



FYNBOS FORUM

Programme

THEME: “International Year of Biodiversity”

3rd – 6th August 2010

NG Church Centre
Church Street
CITRUSDAL

Organised by the Fynbos Forum Committee.

Funded by

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



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ACKNOWLEDGEMENTS

FYNBOS FORUM

3rd – 6th August 2010

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 an international researcher's participation & assisting with administration support to the secretariat.
4.	The Botanical Society of South Africa for administering the Fynbos Forum funding.
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6	Table Mountain Fund (TMF) for funding the Fynbos Forum Innovation Scholarship
7	SANBI for accommodating the Secretariat in the Kirstenbosch Research Centre.
8.	Colleagues in Citrusdal for motivating to have Fynbos Forum in Citrusdal, and helping with the preparations.
9	All Paper & Poster Presenters, Workshop Facilitators, and Leaders of field trips for arranging such interesting programme this year.

COMMITTEE MEMBERS 2009 – 2010

Chairman:	Ms Julia Wood (Chair)
Committee:	Dr Nicky Allsopp Ms Odette Curtis Prof Karen Esler Dr Patricia Holmes (Acting Vice Chair) Mr Onno Huyser Rupert Koopman Mr Xola Mkefe Mr Augustine Morkel Mr Matthew Norval Mrs Azisa Parker Mr James Reeler (AV expert) Ms Lee Sauls
	Ms Connie Krug (Vice Chair - Resigned January 2010)
Secretariat:	Ms Wendy Paisley
Secretarial Assistance:	Ms Elverina Coetzee, SAEON

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 FORUMS

FYNBOS FORUM PROJECT

1977:	Various dates at UCT & Stellenbosch University- founding of the Fynbos Biome Project
1978:	Various dates and various venues
1979:	29 January, Stellenbosch
1980:	20-30 July, Stellenbosch
1981:	29-30 June & 1 July; UCT
1982:	11 June, UCT
1983:	28 June, UCT
1984:	26 June, Stellenbosch

- 1985: 29-30 July, Stellenbosch
- 1986: 26-27 June, UCT
- 1987: 23-25 June, Saasveld, George
- 1988 : 27-29 July, Avalon Hotel, Montagu

FYNBOS FORUM (*name change*)

- 1989 : 18-20 July, ClanWilliam
- 1990 : 1-2 October Stellenbosch, The University of Stellenbosch, Die Ark
- 1991 : 11-13 August, 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 : 22-23 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 – known as Interfaces, a joint forum with Arid Zones Ecology Forum

2009: 4th – 7th August - The Sports Centre, Bredasdorp

2010: 3rd – 6th August – NG Church Centre, Citrusdal

FYNBOS FORUM 3rd - 6th August 2010

Programme Overview

Times	Tues 3 rd August		Times	Wed 4 th August		Times	Thurs 5 th August		Times	Fri 6 th August	
			7.00	Registration		7.00	Late Registration		7.00	Late Registration	
			8.00	Welcome Julia Wood		8h00	Keynote Address		8h00	Keynote Address	
			8.10	Opening Address Chair		8h30	Parallel Session 5	Parallel Session 6	8h30	Parallel Session 7	Parallel Session 8
			8.40	Keynote Address		10h30	Tea		10h15	Tea	
			9h.10	Plenary		11h00	Keynote Address		10h45	Parallel Session 9	Parallel Session 10
			9h35	Plenary		11h30	Fieldtrip Prep		11h55	Keynote Address	
			10h00	Tea		11h45	Collect lunches & leave on fieldtrips		12h15	Closing Remarks, Prizes	
			10h30	Parallel Session 1	Parallel Session 2		Field trips all day		12h30	Packed lunches and depart for home	

12h00	Registration			11h30		Parallel