presentation explores the various ways in which conservation practitioners and others can use the Red List to support and enable such protection.

The main applications for the Red List that will be discussed are:

- The use in spatial biodiversity planning (also known as conservation planning), including how plant species of conservation concern should be used to contribute to the identification of geographic priority areas for biodiversity conservation.
- The environmental impact assessment process, how the occurrence of should be used to inform decision-making about development applications.
- How plant species of conservation concern should inform prioritisation of sites for Biodiversity Stewardship Programmes, in support of expansion of protected areas.

In addition to exploring applications of the Red List, in this presentation we will discuss the relationship of the Red List to other international, national and provincial species lists, and explains what overlap exists between these lists and why there are differences between this Red List and these other lists.

How Not To Communicate a New Approach to the Management of Damage-Causing Predators

Keywords: Damage Causing Animals

Kas Hamman & Jaco van Deventer

CapeNature, Rondebosch

Conflict with wild animals remains an inherent risk of livestock farming within or adjacent to areas where substantial natural habitat still exists and it is a challenge inherently linked to this form of agriculture. Certain indigenous wild animals do cause damage to property and losses to agricultural commodities. Conservation authorities still have a mayor role to play in addressing the issue of managing "damage-causing animals" and have a duty to advise landowners who practice agricultural activities that are not always compatible with the ecological requirements of natural ecosystems in any given geographic area. An important part of this mandate includes the conservation and sustainable utilization of naturally-occurring biological resources in a manner which is scientifically, ethically and morally justifiable. The managing of wildlife or wild animals that are causing economical damage in the agricultural sector and all actions taken to reduce or eliminate losses caused by wild animals, is inherently part of the producer's production process and responsibility. These animals do effectively have prior rights in that they evolved in these areas and existed there prior to the conversion of the land for agricultural purposes. The landowners thus need to take reasonable steps to protect their agricultural resources and

infrastructure from being damaged or “utilized”. The underlying principle of the holistic approach to manage damage-causing animals, is that animals responsible for causing the damage or killing livestock, must be identified correctly and targeted if required. The use of inhumane and non-target specific control methods are not acceptable.

At national level a process has been initiated to draft National Norms and Standards for the management of damage causing animals. The use of humane control methods will most probably form an integral part of these norms and standards. Earlier this year CapeNature amended its annual Hunting Notice to take effect from 1 of January to bring its management in compliance with the now generally accepted holistic principles. Although a pro-active combined press release was issued with Agri-Western Cape, some landowners saw the restrictive use of control methods such as gin traps, dogs and night shooting as drastic and unacceptable forms of interference with their “right” to control damage causing animals. The resultant emotional uproar soured relationships with landowners and the mentioned association quite badly. The question is, could this negative reaction be avoided and if so how?

PARALLEL SESSION 3: ENVIRONMENTAL MANAGEMENT

A Strategy Aimed At Establishing Management Plans For Estuaries In The Cape Floristic Region

Pierre De Villiers, Nompumelelo Thwala
CapeNature

To ensure the long - term conservation and sustained utilization of the estuarine biodiversity in the Cape Floristic Region, a Regional Estuary Management Programme is being implemented as part of the overall Cape Action Plan for People and the Environment. This involves the co-operation of National, Provincial and Local Authorities as well as all stakeholders. This C.A.P.E. Estuaries Programme will be the first of its kind in South Africa and will serve as a test case for the incorporation of strategic decision making into local estuary management. The overall aim of the programme is to align processes, interventions and actions with the Integrated Coastal management Act (2008).

The C.A.P.E. Estuaries Programme is driven by a co-ordinator and is directed by an inter-Governmental Task Team. The process is supported by a Technical Working Group and two guiding documents central to estuary management in the region, namely the C.A.P.E. Estuaries Conservation Planning document and the C.A.P.E. Generic Estuary Management Planning document. Estuary Management Plans are in the process of being developed for in excess of 15 estuaries in the CFR. Additional estuary management plans are being developed in the Eastern Cape and KwaZulu-Natal using a similar process. Estuary management training courses have been developed to increase capacity in the field of estuary management and a National database has been developed to store and maintain estuary data. Processes are being developed to integrate estuary management into the broader coastal management field.

Putting the ecosystem approach to work: The Langtou River pilot study, Southern Cape

Key words: agriculture, ecosystem approach, EIA

De Villiers, C.C.

C.A.P.E. Specialist Land-use Adviser: Land-use Planning and Decision-making

Damage exceeding R1,36-billion was caused by floods in the Southern Cape in August 2006 and November 2007. One of the hardest hit catchments was that of the Langtou River, a Critically Endangered tributary of the Gouritz River. Farmers here have over many decades adapted their irrigation practices to intra-annual flooding. Where floods have moved the channel or swept away land and infrastructure, repairs have usually been done without the involvement of any authorities. Since July 2006, unauthorised activities have been illegal in terms of the NEMA EIA regulations. At least six farmers have been investigated for alleged regulatory infringements or not exercising the ‘Duty of Care’ provisions of NEMA. Some role-players have expressed dissatisfaction about the enforcement of environmental legislation in a sector where agricultural and water affairs’ officials appeared to have tolerated local responses to the dynamics of the Langtou River. Following from this, the local farmers’ and water users’ associations have joined forces with Agri Wes-Cape, the provincial LandCare programme, the Department of Environmental Affairs and Development Planning and the National Department of Agriculture to develop an

environmental management plan (EMP) for the Langtouw River. The EMP will assist with expediting post-flood repairs and emergency works within the framework of environmental, water and agricultural legislation. The Table Mountain Fund has undertaken to support a pilot EMP project that aims to: contribute to the restoration of priority habitat, align riparian land-uses with the guidelines of the Gouritz Initiative and River Health programme, identify flood-prone areas and infrastructure that may require NEMA authorisation for repairs and defensive works, and to generally introduce a precautionary, ecosystem-based approach to agri-environmental management. The project proposal was developed by the Botanical Society of South Africa.

Water and soils: a call for an integrated approach to sustainable management

Key words: hydrological processes, soil ecology, ecosystem services

Le Maitre, D.C. and O'Farrell, P.J.

Natural Resources and the Environment, CSIR, Stellenbosch

Ecosystems play a vital role in regulating the fluxes and quality of water between the land and atmosphere, and across landscapes in a variety of interdependent ways that affect the delivery of ecosystem services to society. The components and processes that are involved are intimately and intricately linked together and are the key drivers of land productivity. The importance of these interdependencies is not generally appreciated by society or even by scientists themselves. A new approach is needed to give appropriate attention to these relationships and the importance of managing the whole land and water cycle. We are now in a situation where water resource management is facing a crisis with pressures for extractive, consumptive and polluting human-uses continuing to increase and the state of our land and freshwater systems continuing to decline. Similar pressures face land managers with a declining resource base and the increasing costs of the inputs needed to sustain modern agriculture. Sciences that relate to hydrological services, and particularly the central and vital role played by the interactions between soils and water, need to move beyond their silos to build the multi and trans-disciplinary knowledge needed to address scientific problems which span these traditionally separated fields. This knowledge, in turn, is required to support and guide policies, legislation and management institutions whose actions will sustain, and in most cases restore, the life-support systems that deliver the ecosystem services we depend on. Many of these ideas are not new, Aldo Leopold articulated many of them in the 1920s and 1930s and he was not the first. What will it take to make us change course? We are unlikely to have the luxury of further 70 years to discuss the necessary changes.

Prioritizing quaternary catchments for invasive alien plant control within the fynbos and karoo biomes of the Western Cape Province

Greg Forsyth, David le Maitre and Brian van Wilgen

CSIR, Stellenbosch

Invasive alien plant control requires the allocation of limited resources to control operations to maximise benefits. The priorities are based on a mixture of fact and opinion, interpreted either subjectively or objectively, but often not explicitly so. Our study sought to develop an approach that could assist managers and planners to prioritise their activities in a way that is transparent, logical and defensible. The Analytic Hierarchy Process (AHP) was used to facilitate the prioritization of both invasive alien plants and quaternary catchments for clearing in the Western Cape. AHP is a multiple criteria decision-making tool for setting priorities when both qualitative and quantitative aspects of a decision need to be considered, and for achieving group consensus. Expert workshops were convened to develop criteria for the identification of priority invasive alien plant species and areas (quaternary catchments) in the fynbos, succulent karoo and Nama karoo biomes of the Western Cape. The primary criteria identified as a basis for the prioritization of quaternary catchments were; i) capacity to maintain gains, ii) maintaining the integrity of the water resource, iii) potential of alien plant species to spread, iv) value of the catchment for biodiversity, v) poverty relief, and vi) potential for veld utilisation. These criteria were compared and ranked using pairwise comparisons within an AHP model with respect to the following goal, "Reduce and control invasive alien plants to minimise their negative impacts on natural resources". Each criterion was assigned a weight in terms of its importance, and the largest weights were given to the capacity to hold onto gains (42%) and protecting water resources (22%). Readily available spatial datasets representing the criteria were collated and analysed for each quaternary catchment to determine their contribution to each of the criteria. The quaternary

catchments were then assessed and ranked within the primary catchments E (Olifants / Doring rivers), G (Berg River and Overberg), H (Breede River), J (Gouritz River) and K (Garden Route).

TOWARDS MORE EFFICIENT MANAGEMENT OF INVASIVE ALIEN PLANTS: SPATIAL PRIORITISATIONS

Key words: alien invasive plant management, prioritisation, optimisation

Rainer M. Krug¹, Núria Roura-Pascual¹, David M. Richardson¹

¹ Centre for Invasion Biology, Department of Botany and Zoology, Private Bag X1, Stellenbosch University

Managing invasive alien plants (IAPs) is usually a triage, constrained by human and financial resources. Limited resources do not allow for the complete eradication of all IAPs in the whole managed area. It is thus essential to use an objective and transparent prioritisation approach. However, even the most objective and transparent prioritisation does not guarantee effectiveness, and success, measured in time required until an IAP is eradicated or decimated to a given level, can only be assessed over time.

To be able to compare the effectiveness of different prioritisation strategies and to select the most effective one, we developed a spatio-temporal simulation model (SpreadSim) to simulate the spread of IAPs over time. Simulations were run over 30 years, during which one prioritisation strategy was used, and the amount of area cleared was constrained by financial resources. SpreadSim incorporates spatial as well as non-spatial information, includes fire spread simulation, the spread of the IAPs and costs of clearing.

We will show that the prioritisation and optimisation are highly dependent on the underlying landscapes, but that certain generalisations can be drawn for both. Implications and data requirements for the usage of this methodology in management will be discussed.

PARALLEL SESSION 4: FIRE

Fiddling while Rome is burning – fire management in the Cape Mountains

Keywords: biodiversity management, ecosystem services, overstorey reseeding proteas

Schutte-Vlok, AnneLise¹ & Vlok, J.H.J.²

¹ CapeNature, Private Bag X658, Oudtshoorn, 6620

² Regalis Environmental Services, PO Box 1512, Oudtshoorn, 6620

The mountain fynbos of the Cape Mountains is generally regarded as an over-protected vegetation type, not requiring additional legal protection measures. Mountain Fynbos is not as threatened as lowland fynbos types, but serve a specific purpose, especially towards providing water.

CapeNature manages these mountainous areas to fulfill two major objectives: firstly, to conserve the full complexity of biodiversity in these regions and equally important, to retain the water supply ecosystem service to the dependent humans.

Still ecologically best understood in the mountain fynbos is the overstorey reseeding protea component – we still use them as an indicator of the ecological health of the ecosystems we manage. We know these plants are important to retain in the environment, but how many populations should we retain? How dense should these plants be to serve biodiversity and human needs?

We present two legal cases in which we are testing the legal system regarding our objectives. One from the southern Cape where these plants tend to be more abundant as an overstorey species and a Boland example, where populations are highly fragmented. CapeNature is currently questioned in its objective to retain these plants in the water catchment areas they manage.

Climate change models predict that fire frequency will increase, which will result largely in the demise of these plants. Should CapeNature still attempt to conserve these flagship plants? If not, what other better surrogate for sound biodiversity management on a landscape level can you suggest?

Individuals are still fiddling like Nero, while the fynbos is burning. Can the Fynbos Forum come to a common agreement that CapeNature should still focus on the maintenance of these plants as an objective?

The Demand for Resources to Practice Fire Management in the Protected Areas of the Western Cape – South Africa

Key words: Fire Management, Financial and Human Resources

Erasmus, W.Z.

Programme Manager Fire, CapeNature.

Fynbos survives in fragments throughout the Province of the Western Cape. Vast and irregular boundaries with heavily populated residential areas, plantations and cultivated lands, impact in various ways on the fire regimes. Management intervention in some form is inevitable within this environment, and Conservation Managers need to apply some form of Fire Management if they wish to achieve biodiversity objectives. Furthermore, Managers also need to comply with National Legislation and ensure that their own infra structure, as well as that of their neighbours, is protected from wild veld fire.

Fire Management in effect entails three main activities that are closely integrated, namely,

- the suppression of wild fires,
- the implementation of prescribed burns, and
- the preparation of firebreaks.

These activities are labour intensive, requiring large numbers of field workers to carry out dangerous and physically demanding operations.

The National Department of Forestry had, up until the mid-1980's, managed the vast Mountain Catchment Areas (MCA's) which formed most of the Fynbos biome. The Western Cape Provincial Conservation authority took over control of the MCA's, after which management resources dedicated to Fire Management declined quite significantly. This came about directly as a result of financial restrictions imposed by the authorities.

This study discusses a means whereby the human resources required to manage fire in order to meet ecological and legislative objectives, is described. This provides an essential means for management to determine the volume of work for which Fire Managers are responsible. Furthermore, it can be used to determine accurate budgetary targets.

Towards an adaptive interference fire management system for the Outeniqua and Tsitsikamma Mountains

Key words: fire management, fire protection, biodiversity conservation

Vermeulen, W.J¹, Kraaij, T.², Seydack, A.H.W.¹, Van der Merwe, C.J.³ and Britton, J.⁴

¹ Scientific Services, South African National Parks, PO Box 3542, Knysna, 6570

² Scientific Services, South African National parks, PO Box 176, Sedgefield, 6570

³ Garden Route National Park, Private Bag X530, Humansdorp, 6300

⁴ Garden route National Park, PO Box 24, Karatara, 6580

Large areas of the Outeniqua and Tsitsikamma Mountains have been incorporated into the newly established Garden Route National Park. The management challenge is to develop and implement a fire management system that would incorporate the different aspects of a natural fynbos fire regime to ensure the conservation of biodiversity and the maintenance of natural ecological processes, but with due consideration of fire risk to neighbouring property.

Moving away from the traditional, intensive, scheduled block-burn system, an adaptive interference fire management system is envisaged for the area. This system provides for the use of both natural and artificial sources of ignition. Considering the extent and topography of the area, and the locality and distribution of commercial plantations and natural forests in the landscape, two fire management sub-zones were distinguished. These include an adaptive interference zone where lightning would be the primary source of ignition, and a block

belt zone where prescribed burning to afford fire protection to bordering plantations, would be of primary importance. Fires will be controlled in space and time as demanded by the appropriate fire regime for mountain fynbos, fire risk to property, veld age configuration, etc., based on an annual assessment of fire risk and conservation management requirements.

Predictive Modelling in Conservation Managers Decision Making Systems related to Fire

Key words: Prediction, Decisions, Management

Morkel, A.T.

Kirstenbosch National Botanical Garden, South African National Biodiversity Institute.

The ability of a conservation manager to forecast and take credible decisions related to the impact of a fire regime on biodiversity is often a hotly contested subject. In the sea of research opinions, managers are often faced with a high degree of uncertainty when taking the decision on which fire regime to maintain and the impact it will have on biodiversity. Ideally, by providing a forecast simulation model, managers are able to forecast the impact of their decisions relative to the variables and criteria identified. However, there are various pro's and con's to this approach in both the academic and implementation paradigm. The resulting research question and/or hypothesis is to investigate whether predictive modelling is a useful and practical tool for conservation managers to make reliable, credible and ecologically sound decisions related to the impact of fire on biodiversity?

The focus of this platform paper is to highlight some of the issues associated with the implementation of a practical, effective and efficient predictive modelling system.

Towards Determining the Ecological Fire Season for the Garden Route Coastal Mountains

Key words: Proteaceae recruitment, lightning, fire weather

Kraaij, T.¹, Cowling, R.M.², Vlok, J.H.J.³ & van Wilgen B.W.⁴

¹ Scientific Services, SANParks, Rondevlei

² Botany Department, Nelson Mandela Metropolitan University, Port Elizabeth

³ Regalis Environmental Services, Oudtshoorn

⁴ Centre for Invasion Biology, CSIR, Stellenbosch

The season of natural fires in fynbos is largely determined by climatic factors and can have a marked effect on regeneration patterns and the subsequent floristic composition of mature fynbos. Research has shown that summer and early autumn fires are beneficial for regeneration of most fynbos plant species. This is also consistent with natural fire ignition patterns, although fynbos fires can occur in all months under suitable weather conditions. Most research on fynbos fire seasonality has however been done in the western parts of the Cape Floral Kingdom (CFK), while recent work in the eastern CFK, with its less seasonal climate, indicates more variable recruitment conditions throughout the year. This study proposes to characterise the natural fire season for fynbos in the Outeniqua and Tsitsikamma Mountains by assessing the seasonality of lightning and fire-prone weather (using fire danger index ratings), and by evaluating the seasonality of historical fires of natural cause. A seed-transplanting experiment will furthermore be conducted to determine if Proteaceae recruitment is seasonally controlled. Improved understanding of fynbos fire regime requirements in the Garden Route coastal mountains may afford managing authorities with more latitude for using fire as a means to control the vast pine infestations which resulted from decades of plantation forestry in the area. Ultimately this research is thus aimed at developing fire management guidelines for the newly proclaimed Garden Route National Park that would address the needs of biodiversity conservation, invasive plant control, and fire risk management.

Introduction to Firewise South Africa

Key words: Wild fires, Firewise, biodiversity, urban edge

Charlton, V.¹, Erasmus, Z.² and Mckrill, L.J.³

¹ Working On Fire, Manager of National Advocacy and awareness

² Cape Nature, Fire management

³ Working on Fire, Media and Community Liaison officer, Western Cape

One of the driving forces of many of the South African Biomes is that of fire; these regions are predisposed to burn at regular intervals on average between one and twenty years, dependant on the vegetation within a certain biome type. ¹

Fires occurring too frequently are often uncontrolled and exceptionally hot (due to the presence of invasive alien plants), can negatively impact biodiversity within biomes.²

Every year South Africa is victim to many wildfires, a number of which have been started deliberately, at a cost to both Biodiversity and the many livelihoods which depend upon the natural resources.³

The concept of FireWise communities was developed by the National Fire Protection Association and the USDA Forest Service in 1985 after the devastating wild fires in California, USA, that destroyed 1 400 homes.²

In 2006 two representatives of Working On Fire visited the United States in the search for a programme which could assist in creating awareness of the dangers and benefits of veld and forest fires, which would be beneficial to the public.¹

The Firewise concept was taken on and adapted to suit the South African landscape and has since been supplied applied to three communities in South Africa, with several following.²

The main aim of Firewise is to try and equip communities living in urban villages bordering natural veld, [The Wildland Urban Interface] with knowledge to protect their homes and livelihoods in the event of a wild fire.

PARALLEL SESSION 5: STEWARDSHIP

Working and learning with people working the land: A case study of a stewardship and extension professional development programme

Key words: professional development, institutional strengthening, work-integrated learning

Glenda Raven

South African National Biodiversity Institute, Fynbos Programme – C.A.P.E. Programme

The C.A.P.E. Capacity Development Programme (CDP) aims to support the development of capacity for effective and appropriate conservation management. One key area of work involves the development and offering of accredited learning programmes that enable the professional development of conservation professionals towards strengthening conservation management practices and consequently partner institutions in meeting their required biodiversity conservation mandate. One such case is the development of a Stewardship and Extension professional development programme, aimed at supporting the development of competence amongst stewardship and extension professionals to engage effectively and appropriately with a wide range of stakeholders in the multiple, diverse and very complex socio-ecological contexts in the South African landscape. Developed and run as a semi-distance learning programme, with a work-integrated learning orientation, through workplace-based participants were able to apply learning to their practice of stewardship and extension with which they engage in their professional contexts and make proposals for strengthening stewardship and extension at an institutional level. 16 participants in the 2008 course all note the valuable and relevant learning experience from participating in the course, at an individual level and equally at an institutional level. Towards sustaining the offering of the course as the field of stewardship and extension grows at a provincial and local government level, the course has been taken up by Nelson Mandela Metropolitan University from 2009, currently offered to 32 pre- and in-service stewardship and extension professionals. This case of stewardship and extension professional development, with its work-integrated learning orientation, illustrates on the one hand the significant linkage between the professional development of individuals and the strengthening of communities of practice at an institutional level. On the other it illustrates the critical significance of developing linkages between the conservation sector and the higher education sector towards better supporting the development of capacity for effective conservation management.

Key Words: conservation, stewardship

Nora Sperling Thiel

WCCSA c/o O.C.F. PO BOX 1949, HERMANUS,

Chris Martens, appreciating that CapeNature's Stewardship programme could not assist everybody, felt that an association should be formed for all conservation minded landowners, whether in the formal Stewardship Program or not. (Landowners that could apply for membership from outside the formal CapeNature program would be, for example, owners of mountain fynbos which needs protection but is not critically endangered. The Western Cape Conservation Stewardship Association's (WCCSA) was formed to assist conservation minded landowners (and conservancies) within and outside CapeNature's formal Stewardship program. The association is however entirely separate and independent but works together with CapeNature and all conservation minded landowners in the province.

WCCSA was formed in October 2003. Mr Valli Moosa, statesman and president of the I.U.C.N. is the patron. The Stewardship Association provides a networking platform for all those involved in conservation on private land in the Western Cape. While a number of regional conservancy forums currently exist within the Western Cape, to date there has been no single forum or provincial association that represents the interests of all the regional forums and other privately owned sites that are not conservancies (e.g. Private Nature Reserves and National Heritage Sites). The key purpose of the Association is to support, motivate and co-ordinate the diversity of private conservation initiatives in the Western Cape and its key objective is to represent private conservation initiatives at provincial and national level. WCCSA aims:

To further the best conservation interests of its members

To provide a platform for networking

To stimulate awareness of the contribution and importance of private sector conservation initiatives

To promote the concept of stewardship provincially and nationally.

To establish co-operation among all role players.

To influence leaders in all spheres of public affairs to accord the necessary priority to conservation issues.

The Declaration of a Protected Environment: who, how, where, why and when?

Key words: Protected Environment, private land, NGO's

Booth, Pamela

PO Box 56, Sedgefield, 6573

Private landowners have historically had few opportunities to formally conserve their land and those that are available are at the discretion of the conservation agencies such as CapeNature and SANParks i.e. a landowner may wish to enter into a contractual agreement but is unable to do so unless the agency is willing. With the introduction of the National Environmental Management: Protected Areas Act the declaration of a Protected Environment breaches this gap in that landowners are now able to approach the minister directly to have their properties declared a PE. In addition, a PE can be less onerous than a contractual park or reserve – often an attractive element for private landowners. A PE offers the most flexibility of all the formal conservation stewardship options regarding landuse. When comparing a PE to a contract park or reserve, the only non-permissible activities for a PE are commercial prospecting and mining. In the event landowners would like strict controls on landuse that are binding on successors in title they may voluntarily agree to the registration of title deed restrictions. The question: Is there a gap for NGO's to use the legislation to reach those land parcels that are not targeted by the agencies and to play a facilitation role to guide landowners through the process? This is particularly relevant in the Garden Route where conservation targets are beyond the capabilities of both the agencies and there is an NGO willing to fill the gap. It is also important in the broader provincial perspective where additional stewardship tools are required to reach the 80% of the Cape Floristic Region that is privately owned.

The challenge for NGO's is to find the right recipe: a dash of CapeNature's stewardship, a splash of NGO lateral thinking and a twist of treasury's incentives.

**The Role of the Environmental Impact Assessment Process in Conservation Gains:
Reactive Stewardship**

Keywords: reactive stewardship, environmental impact assessment, development

Smart, R.M.¹ and Ralston, S.²

¹Cape West Coast Biosphere Reserve

²Land Use Advice: Scientific Services, CapeNature

Most of the biodiversity priorities in the Western Cape fall outside of protected areas. The Stewardship Programme aims to address this by encouraging landowners to commit to conserve and manage biodiversity on their own land. The CapeNature Stewardship Model's initial focus was on voluntary conservation in agricultural landscapes, but as the Stewardship Programme expanded priority sites with other land-use types were identified.

The West Coast, for example, is facing huge development pressures, including from tourism and housing along the coast and the Saldanha-Vredenberg industrial development node. However, the area also contains many unique habitats and important ecological processes. Industrial and residential development usually triggers the requirement for an environmental impact assessment process before the activity may proceed. The Conditions of Approval attached to an authorisation are legally binding on the developer. This is an ideal situation for stewardship to be implemented and be legally enforceable, in effect securing an on-site biodiversity offset. Stewardship needs to be included in the EIA report in order for it to be included as a Condition of Approval. West Coast case studies include Helena Views and Mount Royal Golf Estate where the establishment of a trust fund for management of the site (and surroundings) was included as a Condition of Approval. A key factor in the success is communication between the Conservation Agency (extension officer and commenting body), the provincial Environmental Department, the environmental consultant and the developer.

PARALLEL SESSION 6: PARTNERSHIPS

People and nature on the Cape Flats: experiments and lessons

Key words: community, lessons, handbook

Paula Hathorn, Ntsiki Mlotywa,

South African National Biodiversity Institute, Cape Flats Nature

Cape Town has a population of about 3.4 million living in an area of 2.461 km². There are approximately 940 000 households in our city with 38.8 percent of them living below the poverty line. We have a coastline of 294 kms. There are 11 critically endangered vegetation types occurring within the city, three of these occur nowhere else. 58% of the population over 20 years old has an education level lower than matric. It is a unique, vibrant and ever changing city, breathtakingly beautiful, with plenty of opportunities and plenty of challenges.

This is the context in which Cape Flats Nature has been operating for the past seven years, exploring and experimenting with how to build bridges and mutual benefit between people and nature.

The lessons and experiences that contribute to the growing practice of urban conservation management that integrates social development and biodiversity priorities will be recorded in an urban conservation handbook that is in the process of being developed and will be available on the web. The handbook draws on Cape Town's experiences of urban conservation management, from the Cape Flats Nature project, the City's Biodiversity Management Branch, Cape Nature and the Table Mountain National Park.

This talk will reflect on the changing context and on the lessons that we can draw from the project's experiences in our work with community partners, conservation management, communication and lobbying.

The Nature Care Fund, the future of urban conservation!

Key words: Skills development, urban conservation, biodiversity, community

Ogilvie, M J F

Cape Town Environmental Education Trust, The Nature Care Fund

The Nature Care fund was started as an initiative of the staff and management of Cape Town Nature Conservation (South). The aim of which is to manage and conserve public and private land which considered to be of

biodiversity importance. It acts as a platform for friends groups, corporate companies and private individuals to get actively involved in conserving sensitive areas close to them. Through these contributions qualified conservators are deployed in the field. At present there are ten sites managed by the Nature Care Fund and the list is growing.

Kenilworth Racecourse Conservation Area: Partnerships and Role-players

Farha Ally

Intern: Kenilworth Racecourse Conservation Area

Kenilworth Racecourse Conservation Area (KRCA) is situated within the City of Cape Town, in the Western Cape Province. This is a critically important ecological area within the Biodiversity Network (CCT Biodiversity Strategy) and has been listed by the Botanical Society as one of the Core Conservation Areas for conserving Cape Flats Flora. KRCA is made up of Cape Flats Sand Fynbos, a critically endangered vegetation type of which less than 1% is formally conserved. Nearly 85% of this vegetation type is transformed and KRCA is one of the last and most pristine remnants.

The area is approximately fifty-two hectares and the functioning of this area relies on the participation of many different organizations, namely Gold Circle Racing and Gaming, City of Cape Town Biodiversity Management, Friends of Kenilworth Racecourse Conservation Area CapeNature, South African National Biodiversity Institute, Custodians of Rare and Endangered Wildlife, Cape Town Environmental Education Trust and the Wildlife and Environmental Society of South Africa and. This presentation will showcase the partnerships that have formed and the roles that these organizations play in contributing to successful management and conservation of KRCA.

AGULHAS PLAINS: Together for a Sustainable Future

Key words: working together, integration, partners, benefits, sustainability

Carinus, TvZ,

South Africa National Parks: The Agulhas Biodiversity Initiative (ABI)

Following an international donor conference in September 2000, the Government of South Africa requested support from GEF through the World Bank and UNDP to implement the C.A.P.E programme, and specifically to establish the institutional foundations, systemic, institutional and individual capacities and know how needed to spearhead conservation in a cost effective, participatory and sustainable manner. The Agulhas Biodiversity Initiative was implemented as part of the C.A.P.E. programme with the purpose of: *“Biodiversity conservation and socio-economic development on the Agulhas Plain are significantly enhanced through effective management and coordinated multi-sector stakeholder involvement.”*

New models for managing protected areas, linking management within core protected areas, in the public domain, with various categories of private reserves, and surrounding productive landscapes are being looked at and proposed. New institutional arrangements are being investigated and an ABI Way Forward has been proposed and are being investigated which in the end might be linking conservation agencies, municipalities, agriculture departments, tourism agencies, private landowners and community associations. As part of this integration, funding has been transferred to partners to implement the activity and to initiate a sustained budget line item. Conservation aims has been mainstreamed into the local authorities development plans and the conservation objectives has been integrated into the Integrated Development Plans and extension operations of the Overstrand and Cape Agulhas municipalities. Barriers to the sustainable utilization of wild flowers are addressed to the extend that new markets are being looked at and management systems and safeguards instituted to enable the sustainable utilization of wild resources, and in particular fynbos within specially demarcated zones thus providing economic incentives for conservation and livelihood opportunities. This new model for managing protected areas are being incorporated in conservation strategies and site action plans in other protected areas by SANParks, and this could provide a model for spearheading conservation in Phase 2 of C.A.P.E.

As part of this the partners has looked at an ABI 2 - Way Forward project which can formalise and institutionalise this “Off-reserve” management and integration in both the public and private domain. This will integrated the efforts of all the partners and a common goal was already established of: “Working together to secure a healthy

natural environment to provide benefits for all forever by enhancing the regional economy within the Overberg.”
Eendrag maak mag – Together we can make a difference!!!

People and renosterveld conservation: working together in the Overberg to conserve severely threatened lowland habitats.

Keywords: Renosterveld, People, Targets

Odette Curtis

Box 174, Napier, 7270, C/O CapeNature / TMF-WWF

Renosterveld has been the subject of many conservation planning initiatives and has received much attention in conservation circles on a global scale. We have, at our disposal, several impressive conservation planning tools in the form of detailed GIS maps and associated systematic conservation plans. However, besides one small statutory reserve, there is currently no renosterveld or other lowland habitats under formal protection in the Rûens area of the Overberg. Several (± 15) stewardship contracts are 'in the pipeline', which will contribute only 0.3% to the target for Eastern Rûens Shale Renosterveld (CE), 0.18% to the target for Cape Lowland Alluvial Vegetation (CE), 22% to the target for Greyton Shale Fynbos (EN) and 2.79% for Swellendam Silcrete Fynbos (EN). Apart from the Greyton Shale Fynbos, lowland habitats in the Overberg continue to be inadequately secured for conservation in the long-term and we are very far from reaching our desired targets. So what are the issues that hinder our progress towards conserving our *Critically Endangered* Lowland habitats and how do we address them? The challenge, as with most conservation issues, lies with *people issues* (including fear of losing control of the land, misconceptions about how land value might change with conservation agreements and lack of incentives to change conservation and management-related attitudes). Bridging the gap between all the essential roleplayers (including managers, landowners and scientists) and finding a happy 'middle-ground' is key to ensuring that our efforts to conserve these near-extinct habitats are not fruitless. In this paper, I will present some of the challenges and success stories that we have experienced in the lowlands of the Overberg, through interactions with people involved with the lowlands-focused projects here.

Bottoms up!! Viewing conservation challenges through the wine glass.

Key words: Biodiversity and Wine Initiative (BWI), lessons learnt, biodiversity business

Inge Kotzé

(BWI project coordinator), Biodiversity and Wine Initiative, Private Bag X2, Die Boord, Stellenbosch, 7613

The Cape Floristic Region (CFR) is world famous for its dramatic and varied landscapes and its astonishing diversity of plant and animal life, and recognized as a biodiversity hotspot and World Heritage Site. The Cape winelands lie within this region, with 90% of all grape production occurring within the CFR. Ongoing vineyard expansion, ever increasing alien plant infestation, too frequent fires and uncontrolled water abstraction and pollution, are undermining this unique natural heritage and long term sustainable agricultural production within the CFR.

The Biodiversity & Wine Initiative (BWI) has been in existence for 5 years. The aim of this initiative is twofold: firstly, to minimise the further loss of threatened natural habitat, and secondly, to promote sustainable production within the South African wine industry, in partnership with the Scheme for Integrated Production of Wine (IPW), through the implementation of sound environmental farming practices.

BWI membership continues to grow with strong producer buy-in and support and the development of the export wine product, Brand South Africa, incorporating the essence of this unique natural heritage with the marketing positioning of "Variety in is our nature". The BWI conservation footprint now exceeds the 102,000ha vineyard footprint. This presentation will highlight lessons learnt and sustainability challenges of establishing this conservation partnership within the South African wine industry, reviewing five years of project development and looking forward at some of the key challenges for consolidating the initial gains made within the wine industry.

Tourism as a tool for the conservation of fynbos

Keywords: fynbos, sustainable tourism, conservation

Maarten Groos

Farm 215 nature retreat & fynbos reserve, DIST GANSBAAI

Seizing upon the growing trend of “sustainable tourism” to increase the attraction of fynbos for the tourism markets and as a result have a market driven argument to strengthen fynbos conservation and halt ecologically irresponsible developments.

It is easy to see how tourism can be detrimental to indigenous nature. Examples come easy. A growing niche in the Tourism markets has however become more aware and sophisticated and tourism products operating on genuinely responsible and sustainable standards have become more organised. As a result “Green-washing” and the use of empty “green” slogans will become more difficult as tools to market irresponsible tourism.

Though the word “fynbos” can be found in each and every tourism guide, at present most tourists leave the Cape without a clue about what fynbos actually is (*never mind, the pines on Signal Hill were stunning*). As a matter of course, municipalities whose local economies depend on tourism, continuously support developments which are destructive to the remaining natural areas.

The conservation of fynbos can benefit from the growing trend, especially in Europe, to plan a holiday on the basis of genuine sustainable standards. For a growing group of tourists, it matters less how the surrounding “greeneries” look, as long as it is the real stuff on which they can tread lightly. More and more tourists are prepared to pay a premium if they are convinced that the extra money is used to keep their holiday-footprint low.

This development can be left to its own devices (and as a result allowing a high degree of green washing) or can be actively managed. Active management includes a marketing focus of the “fynbos community” on the main tourism markets feeding the Western Cape and a much bolder communication by the same community with the powers that be, explaining that by lacking to properly conserve indigenous nature and allowing for irresponsible developments, this country is robbed both from substantial future income derived from tourism and from the creation of decent jobs.

The above general approach is supported by developments on the ground. Especially on the Agulhas Plains, commercial enterprises have pioneered in the development and successful operation of genuine sustainable tourism products and in properly communicating the attractions and limitations of a genuine sustainable operation.

Birding tourism to the Cape Floral Kingdom

Key words: birding, avi-tourism and conservation, endemic species

Odendal, A.W. ¹

¹ BirdLife South Africa

The Western Cape's lengthy coastal belt, towering Cape Fold Mountains, wide sheltered valleys and the remarkable Cape Floral Kingdom host a vast array of birds, including many special and endemic species. The area abounds with birding “hot spots” and here De Hoop, De Mond, Grootvadersbosch, Fernkloof, Harold Porter and the Agulhas National Park spring to mind. Birders will delight in the many special and often endemic birds such as the Blue Crane, Cape Sugarbird, Cape Rock-Jumper, Cape Siskin, Victorin's Warbler, Orange-breasted Sunbird, Protea Seedeater and Black Harrier to name but a few. The Western Cape has a number of different ecosystems and offers a rapidly growing number of avi-tourists the opportunity of birding in mountain, coastal, river and estuarine habitats. BirdLife South Africa is developing the Western Cape birding routes to market the area's avian riches among local and international birding fraternities. Increasing numbers of international visitors are already being assisted to get the most out of the birds in the region. Bird checklists, information brochures and a website at www.westerncapebirding.co.za are being developed, and local bird guides drawn from previously disadvantaged communities are being trained. This paper will illustrate the vast potential that birding tourism holds for the Cape Floral Kingdom, give feedback on progress with the development of the birding routes and use the Agulhas National Park as a brief case-study on how the area's birding potential could be developed.

The CREW programme: Making volunteers work for conservation

Key words: threatened species, civil society, monitoring,

Ebrahim. I, Zikishe. V¹
CREW, SANBI, Claremont, 7735

Since the inception of the CREW programme in 2003 the programme has expanded nationally and is currently working with 17 groups across the country. We have found that most the groups we work with have become the botanical experts in their area. In addition to mapping and monitoring the rare and threatened plants our volunteers has become involved in taking the next steps to ensuring the conservation of threatened plants and habitats. Our paper will focus on showcasing the incredible discoveries the CREW programme has made over the last year, the conservation action our groups has been involved in and the lessons we have learnt about establishing partnerships between CREW volunteers and conservation authorities.

The Nuwejaars River Nature Reserve, a privately owned Special management Area.

Keywords: Partnerships; Protected Environment; Nuwejaars River Nature Reserve

Rory Allardice
Project coordinator, NRNR

The threat of losing their properties through expropriation by SanParks or land redistribution and the need to conserve biodiversity has driven a partnership between the private and public sectors on the Agulhas plain to establish a protected environment under NEMA.

ABI motivation and support of the private landowners initiative has resulted in the acceptance of a constitution by 23 land owners and the registering of restrictions on 110 title deeds to ensure the perpetuity of biodiversity conservation in the Nuwejaars Wetland. This has met ABI commitments to develop formal protection on the Agulhas plain by the end of project.

As a result of the partnership between ABI and the NRNR, the ability to generate funding through grants from ABI, DBSA, TMF and the German government has projected the NRNR into achieving objectives faster than expected. The formation of a development strategy, a management plan, and action plans has progressed quickly to deal not only with threats but also to take advantage of momentum and opportunities.

Funding from the German Government amounting to €2 million for carbon emission reduction and sequestration projects has stimulated movement to achieve management objectives.

Biodiversity Based Business - Dyer Island Cruises & Marine Dynamics

Keywords: social development; research; conservation

Chivell, W.
Gansbaai

In Gansbaai, Dyer Island Cruises (boat based whale watching) and Marine Dynamics (shark cage diving) are proving how commercial businesses can contribute towards social development of people, education, research and conservation of the area in which they operate. Projects currently being undertaken include:

- 1. Faces of Need – Sharks** A five year research scheme initiated in conjunction with South African Shark Conservancy (SASC). Provides support for monitoring programmes set on three key local shark species.
- 2. Faces of Need – Penguins** Provides African Penguins on Dyer Island with artificial nests, as a result of human removal of all the guano from the island in which the penguins used to nest.
- 3. Tourism Development (Marine Big 5) project** Initiated in order to increase awareness of the magnificence and necessity of conserving our marine ecosystems.

4. Clean Marine Develops educational material on marine litter and the associated threats to marine animals, collects litter at sea from fishing vessels by the provision of specially designed bins, conducts regular coastal clean-up campaigns.

5. Whale Research DIC assists scientists conducting research with transport, detailed log sheets and photographs of whale and dolphin sightings; records and investigations into marine mammal and sea bird injuries and deaths; collection of whale faeces for analysis.

6. Animals in Need DIC is involved in the care of over 90% of all animals in need from De Kelders to Die Damme. Animals are collected, cared for, and expert help sought if needed.

7. Nolwandle Project Initiated as part of ongoing commitment to responsible tourism, giving consideration to the social, economic and environmental impact of the operation, therefore spreading the benefits that tourism can bring. 24 Ladies from local community trained in making of various crafts that are sold to tourists coming to Gansbaai for whale and shark watching.

PARALLEL PAPER SESSION 7: SUSTAINABLE HARVESTING

Flower Valley's sustainable harvesting research program on the Agulhas Plain

Key words: biodiversity, flower farming, sustainability

Privett, S.D.J.¹, Gaertner, M.²

¹ Fynbos Eco-scapes, Witkrans, Gansbaai, 7220

² Centre for Invasion Biology, Department of Botany and Zoology, Stellenbosch University, Private Bag x1, Matieland 7602, South Africa

The Agulhas Plain region is characterized by lowland fynbos with exceptional biodiversity value. Ninety-five percent of the land is in private ownership. Fynbos flower farming covers the second largest surface area of the Plain and is thought to have higher flower harvesting levels and generate more income than any other fynbos area in the Cape Floristic Region (CFR). Formal fynbos flower harvesting industry on the Agulhas Plain is worth an annual R200 million in sales and directly employs between 2,500 and 3,000 people. Conservationists and scientists have long been concerned that flower harvesting and cultivation will result in the loss of conservation worthy habitat on privately owned land. Therefore Flower Valley has chosen a particular approach to address biodiversity loss and human development in an integrated way. The sustainable harvesting project intends to provide practical, easy to implement guidelines for the sustainable use of wild fynbos resources with the maximum benefit to landowners and local communities. Baseline for the fulfillment of these objectives are five integrated research projects namely, the resource base assessment, the vulnerability index, the sustainable harvesting project, the biodiversity –impact study and a restoration project. Each of these projects contributes in its own way towards a sustainable use of fynbos resources.

Agulhas Plain: A Resource Base Survey for Wild Fynbos

Key words: Agulhas Plain, Survey, Wild Fynbos

Bailey, R.V.¹, Euston- Brown, D.² and Privett, S.D.J.³

¹ Flower Valley Conservation Trust, PO Box 393, Gansbaai 7220, South Africa

² Vegetation Ecologist, PO Box44066, Scarborough 7975, Cape Town, South Africa

³ Fynbos Ecoscapes, Witkrans farm, Gansbaai 7220, South Africa

The CFR occupies a surface of 90,000 km² out of which the Agulhas Plain covers approximately 270,000 ha of semi-arid, lowland fynbos and renosterveld. Wild fynbos harvesting is the single largest economic activity on the Agulhas plain. Detailed information on levels of harvesting from the natural veld is scarce. To ensure a sustainable manner of harvesting a methodology was developed that could define size and distribution of harvestable wild fynbos populations. The objective was to develop an economical, logistical and feasible methodology for calculating total population sizes and total number of harvestable stems of wild fynbos within the natural landscape. The reasoning behind this projects is that information on disbursement and size of individual populations in combination with actual off take figures can form the basis on which sustainable harvesting can be measured. It is however important to note that these calculations provide a simplified methodology for calculating population densities and total harvestable stem numbers in a very complex ecological system. The composition of

fynbos landscapes is extremely variable both over space and time and populations of many species (especially serotinous Proteaceae) move across landscapes over time and have patchy and variable densities. Therefore further testing is required in order to ascertain the accuracy of estimates on the landscape scale. We are however confident that the figures produced through this project provide a reasonable estimate of what is available at the time and a first attempt of developing a 'quick & easy' methodology for determining the commercial carrying capacity in fynbos landscapes on the Agulhas Plain.

Agulhas Plain: Does the sustainable harvesting of fynbos have an impact on the lives of people?

Key words: Sustainable harvesting, economic development, human development

Dr Joan Prins¹, in collaboration with Lesley Richardson, Executive Director, Flower Valley Conservation Trust²

¹ Private consultant

² Flower Valley Conservation Trust

The Agulhas Biodiversity Initiative (ABI) is exploring ways and means of conserving biodiversity at landscape level on the Agulhas Plain. The focus area stretches from the Klein River in the west to the Breede River in the east and constitutes one of the largest extant storehouses of lowland fynbos and Renosterveld habitats in the world. One of the main outputs of ABI is to demonstrate that harvesting of wild fynbos along sound ecological, social and ethical lines can be a viable land use option within this unmatched diversity of habitat types and ecosystems.

Flower Valley Conservation Trust acts as the champion for sustainable harvesting and has to show evidence that such operations can indeed be sustainable and are also having a positive impact on the well-being of people participating in this segment of the local economy. For this purpose a model was developed to monitor and evaluate the economic and human development performance and impact of sustainable harvesting. The five primary indicators relate to human development, physical living environment, social development, financial/economic development and natural/environmental development.

The first audit report has been completed in April 2008 and was based on the findings of full-scale audits on two pack sheds and four farms participating in the programme. The audit process covered 124 workers and six landowners/managers (100% of participants) in one-on-one interviews and was done in collaboration with WIETA auditors. The outcome was reflected in individual reports for pack sheds and farms and a joint report for the Trust/ABI and included some recommendations. These are now being used as working documents to enhance performance. The findings of the audit shows some interesting comparisons between the beneficiaries of sustainable harvesting and those engaged in other sectors of the local economy and offer points for debate as a case study for C.A.P.E.

Does wild fynbos pay?

Keywords: profitability, fynbos, wild harvesting

Knoesen, H.L. and Conradie, B.

School of Social & Business Sciences, NMMU Saasveld, Private bag x6531 George 6530

Since the early 1970s farmers in the Overberg have had to contend with falling real wheat prices and rising real fuel prices. This and the growing urgency to conserve lowland fynbos raises the question of whether the biodiversity on the Agulhas plain can pay for itself, especially through the commercial harvesting of wild fynbos. It was recently reported that a quarter of the Western Cape's protea producers rely only on wild harvesting, but little data exists on which to base claims of the profitability of such ventures. This paper presents financial data for Flower Valley Farm, a test case set up by Conservation International for the explicit purpose of demonstrating that fynbos harvesting from the wild can compete with other land uses on the Agulhas plain. The veld types on the farm are dominated by acid and neutral sand proteoid fynbos. At just under 600 hectares it falls amongst the 20% smallest operators in the wild harvesting sector of the protea industry. What was marginal to begin with burnt down in 2006. At that point Flower Valley reinvented itself to become a contract harvester, which in 2008 operated on several thousand hectares on fifteen properties. In that year Flower Valley generated a gross income of R625,000, a gross margin of just under R300,000 and an estimated net farm income of R200, 000. In 2008 the farm covered

its harvesting costs in all weeks and made a profit in 84% of the weeks. Obviously financial viability is a function of prices, and with rising transport costs and the world economic slump one should expect falling revenues. A sensitivity analysis shows that a 33% decline in revenue reduces net farm income by 70%. We also establish a minimum feasible order size and discuss the maximum distance over which picking should occur.

Sustainable harvesting in nature reserves: a case study

Key words: vulnerability index, resource base, community benefits

Hudson, V.

CapeNature, Walker Bay office, Hermanus

Sour figs have been harvested on the Agulhas Plain for generations – and for almost as long these plants with their attractive yellow, pink or purple flowers have been poached in CapeNature's four Walker Bay nature reserves. Despite the name, it is the flowers of the *Carpobrotus* genus that are harvested from December to March when they are dry. While the dried product may look unimpressive, it is a rare and very popular delicacy for the initiated. In a first of its kind, CapeNature issued a permit to the Uzenzele Community Development Organisation at Pearly Beach for harvesting sour figs in the 2007–2008 season. In the 2008–2009 season, permits were issued to two community organisations. The pilot project was made possible by a newly developed mechanism, a vulnerability index, which indicates how vulnerable species are to harvesting. The vulnerability index is one of the tools developed by the sustainable harvesting working group of the Agulhas Biodiversity Initiative (ABI). By using the index, CapeNature was able to determine that controlled harvesting would not threaten the long-term survival of the species. Another pilot study was carried out in 2008, this time to determine the potential sour fig resource base in the reserves to establish sustainable harvesting levels. With the help of botanist Sean Privett, and using ABI's resource base assessment tools, eight random plots of 10 m by 10 m per reserve were identified and studied.

Impacts of harvesting on reproduction of five commercially exploited fynbos species: Recommendations for the flower industry

Key words: Agulhas Plain, fynbos, sustainable harvesting

Forbes, G.¹, Privett, S.D.J.² and Gaertner, M.³

¹Flower Valley Conservation Trust, PO Box 393, Gansbaai, 7220

²Fynbos Eco-scapes, Witkrans, Gansbaai, 7220

³Centre for Invasion Biology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa

Wild fynbos harvesting is one of the largest agricultural practices in the Agulhas Plain. Information with regards to the influences of harvesting on indigenous fynbos, which has been used since 1877, is limited to a few studies. Of the 74 species which has been identified as harvested on the Agulhas Plain, this study experiments with species from three different guilds; obligate seeders, re-sprouters, and myrmecorous Proteaceae. The objective of this study is to investigate the influences of harvesting on the vegetative re-growth and inflorescence production of five frequently harvested fynbos species, from the Agulhas Plain. The species investigated are *Brunia laevis*, *Staavia radiata*, *Erica corifolia*, *Erica imbricata* and *Leucospermum truncatum*. Four harvesting rates (25%, 50%, 75% & 100%) have been experimented with and replicated within each species including controls (un-harvested plants). The study was initiated 2006 as a long-term monitoring project. So far preliminary results have shown that harvesting does influence re-growth and inflorescence production. Results presented are a comparison of the number of inflorescence per individual before harvesting and after harvesting. The re-growth of *Brunia laevis* is being impacted negatively. None of the harvesting rates has indicated an increase in inflorescence production. Results from *Staavia radiata* and *Erica corifolia* showed an increase in re-growth in the 25% harvesting level from 2007 to 2009. Harvesting of re-seeders at 100% has resulted in the mortality of all individuals. *Leucospermum truncatum* has shown an increase in inflorescence production limited to 25% harvesting level from 2006 to 2008. Harvesting these proteoids at the base or below the first node of the plant resulted in the mortality of all individuals.

The study aims to provide the wild flower industry with practical guidelines on how to manage harvesting and utilize the natural resources sustainably.

PARALLEL SESSION 8: CONSERVATION/ CONSERVATION PLANNING

City of Cape Town's Biodiversity "Wetwork": prioritisation of City wetlands for conservation

Key words: wetland mapping, wetland prioritisation, conservation planning

Snaddon*, K., Holmes#, P., Day*, L., Ewart-Smith*, J., Ollis*, D., Job*, N., Ractliffe*, G. and Dallas*, H.

* Freshwater Consulting Group, P O Box 43935, Scarborough, 7975

Biophysical Specialist, Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town

Over the past 3 years, the wetlands of the City of Cape Town have been captured on a GIS layer, with the associated wetland classification, according to the draft National Wetlands Classification System. Wetlands were further grouped into similar types, based on the surrounding vegetation type. A subset of wetlands on the City Wetlands Map was partially ground-truthed in 2008, and the accuracy of the Map found to range from approximately 40 to 100%, depending on the wetland type. Dune strandveld depressions and sandstone fynbos seeps were found to be the most difficult wetland type to accurately map. The next phase of work required the prioritisation of wetlands, for the conservation of biodiversity, and for their inclusion in the City's largely terrestrial Biodiversity Network and Bioregional Plan. The prioritisation of wetlands was achieved using a scoring method, whereby a number of criteria were used to rank wetlands within each wetland type. Criteria were chosen based on the availability of spatial information that could be used to score each wetland. High-ranking wetlands were then assigned to two Critical Biodiversity Area (CBA) categories – CBA1 and CBA2. Wetlands that were ranked lower than the CBA's were assigned either to the Critical Ecological Support Areas category, or the Other Ecological Support Areas category. The ranking of wetlands will allow for their incorporation into the Network, through the setting of selection rules.

What if everything is important? Identifying Critical Biodiversity Areas in the Overberg

Key words: Systematic Conservation Planning, Threatened ecosystems

Stephen Holness¹, Peter Bradshaw¹

¹ SANParks, PO Box 20419, Humewood, 6013

This paper presents an overview of the methodology and outputs of the recently completed Overberg District Finescale Conservation Plan. It explores the systematic conservation planning underpinning the identification of Critical Biodiversity Areas and Ecological Support Areas in the Overberg District of the Western Cape of South Africa. The area is home to an almost unmatched set of biodiversity assets: at the species level the area is full of Red Listed taxa and contains a high portion of fynbos endemics; at the habitat level it includes a number of listed threatened ecosystems; and from a process point of view the area includes significant wetland systems, important estuaries and some of the few remaining ecologically functional lowland habitats in the CFR. Unfortunately this area is subject to heavy development pressure (urban expansion, especially tourism and coastal development; plantations; arable agriculture), is impacted by invasion by alien species, and has been subject to major disruption of ecological processes especially through landscape fragmentation. Although the reserve network is fairly extensive and covers what looks like a healthy portion of the area, it is poorly representative and many habitats and species remain under-protected or even unprotected. The net result is that (with a few exceptions) much of what remains intact outside of protected areas can be considered to be important. However, choices need to be made and areas need to be prioritized. This paper examines the process of making these difficult choices across terrestrial, freshwater and marine environments in order to identify a transparent and defensible set of Critical Biodiversity Areas and Ecological Support Areas that provide the best chance of long term persistence of the diversity of the Overberg.

Conserving priority lowland areas. Assessing the status of the Jarman sites

Key words: threatened ecosystems, conservation, Priorities, conservation planning

Ebrahim. I¹ and Koopman. R.²

¹ CREW, SANBI

² Scientific services, Cape Nature

In 1986, a landmark work entitled "Conservation priorities of the lowland regions of the fynbos biome" (edited by ML Jarman) was released. Sites across the entire Cape Province (today's Western, Eastern and Northern Cape) were assessed and identified as conservation priorities. In 1994 Chris burgers reassessed the sites to evaluate the progress made on these sites. His finding was that on the Southern and Western lowlands only at 19% of the sites conservation progress was made. A number of planning products have emerged since the Jarman report was completed but the Jarman Report is still acknowledged as an excellent benchmark.

Recent field work has found that many of the original Jarman sites have been lost or are losing their integrity through neglect. Although the fine scale vegetation mapping and conservation planning that has happened over the last 10 years has added incredible value to the identification of priority areas and making these planning products for useful for decision makers and conservation authorities they have not influenced the conservation status of many of the sites. Based on fieldwork conducted by the Fine scale planning projects and the CREW project we will look at some of the Jarmin sites and reaccess there conservation status and current condition. We will also illustrate that the Jarmin report was good at identifying the priority areas on the lowlands and we need to use this product more effectively.

Conservation status updates for geometric tortoises and speckled padlopers

Key words: Tortoises; fynbos; conservation status

Ernst HW Baard, Scientific Services Unit, CapeNature, Private Bag 5014, Stellenbosch 7599

The current distribution and population status of the geometric tortoise and southern speckled padloper, two threatened tortoises of the Fynbos, is in the process of being updated by means of accurate fine-scale mapping of remaining habitat and focused field surveys within their distribution ranges. The conservation status of both species remain of concern and this updated information will play an important part in the current South African Reptile Conservation Assessment. Future conservation management options will be discussed, including the preparation of biodiversity management plans for both species and the implementation of conservation stewardship options for the protection and securing of remaining populations.

THE OCCURRENCE OF THE CAPE HARE (*Lepus capensis*) ON THE AGULHAS PLAIN AND THE QUESTIONS IT HAS RAISED

Key words: Cape Hare, actual status, Southern areas

D'Alton, M.J

Landowner Agulhas Plain, P.O.Box 400, Bredasdorp, 7280

The Cape Hare (*Lepus capensis*) was first described by Linnaeus in 1758 from specimens from the environs of the Cape of Good Hope. Although found throughout Africa in suitable habitat, the valid subspecies of *Lepus capensis capensis* refers to forms from the Cape as far as Oudtshoorn and the Olifants River in the North and was known, from the literature, to occur around Bredasdorp.

During a research project in 2007, by the Research Institute of Wildlife Ecology of the University of Veterinary Medicine, Vienna in collaboration with the Department of Zoology and Entomology of the University of Pretoria, no

evidence of the Cape Hares' continued existence could be found in the Southern part of the research area around Bredasdorp. Conservation authorities were unable to throw light on their current status and no data appeared to exist.

This raises many questions some of which are; what is the current status of hares and all small mammals; what systems are in place to monitor these populations; who should be responsible for this?

***Amietophrynus gutturalis*, Indigenous African...Cape Town Invader**

Keywords: Invasive, Threatening, Eradication

B.O. Beukes

City of Cape Town, Biodiversity Management Branch, Project coordinator, Berkley road, Old Abattoir, 7405.

The control and eradication of invasive species of both fauna and flora has become an integral part of conserving indigenous species and ecosystems.

Toads are known to have invasive potential and various species have become invasive in numerous locations around the world. The most extreme examples are *Rhinella marina* (Cane Toad) and *Xenopus laevis* (Platanna).

Now, a less famous invasive has been introduced into the City Of Cape Town, the Guttural Toad (*Amietophrynus gutturalis*). This African toad is adapted to live and breed in disturbed areas, which makes it one of Africa's most common amphibians. As a result it has a high invasive potential in the suburbs of Cape Town; posing a threat to a number of indigenous species. Of particular concern are specialised niche amphibians such as the endemic Table Mountain Ghost Frog (*Heliophryne rosei*), Micro Frog (*Microbatrachella capensis*) and the Western Leopard Toad (*Amietophrynus pantherinus*).

The presence of this species on the Cape Peninsula is best regarded as a case of early detection. It is thus essential that the species is eradicated before detrimental ecological effects become apparent and while the population and distribution range is at manageable levels.

The historical invasion, potential threats posed to the unique herpeto fauna of Cape Town as well as the eradication strategy being employed, will be presented.

KEYNOTE ADDRESS 6TH AUGUST:

“After all those cosy years of working together, show me the money”: From economic valuation to real-world investment in the fynbos biome

Key words: economic valuation, ecosystems, fynbos, decision making, institutional processes and arrangements

De Wit, M.P. ^{1*}

¹ Stellenbosch University, School of Public Management and Planning and De Wit Sustainable Options (Pty) Ltd
*martin@sustainableoptions.co.za

The last decade has seen several studies demonstrating the economic value of ecosystems and the fynbos biome is no exception. Despite notable criticism on some of these studies, on average they have succeeded in raising the awareness on the value of well-functioning ecosystems. In some instances this has led to conservation and restoration success on the ground, but what is needed is an institutional system that will translate abstract economic values into real financial investments in ecosystems. With continued increased pressure on the world's biodiversity on the one hand and shifting agendas towards climate change and a rather reductionist and in practice partial ecosystems goods and services (EGS) analysis on the other, economists and ecologists need to build on their successes and find new meaning in their work on total systems value, as opposed to a focus on total economic value (TEV) or an EGS analysis only. Economists and ecologists would also do well by soliciting the services of those who can assist in the development of new institutional processes and arrangements that can capture the real financial benefits of well-functioning ecosystems beyond the usual short-term and consumptive benefits. Based on a analysis of current bottlenecks to realise real-world investments in specifically fynbos ecosystems, an action-orientated agenda focussed on performing economic valuation studies to better serve the

needs of decision makers, an increased understanding of and leverage of total systems value, and a renewed focus on the institutional process and arrangements to capture fynbos ecosystem values, is proposed.

SAEON GUEST SPEAKER 7th August:

Restoration of a Texas savanna: The different effects of season of prescribed fire on native and invasive species.

Key words: invasive species, prescribed fire, restoration.

Mark Simmons and Steve Windhager

University of Texas at Austin, Lady Bird Johnson Wildflower Center, 4801 Lacrosse Avenue, Austin, Texas, USA,

Prescribed fire is increasingly utilized as a tool for grassland and savanna restoration and conservation. In the Great Plains of North America fire is often installed during the dormant season due to ease of installation and to promote the growth of the predominant warm-season grasses. However, the timing of modern anthropogenic fire conflicts with the seasonality of lightning-caused wildfires that once maintained these systems. Although attempts have been made to coarsely model fire-season effects, the paucity of studies and conflicting results have not produced useful generalizations for restoration practitioners. This long-term study seeks to examine the responses of the herbaceous and woody component of the savannas of central Texas and to test the assumptions surrounding floristic guild responses to seasonal prescribed fire. After seven years of data collection it appears that the response of the plant community is far from uniform, with species often exhibiting no response or contra-indicated responses to fire treatment and strong interactions with climate. However, the beneficial consequences of implementing prescribed fire in different seasons is that some species can be encouraged while others significantly reduced. For example, summer fire facilitates the selective reduction (up to 90% mortality) of a Eurasian invasive grass species *Bothriochloa ischaemum* while facilitating native grasses. Thus, rather than regarding fire as a binary treatment, we suggest that restoration practitioners use seasonal prescribed fire to manipulate community structure for multiple goals such as: removal of undesirable and invasive species, restoration of habitat, increase forage and reduce wildfire fuel.

PARALLEL PAPER SESSION 9: ECOLOGY

In ditches and dongas: but down and out? The value of conservation corridors in West Coast Renosterveld

Key words: renosterveld, conservation, corridors

Anne Horn¹, Cornelia B. Krug² and Karen J. Esler^{1,3}

¹ Department of Conservation Ecology & Entomology, University of Stellenbosch

² Zoological Institute, University of Cape Town

³ Centre of Excellence for Invasion Biology, University of Stellenbosch

While conservation corridors are thought to be highly beneficial in the fragmented natural vegetation of the West-Australian Wheatbelt, initial observations in South Africa have indicated little conservation value. This is especially evident in renosterveld, one of the most strongly fragmented vegetation types. Furthermore, corridors are thought to be potential conduits to alien invasive species. Renosterveld is so highly transformed that few corridors exist and those that are present are often narrow or highly infested with invasive species such as acacias or eucalypts along riverbeds. In our project, we examined strips of land of varying width along drainage lines between Tygerberg hills fragments and the Diep River for presence of renosterveld species. Additionally, we collected fruit of common geophyte species from both corridors and surrounding larger fragments to compare seed set in the two different environments. Our results show that a number of renosterveld species do occur in even heavily invaded strips. Seedset in geophytes was even higher within the corridors, so it is likely that at least some pollinators use these strips and could thus move between fragments. Altogether, the potential negative effect of the connecting strips appear to be outweighed by far by the benefits, i.e. providing dispersal corridors for both plants and pollinators. However, the value of a corridor is likely to be enhanced by management methods such as alien clearing and grazing control. Finally, wider corridors over 60 m in width provide conduits for a larger range of species than smaller corridors.

Renosterveld – not always what it seems.

Key words: disturbance regime, biodiversity reduction, state of knowledge

Robin Jangle

Nature Conservation Corporation, P O Box 30223 Tokai 7966 Cape Town

Of the three major vegetation types that comprise the Fynbos Biome, renosterveld is the most difficult to define and also the most diverse as regards physiognomy. What is renosterveld and is all renosterveld really renosterveld? Of particular interest is the origin and ecology of the various vegetation units presently defined as renosterveld. What are we really conserving and are we applying management interventions that correspond to the disturbance regime that gave rise to these assemblages? These questions are explored and the proposed origins of the various, as presently defined, vegetation units expounded.

Is space a limiting factor for the chacma baboons (*Papio h. ursinus*) of the Cape Peninsula?

Key words: baboons, spatial ecology, human-modified environments

Hoffman, T.S.¹, O'Riain, M.J.¹

¹Zoology Department, University of Cape Town, Cape Town, South Africa

The chacma baboon population (*Papio h. ursinus*) of the Cape Peninsula is small, isolated and in direct competition with humans for access to limited space and resources. A popular perception amongst residents and managers is that space and resources are abundant because of large expanses of 'natural' vegetation within the Table Mountain National Park (TMNP) - an open park running the length of the Peninsula. In this study we test the generality of this assumption by quantifying the spatial ecology of Peninsula troops. Only 38% of the available land within the TMNP was utilized by baboons. Home range sizes varied from 1.55 – 35.48 km² and deviated from the expected positive correlation between home range size and troop size. Resource selection analyses showed heterogeneity in habitat cover to best explain spatial variation. Alien and urban habitats were favoured over indigenous vegetation, and home range size decreased whilst density increased when troops had greater access to both alien and urban habitat types. The almost complete avoidance of indigenous vegetation in favour of disturbed areas suggests that the ecological role of baboons within the Table Mountain National Park may be greatly diminished. All troops selected low lying land and rarely entered the abundant space found at higher altitudes. It is thus clearly apparent that space is not a limiting resource for Peninsula baboons. However, suitable space where the critical resources of sleeping sites, permanent water and high quality food sources are spatially coincident is greatly limited and almost always adjacent to urban and agricultural areas. Reducing human-baboon conflict will thus require a substantial rethink on how we prioritize the allocation of key spatial resources to baboons and humans in the Cape Peninsula.

Habitat Suitability of Helderberg Nature Reserve for Geometric Tortoise: *PSAMMOBATES GEOMETRICUS*

Key words: *Psammobates geometricus*, Habitat suitability, Lourensford Alluvium Fynbos

Olivier, I.R. ¹

¹ Helderberg Nature Reserve, Environmental Resource Management Department, City of Cape Town

The Geometric Tortoise (*Psammobates geometricus*) has a highly restricted distribution, is the rarest chelonian species in Africa and 97% of its habitat has been destroyed. Habitat loss is now the main factor in the decline of *P. geometricus* populations which are found only in fragments of Renosterveld in the Western Cape. However, historically, *P. geometricus* used to occur in the lowland areas of Strand and Gordon's Bay in the south. The natural vegetation in this area is a mix of renosterveld and lowland fynbos, and is classified as Lourensford Alluvium Fynbos, which is a critically endangered veld type, with less than 7% remaining. Due to the critical status of both *P. geometricus* and their habitat, there is an urgent need to determine new areas suitable for their protection. A known *P. geometricus* habitat within the Elandsberg Private Nature Reserve will be analyzed with regards to its abiotic, floristic and structural elements. Comparisons will be made to a site on the Helderberg Nature Reserve where the historical occurrence of *P. geometricus* is unknown, but which is suitable in terms of a broad scale habitat assessment. Twenty-five sample plots of 20 m² will be sampled in both suitable (*P.*

geometricus present) and apparently unsuitable habitat (*P. geometricus* absent). Correlations between abiotic, floristic and structural elements will be examined using correlation coefficients while comparisons between habitats will be performed using ANOVA to classify habitats abiotically, floristically and structurally. This research project may end with the recognition of a new suitable habitat for *P. geometricus* which will help conservators to focus conservation efforts to areas where there is the greatest need for them and thus help to conserve a critically endangered species. Ultimately, it will help to conserve The City of Cape Town's biodiversity.

Using bird species diversity as an indicator of habitat alteration in the Kogelberg Nature Reserve.

Key words: habitat alteration, ecological indicators, conservation

Colyn, R.B.

Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town

The Fynbos Biome hosts more than 9000 plant species, 70% of which are endemic to the region. This area also contains 65% of the threatened and rare plant species found in the entire Southern African region and an alarming 20 out of 21 critically endangered national vegetation types occurring within South Africa. However with rapidly expanding human populations and the subsequent increase in land transformation, the diverse habitats within this biome are placed under various pressures and often altered. The rate and degree to which these habitats are altered is often unknown and therefore the need for environmental monitoring is of significant importance. Ecological indicators are species (populations or communities) within a system that could potentially be used to assess or monitor trends in the condition of an environment. Ecological indicators should therefore provide an early warning or signal of changes within the environment. By using bird species diversity as an indicator, as opposed to a single species, multiple species or groups of species can represent the same habitat or ecosystem. Two bird species lists will be compiled, namely an expected and observed bird species list. Both line and point transects with unlimited range will be used to compile the observed list. Data will be statistically analysed using Analysis of Variance (ANOVA). Two-way ANOVA will be used to compare multiple data sets under more than one variable. Potential reactions of bird species to specific variables could therefore be determined, which in turn could be used to reduce the 'lag-phase' between the existence and identification of the specific environmental problem. The degree of habitat integrity lost or altered can be reduced by identifying an environmental problem in its initial stages, which would subsequently increase the management and conservation efficiency of that specific habitat or ecosystem.

Empirical and Model Derived Respiration Responses to Climate in Different soils of an Arid South African Ecosystem

Aquatic invertebrates - potential indicators of thermal stress

Key words: thermal tolerance, aquatic invertebrates, temperature experiments

Ketley, Z.A., Picker, M.D., Reed, C.C. and Dallas, H.F.

Zoology Department, University of Cape Town, Cape Town, South Africa

Temperature is an important environmental variable for aquatic invertebrates influencing their growth, reproduction, physiology, distribution and abundance. Increasing human impacts including global warming are likely to elevate natural stream temperatures in the future, threatening thermally sensitive species. For example, the Western Cape stoneflies, *Aphanicercia* are restricted to cool, upper parts of mountain streams on the Cape Peninsula, and thus exist at the limits of their thermal range. Currently very little information exists on thermal tolerances of aquatic invertebrate species in South Africa. An understanding of the potential influence of increased stream temperatures on aquatic invertebrates requires the collection of baseline data. Lethal temperature (LT₅₀) and critical thermal maxima (CTM) experiments are two methods used to determine the thermal tolerance of aquatic invertebrates. Results provide information on the relative thermal sensitivities of species. *Aphanicercia capensis* ranks as one of the most thermally sensitive species, and could potentially be used as an early indicator of changing stream temperatures in the Western Cape. Continuous monitoring of stream temperatures and associated invertebrate communities is another crucial process in the establishment of baseline data and monitoring of trends in the face of climate change. A series of temperature loggers have been deployed in Window Gorge Stream, Table Mountain to enable continuous temperature monitoring for the duration of this project and for future monitoring. Community composition data collected down the length of Window Gorge

coupled with water temperature will provide an important reference for future monitoring of possible changes related to global climate change.

PARALLEL SESSION 10: EDUCATION

Institutionalisation of the Eco-Schools Programme within the SANBI Biodiversity Education and Empowerment Directorate

Key words: institutionalise, Eco-Schools Programme, implementation challenges

Mswazi M

SANBI, Gold Fields Environmental Education Centre, Kirstenbosch National Botanical Garden

The Kirstenbosch Eco-Schools Fynbos Node is hosted by the unit of the SANBI Biodiversity Education and Empowerment Directorate based in the Kirstenbosch National Botanical Garden. Initiated in 2006 with funding obtained from the Table Mountain Fund (TMF) via WWF, this node forms part of the larger Eco-Schools Programme administered nationally by WESSA. During the past three years, the educators of the participating schools received direct mentoring from a node co-ordinator whose appointment formed part of the funding and the success of this programme at the ten participating schools can be directly related to this combination of support and pressure. At the end of the funded period in 2008, the decision was made to institutionalise the Eco-Schools Programme within the Kirstenbosch Biodiversity Education and Empowerment Programme and after consultation, it was included in the job description of the Senior Environmental Education Officer. This paper describes the processes followed in developing and implementing this institutionalised model of the Eco-Schools Programme in which the schools have been divided into two clusters of educators in order to create communities of environmental education practise that would become self-sustaining with minimal mentoring required. Furthermore, the implementation challenges experienced with this new model thus far will be discussed with the view of eliciting critical views from the delegates.

The Eco-Schools Programme as a model for whole-school development - a case study of Morgenson Primary School

Key words: Eco-Schools Programme, whole-school development

Larissa Smit

SANBI, Gold Fields Environmental Education Centre, Kirstenbosch National Botanical Gardens.

Morgenson Primary School is located in Hanover Park, one of the most poverty-stricken, crime and gangster hotspots on the Cape Flats. In spite of these extreme challenges, the principal and educators of this school have initiated many successful environmental education projects, the Eco-Schools Programme being one of them. This programme at the school falls within the Kirstenbosch Eco-Schools Fynbos Node which is hosted by the unit of the SANBI Biodiversity Education and Empowerment Directorate based in the Kirstenbosch National Botanical Garden. Initiated in 2006 with funding obtained from the Table Mountain Fund (TMF) via WWF, this node forms part of the larger Eco-Schools Programme administered nationally by WESSA. While many participating schools successfully meet the requirements of the programme in implementing a variety of environmental action projects and learning programmes leading to improved environmental literacy and environmental management, few schools have been successful in involving all of the educators and learners of the school in the programme. Typically, the programme is championed by one or more educators at each school with ad hoc contributions made by the other educators. Morgenson Primary School has successfully made the Eco-School Programme the pivotal point around which all curriculum activities, extra-mural activities and even administration of the school revolves. This paper aims to share the initiatives taken and the processes that were followed by the principal and educators in the development and implementation of this model of whole-school development within this school's exceptionally difficult context.

HOW DO TEENS FEEL ABOUT NATURE?

Key words: teens, nature, survey responses

Ashwell, A.N.

24 Michel Walk, Marina da Gama, 7945, alice@enviroeds.co.za

When they find out that the focus of my PhD is on how teens in Cape Town relate to nature, people often joke that it will probably be a very short thesis! They assume that nature is pretty low on the list of things teens are interested in. Most schools that visit natural areas or participate in programmes like Eco-Schools are primary schools. So we tend to assume that younger children are more interested in nature and the environment than their high school counterparts. However, a recent survey of teenage youth in Cape Town suggests a different story.

I would like to share, through the medium of poetry, some of the profound and often poignant responses of youth to the simple question: *How do you feel about nature?* I would also like to report on what teens have said about a range of nature-based programmes and activities that they have participated in. These insights may help us to respond more appropriately to the interests and aspirations of this age group.

Horticulture as a catalyst for Biodiversity conservation, skill development and sustainable income generation in semi-rural communities: lessons from SANBI's Overberg Useful Plants Project in the Western Cape Province of South Africa.

Keywords: Horticulture, Community-Conservation, Kogelberg Biosphere Reserve.

Phakamani Xaba

SANBI, Kirstenbosch National Botanical Garden.

The Cape Floristic Region is one of the world's biodiversity hotspots. At its heart are the Kogelberg mountains which lie within the UNESCO Kogelberg Biosphere Reserve (KBR). Despite the scenic beauty and world-recognised biodiversity of the area, it has not escaped the pressing socio-economic problems of the widening gap between the wealthy and the poor. Addressing these socio-economic problems is key to any sustainable programme aimed at conserving the region's biodiversity.

The pilot Overberg Useful Plant Project (OUPP) was established by the South African National Biodiversity Institute (SANBI) from its Harold Porter National Botanical Garden to address the plight of the poor in the nearby Kleinmond community and promote conservation. The project was aimed at developing their knowledge of this rich biodiversity resource, securing environmental participation and transfer of horticultural skills through which they could utilize to earn sustainable incomes.

In consultation with the Kleinmond community a number of practical intervention subprojects were also set up to improve the success of the project.

The implemented projects were:

I. Nursery teaching project (Kleinmond)

A small teaching nursery was set up with the local community to cultivate local indigenous plants and, at the same time, transfer practical horticultural skills to interested community members.

II. School garden project (Kleinmond)

An indigenous garden was developed, using the Kirstenbosch Outreach Greening training model, at a Kleinmond community school with the help of community members and learners.

III. Domestic garden project (Kleinmond)

Utilizing skills learnt at the teaching nursery community members were then assisted with planting and cultivating useful indigenous plants at their township homes.

IV. Street tree planting (Kleinmond)

As an applied income-generating exercise community members won contracts to grow indigenous trees in their home nurseries and then transplant and care for them alongside community streets.

This presentation examines the project, step by step, and analyzes its successes and failures.

A learning village for working together to restore living landscapes

Keywords: restoration, cultivation, education

Victoria Willman¹, Matthew Zylstra² Dieter Van den Broeck²

¹ Kouga Restoration Nursery, Working for Woodlands, Eastern Cape Restoration Programme,
Gamtoos Irrigation Board

² PRESENCE network, Living Lands (Secretariat)

Landscape restoration has the potential to provide diverse and multiple benefits for both biodiversity and community. However, in order for this vision to be realised, there must be a physical presence which supports multiple stakeholder groups in engaging in restoration through improved education, research, training, skills, capacity and the rediscovery of traditional knowledge. The Working for Woodlands (DWEA/GIB) Restoration Nursery based at the Kouga Dam in the Eastern Cape is in the process of expanding its activities and focuses to realise this vision through an integrated 'Learning Village'. This hub is being designed around the guiding themes of: restoration; cultivation; and education with a view toward long-term sustainability and empowerment. The Learning Village is in the process of supporting ongoing ecosystem restoration, biodiversity conservation, community awareness and livelihood improvement through participatory planning and consolidating the following elements: cultural botanical gardens; indigenous horticultural nursery; education/training facilities; research accommodation; and small-scale sustainable tourist infrastructure.

The existing nursery already supports a variety of projects within the Eastern Cape Restoration Programme (ECRP). It is also active in providing employment opportunities and training for teams engaged through the national Working for Water poverty relief programme. These activities have found close synergies with the research-implementation objectives of the PRESENCE network which collectively aims to guide the restoration of 'living landscapes'.

The Learning Village is supporting 'a working together for living landscapes' philosophy through:

restoration: designing an on-site botanical gardens which showcases socio-ecological values and processes.

cultivation: propagating indigenous plant species to source restoration projects within the ECRP

education: hosting scientific research projects and community education activities (training, workshops, schools)

An online portal (<http://www.livinglandscapes.co.za>) is also being established as a central point for networking, stakeholder discussion and research dissemination in relation to landscape restoration activities in the region.

PARALLEL SESSION 11: AQUATICS

Vegetation Assessment of the Riparian Zone on the Breede River Catchments.

Buwa ,P and Pandelani, M.

Conservation Scientist, River Conservation, Cape Nature, Private Bag x5014, Stellenbosch, 7599.

The Western Cape appears to be the most heavily invaded of all the Provinces. Especially the Breede River Catchments of the coastal mountain ranges and coastal lowland in the west and in the south having a condensed invaded area of 84398 hectares. Impacts from overgrazing, footpaths, littering and subsistence agriculture in some of the sites were visible. In addition infrastructure associated with urban areas, namely road, bridges and effluent inputs were also apparent. Regulation on dumping of the solid wastes need to be promoted and installed at Keisers River site. Put up litterbins and clear litter regularly. Promote regulations and importance of the River Health. Sampling was undertaken at 52 sites in the Breede River Catchments, which were chosen for Biomonitoring purposes because of the variety of habitat types they presented as well as other factors such as accessibility and compatibility for sampling by other specialist. The riparian vegetation at the sites were identified in the field using various guides. Plant specimens were collected, pressed and dried for later identification at the Scientific Services herbarium in Jonkershoek. Where possible all plants species were identified, unless they were deemed to be of minor importance within the riparian zone. The primary invaders for these catchments were identified to belong to the genera of *Acacia*, *Pinus* and *Hakea*. The management actions for these catchments are to clear alien invasive plants and monitor these areas and to follow up with clearing where necessary.

Biotic signatures of rivers in and around the Tsitsikamma National Park based on Trichoptera

Key words: aquatic insects, conservation, river characterization

Bellingan, T.A.¹, de Moor, F.C.² and Villet, M.¹

¹ P.O. Box 94, Department of Zoology and Entomology, Rhodes University, Grahamstown, 6140

² Department of Freshwater Invertebrates, Albany Museum, Grahamstown, 6139

Caddisflies (Trichoptera) are holometabolous, moth-like insects whose larval and pupal life stages are found in clean, well-oxygenated aquatic environments. Ecologically, the larvae are important because they are diverse; they are found to occur in all biotopes within the aquatic environment, and the sensitivity of many species to water quality also make them valuable for assessing the health of aquatic ecosystems. Adult Trichoptera collected by light trap during autumn, spring and summer, were identified to species or morpho-species and were used to characterize a biotic signature for 11 rivers in the Tsitsikamma region. Each river was sampled in both the upper and lower reaches of the catchments. The main findings include several undescribed species and, using Principle Component Analysis, a clear distinction between the upper and lower regions of each river in both diversity and abundance of adult caddis and a grouping of similar rivers. The characterization of rivers is important because it provides information essential for selecting rivers for further conservation management options and devising an overall conservation plan for the rivers of the Tsitsikamma Mountains. This study forms part of the first phase of a larger 3-phase project initiated by SANParks for the conservation of these rivers.

An assessment of the ichthyofauna of the Breede River System in the Western Cape Province as part of the National River Health Program

Key words: River Health Program, fish, Breede River system

Martine Jordaan and Dean Impson
CapeNature Scientific Services Division

The River Health Program (RHP) is a national initiative aimed at evaluating and monitoring the biological integrity of river systems throughout South Africa. River health is assessed using five indices, one of which is a Fish Index (FI). The FI is a measure of the degree to which a fish assemblage from a specific river deviates from an undisturbed condition. As part of a comprehensive river health assessment, the fish fauna was assessed at 52 sites on the Breede River system. The main findings were that the majority of main stem sites are dominated by invasive alien species including catfish (*Clarias gariepinus*), carp (*Cyprinus carpio*) and bass (*Micropterus spp.*). The presence of these species has a deleterious impact not only on indigenous species, but also on general river ecology. Whitefish (*Barbus andrewi*), a once wide-spread indigenous cyprinid found in the main stem Breede River, has almost disappeared from the system due to the impacts of alien fish. Other smaller indigenous species are still present in smaller mountain tributaries where alien invasive species do not occur, but these species are also absent from main stem sites. Other threats to indigenous fish include the impacts of unsound land use practices (especially in the agricultural sector), invasive alien vegetation in riparian zones and malfunctioning water treatment plants from residential areas. Conservation measures required for the protection of indigenous fish in the Breede River system and the greater Cape Floristic Region are discussed.

Is river rehabilitation involving alien fish eradication about getting the alien fish out or getting the anglers on your side? Four CFR rivers as a case history

Key words: river rehabilitation, threatened fishes, alien fishes, Rotenone

Dean Impson¹, Denis Tweddle², Ryan Weaver³, Louise Stafford⁴.

¹Scientific Services, CapeNature, Stellenbosch

²Enviro-Fish Africa, Grahamstown

³University of Stellenbosch, Stellenbosch

⁴City of Cape Town, Cape Town, South Africa

The Cape Floristic Region of South Africa is internationally renowned for its biological diversity and is a conservation hotspot. Although its indigenous freshwater fish fauna is depauperate for an area this size, it is highly endemic (21 out of 23 taxa). Most endemic fishes are threatened, including 13 that are Critically Endangered or Endangered. The primary threat to these fishes are invasive alien fishes, especially North American basses (*Micropterus*). Through the Cape Action for People and the Environment (CAPE), a pilot project

is currently being undertaken that aims to rehabilitate four priority rivers that are invaded by alien fishes. The preferred method of eradication is using the piscicide Rotenone. This chemical has a proven track record in the USA, but some projects have been highly controversial for a variety of reasons. The pilot project has been assessed as part of an independent comprehensive Environmental Impact Assessment. The EIA has concluded that the choice of rivers for the pilot was appropriate and that Rotenone can be used to eradicate alien fishes subject to implementation of the Environmental Management Programme. Public and media reaction to the project have been lead by a vociferous group of trout anglers who are against the use of Rotenone in a small river with invasive rainbow trout in it that very few anglers fish. This paper describes the project and public reaction to it, which has varied from support from the bass angling fraternity to a concerted attempt to stop the project by some trout anglers.

SHORT KEY NOTE ADDRESS: 7th August:

Invest in Opportunity, Not Inventory in Hotspots

Keywords: conservation planning, effectiveness, implementation, opportunity, priority, spatial prioritization, systemantic assessment

Richard M. Cowling†, Andrew T. Knight*, **Sean D. J. Privett‡** and Gyan Sharma*#

We present a case from the Agulhas Plain that illustrates the futility of species inventory as a means of generating data for identifying conservation priorities. Our case study is Grootbos, a 1 750 ha property located near Gansbaai. While three systematic conservation plans have been completed for the region, none of them identified Grootbos as a priority area. According to the plans Grootbos was an area of low conservation value (or irreplaceability). Grootbos was purchased in 1991 by an innovative and entrepreneurial family who turned it into one of South Africa's leading private nature reserves and ecotourism facilities. Management embarked on a comprehensive plant species survey over a three-month period in 1997, based on a survey of 48 5x10 m plots supplemented with targeted searches for species not recorded in the plots. This plot-based survey, which is comprehensive by any scientific standard, yielded 250 species – 31 of which had Red Data Book status. Four standard techniques for estimating the total species tally for Grootbos via simulation of the plot data yielded tallies of 332, 349, 330, and 377 species. Over the following twelve years the survey was continued to include seasonal and post fire successional species. By 2009 the tally of positively-identified species had risen to 753, with 67 Red Data and five species new to science. This represented between 2.0 and 2.3 times the number of species estimated from the simulated plot data. Consequently, we suggest that conservation strategies in the CFR and other hotspots –especially in landscapes of high vulnerability – deploy limited conservation resources to areas displaying high opportunity by identifying and mapping localities where human and social capital are sufficient to kick-start actions. Furthermore, investing in inventory to improve the effectiveness of spatial prioritizations in hotspots is unwise, given the huge investment required to achieve a situation that approximates comprehensiveness.

POSTER ABSTRACTS

CONSERVATION / CONSERVATION PLANNING:

Conservation of the relict fragments of Renosterveld on the Napier Commonage

Keywords: Renosterveld, Napier Commonage, Management

Cameron McMaster¹ and Odette Curtis²

¹ADDRESS, Napier, 7270

²TMF-WWF, CapeNature, Box 174, Napier, 7270

Three fragments of *Critically Endangered* renosterveld types on the Napier commonage are of particular importance in terms of biodiversity, since for many years they have enjoyed protection from livestock grazing and are still fairly pristine and contain several rare and threatened species, with relatively viable populations. In 2008 the use of productive lands on the commonage area changed from exclusively cropping to artificial pastures for livestock grazing. It became evident that unless steps were taken to protect these unique and well preserved fragments that fall between the matrix of productive lands, they would be negatively affected by the new land use programme. The Southern Overberg branch of the Botanical Society recently embarked on a programme to fence and conserve these fragments. Funds were raised and the fencing completed in May 2009. This poster outlines the steps that were taken to achieve this outcome and discusses the ongoing monitoring and maintenance of the sites required for the future.

Phytogeographical Centres of Endemism in the Cape Floristic Region: location, endemism richness and levels of protection

Keywords: Phytogeographical Centres (PCs), Endemism, Protected Areas (PAs)

Peter Bradshaw

peter.bradshaw@nmmu.ac.za

Park Planning and Development, South African National Parks, Port Elizabeth and Botany Department, University of Cape Town

The Cape Floristic Region is world renowned for its numbers of endemic taxa. Approximately 69% of CFR taxa are restricted to it, including many narrow endemics. However, endemism is not uniform throughout the CFR, and it is important from a conservation perspective to determine where endemic taxa are concentrated.

A dataset comprising 4414 taxa was analysed to identify Phytogeographical Centres of Endemism within the Cape Floristic Region. Taxa analysed were mostly recognised fynbos taxa (e.g. Proteas, Ericas, Restios) or CFR centred taxa. Clustering algorithms on weighted datasets and additional GIS analysis were used to identify Phytogeographical Centres of Endemism. In addition to confirming and refining previous phytogeographical centres, new centres and sub-centres were identified. Endemism richness was found to vary across the CFR, but generally decreased along northern and eastern gradients, corresponding to the amount of winter rainfall received.

The protected area network was evaluated to determine how well it conserves these centres and areas requiring additional protection are identified.

Evaluating anthropogenic land-use changes in two vegetation biomes using crane population trends as an indicator

Keywords: Land use change; Renosterveld, grassland, Grey Crowned Crane, Blue Crane, distribution

Mark H van Niekerk^{1,2*}; Johan Baard ², Kevin Shaw³

¹Dept Zoology & Entomology, Rhodes University, Grahamstown 6140, South Africa

²South African National Parks, PO Box 3542, Knysna, South Africa;

³CapeNature, Scientific Services, Jonkershoek

*markh.vn@gmail.com

The renosterveld biome is highly fragmented and has been severely altered primarily due to agriculture. Large scale land transformations and the resultant fragmentation of the native habitats cause changes in the physical environments and biotic communities of the habitat remnants over time. These changes have severe consequences for biodiversity and one consequence can be the loss of native species. Biodiversity loss, despite the focus of much research and consequent action in recent years, remains a concern, as most extinction rates are around 100 times greater than rates characteristic of species within the fossil record. These large scale transformations have also occurred within the grassland biome in particular, largely as a result of agriculture and afforestation.

Large birds have been shown in previous studies to be particularly useful in the investigation of overall biodiversity richness. This study reviews possible changes in population trends of two crane species, the Blue Crane (*Anthropoides paradiseus*) and the Grey Crowned Crane (*Balearica regulorum*). Changes in the population trends are evaluated within two different biomes, namely the renosterveld biome of the Overberg, and the grassland

biome within the vicinity of Maclear. The data has been spatially presented in order to establish broad geographic and temporal changes through the use of crane population trends.

The Investigation of Measuring Vocalization as a Method for Monitoring the *Microbatrachella capensis* (Micro Frog) population at Kenilworth Racecourse Conservation Area (KRCA)

Tatiana de Rezende – Kenilworth Racecourse Conservation Area, City of CapeTown

Microbatrachella capensis is listed in the Red Data Book as a Critically Endangered (CR) species (Minter *et al*, 2004: 241). *M. capensis* is one of the smallest and most threatened lowland amphibians in South Africa, endemic to wetlands in the Fynbos biome (Minter *et al*, 2004: 243). Currently, there are only four subpopulations of *M. capensis* in the country, of which one is situated at KRCA.

The primary objective of this study is to establish and apply a method of recording *Microbatrachella capensis* vocalizations in KRCA and to investigate the development of a computer program that would be able to analyze and interpret the data recorded. The focus of this research is to establish and implement the monitoring protocol for *Microbatrachella capensis*. This protocol will assist reserve managers, herpetologists and scientists by providing an indication of the population status of *M. capensis* at KRCA, to ensure its long term survival.

Impact of Sand Mining on Biodiversity within the Drakenstein Municipality

Keywords: GIS, landuse, Sand Mining

V. Tucker, Department of Conservation Ecology and Entomology, Stellenbosch University
victoriartucker@gmail.com

There is considerable recorded and anecdotal reference that mining may be having a significant adverse impact on threatened ecosystems in the Western Cape. The degree to which mapped biodiversity priorities inform the regulation of mining is still largely unknown given the potentially grave implications of mining's impact on biodiversity and the lack of information about biodiversity in the mining sector has hampered effective "mainstreaming" interventions to place mining on a more sustainable footing. The methods of determining the impacts involved two manners of spatial analysis, after which recommendations were formed. The GIS approach to analyse the occurrences of sand mines within the Drakenstein Municipality was more effective than aerial photographic references. GIS mapping indicated that the majority of mines mapped (twenty of 37 mapped) fall on habitat that is considered to be Critically Endangered. The prevention and mitigation of mining impacts within the Drakenstein Municipality could be initiated using the Bioregional Planning approach. This approach takes into account the interrelated nature of social, economic and environmental sectors to match land use patterns and human settlements. Table Mountain Fund is acknowledged for funding this project.

Determining the conservation integrity of Lourensford Alluvium Fynbos in the Harmony Flats area

Key words: Vegetation survey, fynbos, conservation

Botes, R. E., Harmony Flats Nature Reserve, Biodiversity Department, City Of Cape Town (CoCT)
rbotes@capetown.gov.za

Lourensford Alluvium Fynbos (LAF) is one of the most endangered vegetation types in the world as only 7% of this vegetation type is actively being conserved in the Harmony Flats and Helderberg areas (Helme, 2004). In order to effectively manage LAF, the vegetation community in HFNR (9ha) and the adjacent erven (9ha) needs to be analysed to determine the conservation integrity. The owners of the erven adjacent to HFNR are currently being approached by Cape Nature to formally declare these lands as conservation areas either through stewardship programs or through the purchasing and conservation of these lands by CoCT. The conservation of these lands would bring the total conserved LAF in the Harmony Flats area to 18ha (Helme, 2004). The LAF found at HFNR

and adjacent erven is regarded as functional and viable although the sites have been modified due to too frequent fires; the invasion of alien vegetation; and other anthropogenic influences (Helme, 2004). To date no research has taken place at HFNR or the adjacent erven which determines the current condition of the LAF remnants as a whole. Past surveys of the vegetation occurring at HFNR and the adjacent erven have been focused on locating specific populations of endangered plant species occurring at these sites. In order to gain a thorough knowledge of the LAF at these sites the research in this study will be focused on determining the species composition and canopy spread cover of the vegetation at each study site; as well as the frequency, density, and height for each species found at the study sites. The Braun-Blanquette (B-B) phytosociological method will be implemented using plots and transects. As a result of this analysis, the value of these remnants as a conservation piece may be determined; data can be used to further motivate the conservation of the private adjacent erven; and the findings will assist in the correct management of resources allocated to the remnants of this endangered vegetation.

ENVIRONMENTAL MANAGEMENT:

Determining the net benefits of clearing invasive alien vegetation on the Agulhas Plain

Key words: Working for Water, remote sensing, hydrological modelling

Nowell, M.S.^{1*}, Le Maitre, D.C.² and Esler, K.J.¹

¹Department of Conservation Ecology and Entomology, Stellenbosch University

²CSIR, Stellenbosch

*megsnowell@gmail.com

Invasive Alien Plants (IAPs) threaten the biodiversity and ecosystem processes of South Africa's Cape Floristic Region due to their ability to outcompete native vegetation for resources such as water, nutrients, light and space. The Working for Water programme, launched by the South African government in 1995 aims at sustainably controlling invading species across the country by 2015. The impact alien plant eradication has on the hydrological cycle of the Agulhas Plain has yet to be established. The aim of this study is to quantify the actual and potential changes in available water as a result of clearing invasive alien vegetation on the Agulhas Plain. Hydrological modelling and remote sensing will be combined in order to determine these changes over a time-series at a catchment scale.

Carbon Sequestration & Alternative Energy = Sustainable Agriculture & Conservation

Key words: Carbon sequestration, energy, sustainable conservation

Napier, V. R. ¹and Barnard, B. ²

¹ Strategic Environmental Focus (Pty) Ltd, Henley House, Wellington Park, Wellington Street, Durbanville.

² Thermex Carbontech (Pty) Ltd, Crystal Place, Stafford, Johannesburg.

Climate change, arguably, poses the single biggest threat to the persistence of the Cape Floristic Kingdom, predominantly through changes in micro-climates. Another threat, the establishment and propagation of alien invasive plants also plagues the Fynbos biome. Through the introduction of new technology, namely Pyrolysis, all organic waste (plant material, agricultural waste, etc) can be converted to a solid carbon skeleton, called charcoal or biochar. This biochar can then be stored in various ways, including in the soil, where it will remain indefinitely thereby providing a secure way of sequestering carbon. Carbon sequestered in the soil will provide many other benefits over-and-above merely removing Carbon dioxide from the atmosphere. These include increased ability of the soil to retain moisture and nutrients thus directly increasing crop productivity. The thermal energy from the pyrolysis process is recovered and converted into electricity using micro steam turbine generators. From a socio-economic perspective, the pyrolysis process will create numerous employment opportunities. Farmers will benefit and food production will be boosted by the provision of viable biochar. This effective and efficient way to convert waste decreases the need for landfill sites which are associated with high levels of the greenhouse gas, Methane. Pyrolysis also provides a sustainable alternative energy source thus decreasing the reliance on fossil fuels and contributing significantly to the fight against climate change. The pyrolysis process provides a possible solution to the struggle between conservation and agriculture. Agriculture requires large tracks of land to meet the nations demand for food security, often encroaching on large portions of natural land desperately needed to meet conservation targets. Through increasing the production potential on any given land, the need for massive

expanses of land for agricultural activities diminishes, thus reducing the pressure on our conservation areas. Agriculture and conservation can actively work together to fight climate change!

Natural capital restoration on the Agulhas Plain: a value adding endeavour?

Keywords: natural capital, restoration, cost benefit analysis.

Helanya Vlok¹; ¹Student (MComm Economics, Stellenbosch University)
*helanya@gmail.com

The high degree of alien vegetation on the Agulhas Plain begs the question of whether its removal and the reintroduction of indigenous fynbos species (i.e. the restoration of natural capital) is a worthwhile endeavour. From an ecocentric perspective restoration is an obvious necessity, but the low number of restoration projects that do occur leads this assumption to be questioned. Two likely causes for the lack of restoration exist: it could be either a shortage of institutions that facilitate the coordination of activities between farmers; or adverse economic incentives that disallow the maximisation of individual welfare. Individual decisions about restoration depend on more than the value added to natural capital. Aspects such as augmented wild flower production, employment opportunities and changes in water supply need to be considered. A cost-benefit analysis is conducted to compare the socio-economic value of natural capital restoration with the zero-action counterfactual. The results will allow for the correct management of the Agulhas Plain biodiversity hotspot.

Valuing the City of Cape Towns Biodiversity and Natural Assets

Key words: Environmental Goods and Services (EGS), Biodiversity, Assets

Purves, A.B. ¹De Wit, M². Jayiya, T³. Van Zyl, H⁴. Blignaut, J⁵. Crookes, D⁶.

1. City of Cape Town: Environmental Resource Management Department
2. De Wit Sustainable Options and University of Stellenbosch.
3. Jaymat Enviro Solutions
4. Independent Economic Researcher
5. Beatus and University of Pretoria
6. Independent Economic Researcher

The City of Cape Town administers an area of 2500km² that is rich in biodiversity, ecosystems, landscapes and coastal environments. Cape Town faces many social and economic development challenges and as a developing city with a focused service delivery mandate, priorities are placed on increasing and promoting development in an effort to build the economy and deliver services to the communities. This development focus takes place at the cost of biodiversity and the natural environment. The economic value of Cape Town's biodiversity and natural environment in general, is poorly understood and largely ignored as part of decision making and budgeting. The City's environmental assets provide a range of direct and indirect economic services and values including, direct use values, indirect use values, regulatory use values, option values and existence values. Currently these EGS's are provided for in the absence of any commensurate investment in our biodiversity and environmental assets. The real value of these services is not acknowledged in our accounting systems, and is therefore not reflected in budgets for rehabilitation, restoration, management and conservation. Very little recognition is given to the real cost of environmental degradation, including the direct cost, replacement costs as well as the opportunity costs. Although there is a growing global awareness of the economic services that natural ecosystems provide, the value of these ecosystem services and the long term costs of their loss are rarely taken into account in decisions about how natural resources are used, or managed. Day-to-day management decisions often focus only on short-term financial returns at the cost of long term sustainability. We will present the results of a study that proposes a methodology to value the City's natural and environmental resources as well as the preliminary results from the application of this methodology to prioritised ecosystems goods and services in the City. The paper concludes with some arguments on how to present this information to support a business case for the environment.

FIRE:

INTEGRATED WILD FIRE MANAGEMENT AT LOCAL MUNICIPAL LEVEL 2008/09

Key words: Local Municipality, Integrated Wild Fire Management Practices, Erosion Control, Post-Fire Monitoring

De Roubaix, L.L. ¹, Lewis, L. ² Drakenstein Municipality, PAARL

The Paarl Mountain Nature Reserve is an urban nature reserve, bordering the picturesque town of Paarl. The reserve is managed by the Drakenstein Municipality and encompasses approximately 2010 ha of mostly Granite Mountain Fynbos and Granite Renosterveld. Due to the close proximity of the reserve to town and the number of activities and users in the area, wild fires are always a threat to the sustainable existence of the reserve and neighbouring urban edge. The preparation of firebreaks, execution of scheduled burns, and suppression of wildfires are some of the major programs run. Priority management interventions include post-fire monitoring, invasive alien vegetation control, erosion control, fire awareness, education and staff training.

Developing an ecological burning regime for Kirstenbosch National Botanical Garden (KNBG) using serotinous Protea as Key Fire Response Species

Keywords: Cape Floristic Region (CFR), thresholds of potential concern, biodiversity

Dabush, J. ¹

¹Kirstenbosch National Botanical Garden, South African National Biodiversity Institute.

The Kirstenbosch Natural Estate (KNE) (314ha), a part of the Kirstenbosch National Botanical Garden, is situated on the South Eastern slopes of Table Mountain (S 34° 21' 09.0" E 18° 55' 39.1) at the heart of the Cape Floristic Region. The Forest and Fynbos Biomes are both represented within its borders (97ha and 214ha respectively) and in particular, the endangered Peninsula Granite Fynbos. While fire is accepted as an essential component in maintaining fynbos structure, functioning and high biodiversity values, it has been excluded from KNE since 1984, with patches of veld now exceeding 30 years in age. Research has been conducted annually since 2006 investigating the impact of the current fire regime on plant species diversity in mountain fynbos communities, scrub community dynamics and fynbos-forest succession. The primary objective of this study is to develop an ecologically based prescribed burning programme for KNBG that promotes the persistence of the areas biodiversity taking into consideration the Garden's urban interface. Two major working documents currently exist to guide this process, one developed in Australia and the other in South Africa. These two methodologies will be combined with data collected since 2006, using permanent sample plots and slow maturing serotinous Protea as Key Fire Response Species to indicate minimum and maximum thresholds of fire interval that the vegetation type can tolerate without loss of species i.e. thresholds of potential concern.

RESTORATION:

The restoration of fynbos old fields using seed

Key words: threatened ecosystems, conservation, seed treatments, sowing protocols

Holmes, P.M. ^{1*} and Cowell C. ²

¹ Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town

² Millennium Seed Bank Project, South African National Biodiversity Institute, Kirstenbosch

* patricia.holmes@capetown.gov.za

A study has been initiated (March 2009 – December 2011) to investigate suitable sowing protocols for restoring Cape Flats Sand Fynbos. This will be done in degraded lands within the Blaauwberg Conservation Area. The proposed research will build on an earlier study that investigated the optimal ground preparation treatments for restoring old fields (Holmes 2008). Cape Flats Sand Fynbos is a Critically Endangered vegetation type that is endemic to the City of Cape Town and has less than 1% of its historical area formally conserved.

Planting propagated material, although feasible, is costly and time consuming, hence the need to develop direct sowing protocols in order to restore larger areas of threatened vegetation types. The aim is to develop guidelines for Sand Fynbos restoration that combine optimal ground preparation and sowing protocols. These should overcome the barriers of grass competition, fossorial mammal disruption and lack of indigenous seed banks to establish a structurally-representative fynbos stand.

Different pre-sowing treatment and sowing technique combinations will be tested in a randomized split-plot design on large field plots to determine the most efficient protocol. Scarification and smoke seed treatments will be tested,

as these have been shown to have a large positive impact on germination rate in laboratory trials. Four sowing techniques will be investigated, namely: broadcast sowing; broadcast with plank embedding of seed; broadcast with hoe-pitted seed bed preparation; and hydro-seed with hoe-pitted seed bed preparation. Seed pre-sowing treatment trials have already begun. Sowing of the field trial is planned for autumn 2010 and monitoring of seedling recruitment will take place over 18 months, encompassing two winter and spring seasons. *Reference: Holmes P M 2008. Optimal ground preparation treatments for restoring lowland Sand Fynbos vegetation in old fields. South African Journal of Botany 74: 33-40.*

POLICY:

A Review: Protected Areas and Climate Change

Key words: ecosystem management, biodiversity planning, conservation

Dabush, J.¹

¹ Kirstenbosch National Botanical Garden, South African National Biodiversity Institute.

The scale of global climate models and biodiversity management activities simply do not match. Reserve managers are at the forefront of this climate change challenge. They are engaged in daily decision-making, vulnerability assessments, impacts and adaptation. Many land managers, however, feel that there is little they can do about climate change beyond what they are already doing, such as trying to maintain basic ecosystem functioning and mitigating other threats. While globally there is a significant amount of published material these are often impractical, lack engagement with experts in the field, and sometimes do not provide effective access to basic knowledge. A major gap exists between science and practical everyday biodiversity management taking place within protected areas. Climate change is predicted to severely impact upon the structure and functioning of our natural environment, changing current patterns of biodiversity and ecosystem functioning. Scientists have also begun to realise that these patterns of biodiversity are not static. Sites picked in one year may turn out to be alarmingly poor at representing the same components in following years. Numerous concepts including, minimum viable population, ecosystem processes, metapopulation, outlier species, connectivity, and environmental gradients are some of the concepts described as being essential to climate informed biodiversity planning, yet no decision support tool currently exists to integrate these concepts, daily biodiversity management and climate science. A collaborative effort involving all stakeholders including scientists, protected area managers, government, public planners and the public needs to be initiated to find practical answers to this urgent issue.

PARTNERSHIPS:

Social Benefit of Community Exchanges to Community Conservation: The Interns Experience (Cape Flats Nature)

Key words: community, exchange, learning

Shahieda Davids, Neliswa Sihawu

South African National Biodiversity Institute, Cape Flats Nature

In 2008 Cape Flats Nature (CFN) initiated discussions with the Greater Cederberg Biodiversity Corridor (GCBC) about a possible community exchange.

The intentions of this exchange were to expose community partners to different projects, tools and experiences in community conservation.

Both Cape Flats Nature and the GCBC work with community partners to explore social and biodiversity benefits through conservation action.

The objectives of the exchange were:

- To build and inspire community conservation champions
- To share and learn from demonstrated community projects
- To take inspiration and ideas back into the community
- To demonstrate conscious learning processes to community partners
- To acknowledge and reward community champions

The exchange explored ways in which communities engage with conservation and biodiversity, challenges, successes and issues of sustainability. The exchange also allowed the GCBC participants to engage and share lessons with community champions from CFN's 6 pilot sites.

We at CFN and our community partners have discovered that the exchanges are of extreme value to the participants and communities. It enables the sharing of lessons and does meet the objectives of the exchange.

Walks for Biodiversity and Wine on the Schapenberg

Key Words: biodiversity corridors, conservation

Heather Epstein, Di Marais and Andreas Groenewald
Schapenberg-Sir Lowry's Conservancy, PO Box 246, Sir Lowry's Pass

The Schapenberg Sir Lowry's Conservancy has launched Biodiversity and Wine Walks (Walks4Wine) on the Schapenberg Hills in the Somerset West-Sir Lowry's Pass vicinity. The area is under huge threat by agriculture, development and invasive alien vegetation. The walks will follow biodiversity corridors and be guided to educate as to the importance of the corridors. Wine tasting will be offered. Monies from the walks will go towards restoring and preserving the endangered land within the Conservancy identified by the City in their Biodiversity Map of 2008 as Critical Irreplaceable Biodiversity areas. Much of the area was ravaged by the devastating fires recently. Participating in the project are wine farms and other properties over which the walks will traverse. Two wine estates Wedderwill and Waterkloof are Biodiversity and Wine Initiative (BWI) champions and others are applying for BWI membership. This project has been endorsed by the Biodiversity and Wine Initiative's Inga Kotze, Pat Holmes of the City of Cape Town, Barbara Court of the Sir Lowry's Pass Tourism Initiative, Dave MacDonald of the Helderberg Conservation Forum and Cape Town tourism.

Project Outcomes

1. Environmental education as to the needs for biodiversity corridors.
2. Restoration of the remaining fynbos areas on the Schapenberg and surrounding mountains and along the Sir Lowry's River [Boland Granite Fynbos (Endangered) and Swartland Granite Renosterveld (SGR) (Critically Endangered)]
3. The establishment of a biodiversity and wine route in the Schapenberg region.
4. An increase in tourism to the area which would generate more work opportunities for the local people.
5. An increase in wine sales at local wineries.
6. Employment for many of the village people as guides, members of teams clearing and rehabilitating fynbos areas (especially important after the fires) and involvement in other support projects for the walks (catering, tea gardens, guest house, taxi/bus services etc).

The Liesbeek Maintenance Project

James Cooper, Project Manager: Liesbeek Maintenance Project , Friends of the Liesbeek

The Liesbeek River finds its source on the eastern slopes of Table Mountain, above Kirstenbosch. It flows for 9km through residential, industrial and public open space areas until it finds its mouth at Salt River. Along the way it feeds the Raapenberg Bird Sanctuary, which is situated at the conference of the Black and Liesbeek Rivers next to the River club and South African Astrological Observatory.

The Maintenance Project was initiated by the Friends of the Liesbeek, and deals with problems experienced along the river and its banks from Bishops court to Observatory. These problems include littering and improper waste management, soil erosion, alien invasive plant control, obstructions in the river, flooding and safety along the river. The project was also initiated to provide training for unskilled employees in order to provide them with skills development for future employment opportunities. South African Breweries funds three Field Ranger positions for two days of the week and Tuffy provides funding for an additional days work each week. The project has been very successful so far with the general condition and peoples perception of the Liesbeek having improved drastically in the last 5 years.

The poster will give insight into the general maintenance of the Liesbeek and other projects undertaken on the river thus far.

Edith Stephens Wetland Park: an Example of a Nature Reserve as Social Space

Key words: urban nature conservation; popular conceptions of nature; social potential of reserves

Sven Ragaller

Edith Stephens Wetland Park, Biodiversity Management Branch, City of Cape Town

The importance of a functioning 'natural' environment for our continued existence is now commonly accepted as great. As part of the smallest floristic region on the planet, Cape Town has the opportunity to make use of this great privilege. Simultaneously the implications of losing this biodiversity hotspot are enormous as it is such a small area. It seems as though we are standing on a knife's edge; on the cutting edge of change, that will either make or amputate this city from its natural environment.

The focus of this poster is on the role nature reserves can play in bringing people to a different understanding of nature. There are three questions that need to be asked: what are people's conceptions of nature? What are conservationists' conceptions of nature? What can both do to achieve a more useful approach to ensuring that our natural resources are indefinitely available?

Residents surrounding ESWP have very different understandings of nature to those of nature conservationists. The reasons or motivation behind these conceptions are key to having a better understanding about how to collectively look after our natural resources. The emphasis needs to be put on partnerships that respect each others histories and approaches.

The Greater Cederberg Biodiversity Corridor: A Landscape Initiative making a difference

Key words: Strategic Objectives, partnerships, projects

Basson, S. , Coetzee, J. , Henning, S. , **Steinberg, A.**
CapeNature – Greater Cederberg Biodiversity Corridor

The Greater Cederberg Biodiversity Corridor (GCBC) is a partnership-based initiative that aims to secure the conservation of global significant biodiversity of the Cape Floral Kingdom in the Greater Cederberg Region, while ensuring benefits to the people of the region.

The strategic objectives of the GCBC include Expansion of Protected Areas, Industry Involvement, Human Well-being, Local Economic Development and Awareness Raising. The objectives provide the guidelines in which projects are initiated within the Greater Cederberg Region. Projects such as Best Practices in the Rooibos - , Potato – and 4x4 industries, the School Resource Package, Outreach Programs and ground breaking Freshwater Corridor Stewardship projects all contribute to the realization of the strategic objective of the corridor.

A large focus of the GCBC is on the Expansion of Protected areas through achieving voluntary stewardship agreements with private landowners in the form of conservation areas, biodiversity agreements and contract nature reserves.

The GCBC is all about partnerships. The success of the GCBC rely on the partnerships between Donors (C.A.P.E, SKEP, CI, CEPF), National and Provincial Governmental Departments, Local and District Municipalities, private land owners, communities and NGO's.

ECOLOGY:

Toads sharing secrets of migration; unravelling how western leopard toads survive in an urban environment

Key Words: threatened species, radio-tracking, amphibians

Feldman, F.¹ and Measey, G.J.²

¹ *The Nature Conservation Corporation, P.O. Box 30223, Tokai, 7966*

² Applied Biodiversity Research, South African National Biodiversity Institute
Farrah@natureconservation.co.za

The western leopard toad (*Amietophrynus pantherinus*) carries an IUCN endangered (En) status due to its limited distribution within the winter rainfall region of the Western Cape. Within the greater city of Cape Town, the areas this species inhabits are almost completely urbanized. Large scale urban development is reported to have led to dwindling populations, and loss and fragmentation of habitat. However, we are lacking quantitative data that supports this. In order to make efficient conservation planning decisions, effective barriers to the movement of western leopard toads need to be determined. Two methods have been employed i.e. radio-telemetry and computer-aided photographic identification of individual animals will be used in a capture-mark-recapture exercise to augment toad movement data and estimate population demographics. Spatial data of each tagged and recaptured toad will be recorded using a GPS and analysed in ARCGIS, together with other layers to contrast habitat occupied in each land use type. The study is being conducted in Kirstenhof, Cape Town. Preliminary results indicate that western leopard toads use Roads (65 %) more for more of the time than Urban Corridors (22 %) or Gardens (14 %) for traveling from their breeding site to foraging sites. Surprisingly, Gardens (89 %) are the preferred foraging sites with Urban Corridors accounting for only a small percentage (11 %). Males appear to have larger home ranges (tracked over a two week period) than females (4177 m² and 1014 m² respectively). Males also traveled further away from the breeding/release site than females (426 m and 351 m respectively). We show that urban gardens are important for foraging, and may be considered important for the conservation of indigenous fauna. However, the preference of these toads to utilize roads as corridors for movement through the urban landscape, could significantly impact the future conservation of this species.

The effects of wildfires on small mammal diversity and abundance at Kogelberg Nature Reserve

Key words: homogenous veld, controlled burns, Kogelberg Sandstone Fynbos

Sommers, A

Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town
Kogelberg Regional Conservation Office, Clarence Drive, Gordon's Bay, South Africa
P O Box 68, Gordon's Bay, 7151, South Africa
andrie.sommers@capetown.gov.za

The fire management of Kogelberg Nature Reserve relies solely on wildfires, no controlled burns have taken place, and as a result the veld is fairly homogenous in terms of age. Kogelberg Nature Reserve has only been actively managed from a biodiversity perspective since 2005 and recently the bulk of which was burnt by a wildfire in December 2008. Prior to this the last fire to burn the majority of the reserve was in December 2000. The study site is on Kogelberg Sandstone Fynbos and fynbos being a fire driven ecosystem, it is necessary to maintain an assortment of veld ages, in order to sustain small mammal diversity and abundance. It has been discussed that small mammal numbers in fynbos surpass their previous numbers six to nine months after fire; this suggests that more regular burns might be more beneficial to small mammal abundance. The main objective of this research is to determine whether control burns should be implemented as an additional management option in the future to maintain small mammal diversity and abundance in Kogelberg Nature Reserve. The baseline data collection shall be done over six months and occur within three study sites namely, hotter and cooler burnt pieces of veld (study site A and B) and a non-burnt control piece of veld (study site C), all study sites are 4000m² (0,4ha) in size and approximately at the same altitude. Each month a small mammal survey will be conducted, recording species, mark-recapture, quantity and various other measurements. A vegetation survey, running concurrently, shall also be conducted and structural growth formation in terms of height and growth form, substrate and number of species shall be recorded.

Effects of climatic warming on lichen populations in South African ecosystem

Keywords: lichens, respiration and photochemistry

Maphangwa, K.W¹, Musil, C.F¹, Raitt, L² and Zedda, L³

1. South African National Biodiversity Institute, Climate Change & Bio-Adaptation , Private Bag X7, Claremont, Cape Town ,7735 , maphangwa@sanbi.org

2. Department of Biodiversity and Conservation Biology, , University of the Western Cape, Bag X17, Bellville Cape Town , 7535

3. Rheinische Friedrich-Wilhelms-Universität, Institut für Nutzpflanzenwissenschaften und Ressourcenschutz (INRES), Abt. Geobotanik und Naturschutz, KarlRobert-Kreiten-Straße 13 D-53115 Bonn, Germany

Elevated temperatures, reduced fog and dew precipitation accompanying climate warming are expected to have adverse effects on photobionts and mycobionts of sensitive lichen species, which could serve as early indicators of environmental change. Responses of several different lichen species from higher mountainous areas and low habitats to heat and drought stress were examined under laboratory conditions. Moistened lichen species (photobionts and mycobionts) were exposed to elevated temperatures (ranges from 24°C and 48 °C) for 2-hour periods in a forced draft oven.

Photochemical responses of lichen photobionts to heat and drought stress were measured with modulated and rapid rise fluorescence meters and combined respiratory responses of photobionts and mycobionts to heat and drought stress measured with an infrared gas analyzer. Diminished photochemical quantum yields and respiration rates were observed in all lichen species with elevated temperatures with photochemical quantum yields more sensitive to heat stress than respiration rates. Lichen species from higher mountainous habitats were more sensitive to elevated temperatures than those from lower habitats.

Differential effects of fog and dew on the hydrology of succulents displaying CAM and C₃ photosynthetic modes in a Mediterranean-type ecosystem of South Africa

Keywords: fog and dew, stem diameter variations, CAM/C₃ photosynthetic modes

Matimati, I., Musil, C.F., Raitt, L., February, E.C.

Fog and dew interception and utilization by plant canopies remains one of the least considered aspects of vegetation studies at any scale yet the few studies that have been conducted point to their considerable influence on ecological processes and a critical role in modulating climate in Mediterranean-type ecosystems of southern Africa. Their relevance to succulent plant hydrology was investigated in this study. Variations in stem diameter were monitored at 2-hourly intervals in 8 shrub species of diverse growth form over a 9-month period. Two groups of species were distinguished based on whether their daily amplitudes in stem diameter were consistently positively correlated with daily fluxes in vapour pressure deficit, which were indicative of a persistent CAM photosynthetic mode, or intermittently correlated with daily fluxes in vapour pressure deficit, which were indicative of mixed CAM and C₃ photosynthetic modes. Among species displaying a persistent CAM photosynthetic mode, high nocturnal fog and dew precipitation amounts corresponded with low daily amplitudes in stem diameter, and vice versa, which pointed to reduced nocturnal stomatal water loss. These patterns, which were indistinct among species displaying mixed CAM and C₃ photosynthetic modes, were corroborated by small daily amplitudes in stem diameter also consistently observed in one species displaying a CAM photosynthetic mode in ambient than artificially fog and dew excluded environments.

Empirical and Model Derived Respiration Responses to Climate in Different Soils of an Arid South African Ecosystem

Justin Nyaga¹, Musil, C.F. ¹, Raitt, L²

¹Climate Change & Bio-Adaptation Unit, South African National Biodiversity Institute

²Department of Biodiversity and Conservation Biology, University of the Western Cape

This study examined the magnitude of soil CO₂ effluxes in an arid South African ecosystem, their responses, as well as those of key limiting nutrients, to soil temperature increases and moisture reductions consistent with a future climate change scenario and compared measured soil respiration rates with those predicted with empirically and theoretically-based soil respiration models.

Measurements of soil respiration rate, temperature, moisture, N and P contents were conducted monthly over a 12-month period in natural environments and those artificially manipulated with replicated open-top warming chambers (average 4.1°C increase) and precipitation exclusion chambers (average 30.1% decrease in rainfall, 26.2% decrease in fog and dewfall) distributed in five different soil-vegetation units.

Measured soil respiration rates were over 3 orders of magnitude less than those reported for temperate and tropical forest ecosystems with 61.5% of the total soil CO₂ efflux contributed by root respiration in moderately vegetated soils. Massive increases (up to 15 orders of magnitude) in soil CO₂ efflux occurred during wet phases, but even these large CO₂ pulses were only comparable in magnitude with soil CO₂ effluxes reported for temperate semi-arid grasslands. There was considerable intra-annual and inter-site variability in the magnitude and direction of soil respiration and N and P responses to elevated temperatures and reduced precipitation levels with poor correspondence evident between soil CO₂ efflux and soil organic matter content. Soil CO₂ effluxes declined in response to precipitation exclusion by 7.1% over all sites and increased in response to warming by 42.1% over all sites. The large increase in response to warming was assisted by a 7.5% enhancement in soil moisture content due to precipitation interception by the chamber walls and its channelling to the soil surface. Relatively smaller respiration increases in response to warming occurred in moderately vegetated soils, these attributed to soil thermal insulation by the plant canopy cover. Soil P and N contents increased in response to warming by 11.3% and 13.3% respectively over all sites, with soil P declining in response to precipitation exclusion by 5.8% over all sites and soil N increasing in response to precipitation exclusion over all sites by 5.8%.

Standard least squares regressions quantified the relationships between soil respiration rate and measured soil physical and chemical properties, and their interactions for each of the 5 soil-vegetation units. These were incorporated in an empirically-based soil respiration (EMR) model which was compared with a theoretically based generalized soil respiration model (GRESP) whose functions included measured Q₁₀ coefficients at soil moisture contents above field capacity, these assumed reduced by half for dry conditions, and maximum retentive and field capacities of soils. EMR modelled soil respiration rates displayed slightly better correspondence with measured soil respiration rates than GRESP modelled soil respiration rates. This apparent from the higher regression coefficients and lower sums of squared residuals, with EMR model residuals also more closely approximating normal distributions. However, despite the EMR model's slight superiority, it was concluded that more precise laboratory-based measurements of soil retentive and field capacities and their Q₁₀ coefficients at different soil moisture contents could improve the GRESP model's accuracy thereby providing a more convenient and uncomplicated means of predicting respiration responses to current and future climates over a wide range of arid soil types

Does sucrose addition inhibit plant growth by depleting soil N?

Key words: Sucrose addition, soil sterilization, bacterial immobilization and soil nitrogen depletion.

Ruwanza, S.^{1*}, Musil, C. F.¹, Esler, K. J.²

¹ Global Change Group, South African National Biodiversity Institute

² Department of Conservation Ecology and Entomology, Stellenbosch University

*sheunesu@sanbi.org

The hypothesis that exogenous sucrose addition to soils inhibits plant growth by stimulating soil microbial biomass, which accumulates soil nitrogen rendering it unavailable to plants, was tested. Two native, early seral species (*Dimorphotheca pluvialis* (L.) Moench and *Ursinia anthemoides* (L) Poir. *subsp anthemoides*) were cultured in heat sterilized (220°C for 72 hours) and non-sterilized soils in a greenhouse under four different levels of sucrose (0, 100, 200 and 300 g m⁻²) supplied monthly over a 4-month active growing period. Foliar chlorophyll contents, photosystem II (PSII) efficiencies, shoot and root lengths and dry masses, inflorescence numbers and N and P contents were measured in the plants, and N and P contents and bacterial cell and coliform numbers analyzed in the soils. Both *D. pluvialis* and *U. anthemoides* displayed significant reductions in PSII efficiency, chlorophyll content, accumulation of biomass and N and P in response to increased levels of sucrose. These findings initially seemingly supported the hypothesis since these reductions were of substantially greater magnitude in plants cultivated in non-sterilized than sterilized soils. Despite this, there was no evidence of any significant increases in bacterial and coliform cell numbers in response to increased levels of sucrose supplied or any significant reductions in soil N and P contents following sucrose additions in both sterile and non-sterilized soils. Greater numbers of bacteria and coliforms were measured in sterilized than non-sterilized soils. This corresponded with reduced soil N contents but these were not reflected in changes in plant PSII efficiency and

growth and total amounts of N taken up by plants which displayed massive increases in sterilized soils. This study's findings did not support the hypothesis and pointed to an abiotic mechanism of sucrose inhibition of plant photosynthesis and growth.

Survivor South Africa: an island of chacma baboons amidst a sea of humanity

Key words: Isolated population; population dynamics; recommendations management

Esmé K. Beamish^{1*}, M. Justin O'Riain¹

¹ Department of Zoology, University of Cape Town, Cape Town, South Africa

* Correspondence: ekbeamish@iafrica.com

The Cape Peninsula baboon population has become geographically isolated from their nearest neighbours as a result of urban expansion. Isolated populations have to be actively managed if they are to be sustainable. The current paucity of data on the population dynamics and life history traits of this population have to date thwarted any attempt to devise a robust population management plan. In this study I present an analysis of data collected over a ten year period (1998-2008) detailing the growth and mortality of the 11 extant Peninsula troops. While the entire population has grown by 15% there have been two years of negative growth associated with high levels of human induced mortality. Growth and survival differed markedly at a regional level with the Northern subpopulation showing consistently higher growth and lower mortality. Within the southern subpopulation the 10 troops were equally divided into five within and five outside the fenced section of the Cape of Good Hope Reserve. On average the troops outside the park were significantly larger and had a higher percentage growth. Substantial differences were evident in the demographic parameters of individual troops within the peninsula. The causes of mortality and growth are discussed and recommendations for the future management of this isolated, protected population are proposed.

DETERMINING FACTORS FOR THE SUCCESSFUL RECRUITMENT OF *LEUCODENDRON ARGENTEUM* AT SILWERBOOMKLOOF NATURAL HERITAGE SITE

Keywords: *Leucodendron argenteum*, population viability, recruitment success

Julie Gane, City of Cape Town,

There has been no research up to now on an isolated population of *Leucodendron argenteum* (Silver Trees) at The Silwerboomkloof Natural Heritage Site (SBK) and very little done on *Leucodendron argenteum* in general. *Leucodendron argenteum* is an endangered species threatened due to loss of habitat and is limited both in distribution and natural regeneration. Due to the surrounding infrastructure, fire has not been used as a management tool and the area has not burnt in over twenty years. Of the 80 *Leucodendron argenteum* recorded at SBK, only 11 are younger than 10 years. That makes an average of 0.1 seedlings per parent plant. The population can be classified as senescent due to the absence of fire for more than 20 years. A variety of biotic and abiotic factors have been identified, which could be influencing the recruitment success and viability of *Leucodendron argenteum* at SBK. Biotic factors identified include pre and post-disposal predation, distribution, density and height of surrounding vegetation, age, sex ratios and flower production. Aspect, slope, soil characteristics and climatic variables are the abiotic factors identified. Due to time constraints only a few factors will be selected for research at this stage. A control site at TMNP containing a productive population of *Leucodendron argenteum* will be correlated with the senescent population of *Leucodendron argenteum* at SBK. Due to *Leucodendron argenteum* having a clumped distribution, an overall impression of each population will be gained by reconnaissance in order to determine adequate or minimal sample size. The average age of each population will be determined and the number of trees in each age class will also be analysed and represented in a graph. Sex ratios of each population will also be analysed by sexing all individual trees within the quadrats and will be represented as a percentage. A Cone analysis will also be done by using transects. Cone predation and seed numbers will be quantified in order to help prove at which stage limiting factors for recruitment occur through each study site. Results will be practically applied towards successfully managing the population at SBK and ultimately improving the probability of germination of *Leucodendron argenteum* in the future.

Invasions in the fynbos: research at the Centre for Invasion Biology with management implications

Key words: vegetation survey, invasive alien plants, distribution

S. Kritzinger-Klopper

DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa
suzaank@sun.ac.za

This poster gives a flavour of some recent projects of the Centre for Invasion Biology (CIB) looking at plant invasions in the fynbos. As one of the senior technical officers at the CIB, I provide a support system to the researchers, students and associates. This means I am involved in a wide range of projects. For example, experiments to improve restoration of fire-prone fynbos vegetation on the Agulhas Plain; studying the effects of land use on alien composition along a riparian corridor (Eerste River); sampling Australian Acacias as part of a molecular ecological research program; and surveying work as part of SANBI's Early Detection and Response Program. Every year, the CIB offers studentships at a variety of levels, see www.sun.ac.za/cib for more details or come and talk to me. While this may mean I have to do more work, the research always does provide interesting insights into the functioning of the CFR, and is often useful for management.

POLLINATION:

Insects on rare plants

Keywords: Pollinators, extinction, plants.

Muhammed Gardee and Michael Samways

Department of conservation Ecology and Entomology, Stellenbosch University, Matieland 7602, South Africa
mngardee@sun.ac.za

The Cape Floristic Region (CFR) is rich in many rare, endemic, and threatened plants. Being so rare begs the question of whether these plants are at risk from a restricted pool of pollinators, or whether these plants are visited by generalist pollinators. If generalist pollinators are involved, do they go on to visit other plant individuals of the same species after visiting the first individual of the rare plant, or are they drawn to more common sympatric individuals of other plant species which are pollinator magnets? Of central concern is the issue of whether these narrow range plants are threatened from failure in attracting pollinators - an effective breakdown in pollination as a keystone process - or if other human-induced challenges are the dangers they more immediately face. Research into these issues is in its planning stage and plant species and sites are currently being selected for study. With concerns over pollination declines in many parts of the world compounded by the predicted extinction of up to one quarter of all insect species within a century, we aim to establish if plant species in the CFR are, with respect to pollinators, 'the living dead.'

SUSTAINABLE HARVESTING:

Impacts of ploughing and introduction of commercial fynbos species on the diversity of sandstone fynbos on the Agulhas Plain, South Africa.

Key words: disturbance, fynbos management, wildflower industry

Treurnicht, M.¹; Esler, K.J.¹ and Gaertner, M.²

¹ Department of Conservation Ecology & Entomology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa

² Centre for Invasion Biology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa

*martinat@exchange.sun.ac.za

The Agulhas Plain is an area of exceptional biodiversity and is currently threatened by a number of (mostly) anthropogenic activities. Consequently it has been the focus of many research initiatives and conservation planning activities in recent decades. Amongst other agricultural activities, commercial fynbos farming is widely practised in the Agulhas Plain. The flower industry uses both cultivated and wild ('natural veld') harvested flowers. In recent years there has been a growing trend away from 'natural veld' harvesting towards the intensive cultivation of certain species. Cultivation from 'natural veld' to produce economically desirable fynbos species

includes the implementation of certain farming practices/techniques. Commercial fynbos farming has become a popular and lucrative industry which can potentially (according to our understanding) be detrimental to fynbos diversity. Our aim is to investigate impacts of commercial fynbos farming (focusing on harvesting from 'natural veld') on fynbos diversity in the Agulhas Plain. Firstly, by conducting a brief questionnaire survey we will investigate the extent of disturbance activities (in terms of fynbos farming) and what; in the opinion of a landholder is the impact(s) of such disturbance activities on fynbos diversity. Hereafter, a vegetation survey will be performed to elucidate information about the impacts certain farming activities have on the structural and floristic composition of fynbos. The insights gained from this study will aim to facilitate sustainable fynbos farming activities for the Agulhas area.

EDUCATION:

Environmental education and early childhood development

Gabrielle Jonker, Flower Valley Conservation Trust, P.O. Box 393 Gansbaai 7220 / Flower Valley Farm Uilkraal Gansbaai, Email address: gcook@flowervalley.co.za

The Flower Valley Conservation Trust (FVCT) is currently implementing a project (2008 – 2010), that is utilising and investigating mechanisms and systems to support the integration of Environmental Education in:

- Early Childhood Development (ECD) practitioner's professional development
- The ECD site based learning programme

Learning is at the heart of this project: the learning and development of young children, ECD practitioners / teachers, project managers, mentors, Eco School coordinators and ECD service providers.

This takes place through:

- Running an ECD site on Flower Valley farm,
- Supporting participating ECD site infrastructure development and governance.
- Establishing and coordinating Eco-Schools' nodes,
- Developing and piloting a short course in environmental education and ECD,
- Mentoring practitioners
- Establishment of an ECD service provider forum
- Catalysing systems and drivers for organisational and institutional collaboration and partnerships around ECD in the region.

Through Eco Schools the project supports practitioners in their efforts to engage children, the ECD centre and the local community in relevant and contextual environmental issues. This needs to be done in ways that are appropriate in terms of children's age, development, culture and context.

Environmental education at the ECD site provides a wonderful opportunity to work and support change on an individual level (e.g. child to child, practitioner to child, child to practitioner, practitioner to parent etc...), group level (e.g. school governing bodies, ECD site management and training etc...) and systemic level (e.g. institutional arrangements, policy, partnerships).

The lessons we learn through this project will be shared nationally. Collaborative efforts are being made to translate and apply these lessons in the region beyond the project period.

The Redevelopment of the 'Pelargonium Koppie' at Kirstenbosch NBG

Key words: ex situ conservation, education, display

1. **Karen Wall**, Scholar, Kirstenbosch National Botanical Garden, SANBI, Private Bag X7, Claremont, Cape Town. and 2. **Phakamani Xaba**, Horticulturist, Kirstenbosch National Botanical Garden, SANBI, Private Bag X7, Claremont, Cape Town.

Kirstenbosch is the largest of a countrywide network of nine National Botanical Gardens administered by the South African National Biodiversity Institute (SANBI). SANBI is mandated through the National Environmental Management: Biodiversity Act 10 of 2004, to establish facilities for visitor amenities and horticultural display of plants collected from natural populations for environmental education, research and *ex-situ* conservation.

There are approximately 200 species of *Pelargonium* in South Africa, which are found over most of the country in a wide range of habitats. It is estimated that 80% of the known species of *Pelargonium* are concentrated in the Cape Floristic Region.

Since pelargoniums are very decorative garden plants and rank amongst South Africa's most famous horticultural exports, and the highest concentration of this genus occurs in South Africa, pelargoniums have for many years been grown and maintained at Kirstenbosch. The Pelargonium Collection at Kirstenbosch houses over 60 species, many of which are also on display in the garden. However, some of the more unusual species are still largely unknown to the gardening public and have not yet reached the commercial horticultural industry.

The aim of the redevelopment of the Pelargonium Koppie is to increase the collection of living plants at Kirstenbosch; to make the Pelargonium Koppie a showcase for pelargoniums by landscaping the section to attract more visitors and rejuvenating its nutrient poor soils, and to replant the garden with a wide selection of pelargoniums and associated species from the same regions, as well as other members of the Geraniaceae. A crucial part of the redevelopment is to increase public awareness of pelargoniums, and to provide the 14 000 learners and students who come to the garden every year with information about pelargoniums. This will be achieved by means of interpretive storyboards and plant labels.

A learning village for working together to restore living landscapes

Keywords: restoration, cultivation, education

Victoria Willman^{1*} Matthew Zylstra² Dieter Van den Broeck²

¹ Kouga Restoration Nursery, Working for Woodlands, Eastern Cape Restoration Programme, Gamtoos Irrigation Board

² PRESENCE network, Living Lands (Secretariat)

*victoria@connectedcat.com

Landscape restoration has the potential to provide diverse and multiple benefits for both biodiversity and community. However, in order for this vision to be realised, there must be a physical presence which supports multiple stakeholder groups in engaging in restoration through improved education, research, training, skills, capacity and the rediscovery of traditional knowledge. The Working for Woodlands (DWEA/GIB) Restoration Nursery based at the Kouga Dam in the Eastern Cape is in the process of expanding its activities and focuses to realise this vision through an integrated 'Learning Village'. This hub is being designed around the guiding themes of: restoration; cultivation; and education with a view toward long-term sustainability and empowerment. The Learning Village is in the process of supporting ongoing ecosystem restoration, biodiversity conservation, community awareness and livelihood improvement through participatory planning and consolidating the following elements: cultural botanical gardens; indigenous horticultural nursery; education/training facilities; research accommodation; and small-scale sustainable tourist infrastructure.

The existing nursery already supports a variety of projects within the Eastern Cape Restoration Programme (ECRP). It is also active in providing employment opportunities and training for teams engaged through the national Working for Water poverty relief programme. These activities have found close synergies with the research-implementation objectives of the PRESENCE network which collectively aims to guide the restoration of 'living landscapes'.

The Learning Village is supporting 'a working together for living landscapes' philosophy through:

restoration: designing an on-site botanical gardens which showcases socio-ecological values and processes.

cultivation: propagating indigenous plant species to source restoration projects within the ECRP

education: hosting scientific research projects and community education activities (training, workshops, schools)

An online portal (<http://www.livinglandscapes.co.za>) is also being established as a central point for networking, stakeholder discussion and research dissemination in relation to landscape restoration activities in the region.

AQUATICS:

The Affect of Water and Microbiological Quality on Fish in the Lourens River, Western Cape, South Africa

Key words: pollution, fish pathogens, river health

Gerber, L.

Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town
Helderberg Regional Conservation Office, Verster Avenue, Somerset West, South Africa
Private Bag X19, Somerset West, 7129, South Africa
Leandri.Gerber@capetown.gov.za

The Lourens River flows from its origins in the Hottentots Holland Mountains in a South-Westerly direction and reaches the sea at Strand beach where it forms a small estuary. The Lourens River is the only river in South Africa that has been declared a Protected Natural Environment and has also been included in the River Health Program in 2003. The Lourens River is negatively affected by various sources of pollution. Indigenous fish species are expected to decline as a result of these factors. The degradation of the river also gives rise to questions regarding the rivers' safety and suitability for recreational purposes, the water quality as well as the general health of the river system and the state of its biodiversity. This study will investigate whether a significant correlation can be drawn between the density and diversity of the fish population of the river and the fish pathogens that is present as a result of pollution. High levels of pathogens are also often an indication of organic pollution. Assessing the microbial constituents is therefore not only an indication of the ecosystem health, but also a measure of pollution occurrence and the suitability and safety of the river for human utilization. Fish surveys will be executed at six different locations along the length of the river. All fish that are caught will be inspected for skin lesions. Water samples will be collected at each site and the total viable bacterial counts will be determined. If it is so found that there is a negative impact on the fish population of the Lourens River due to pathogens present, it may suggest that the river also poses health threats to humans.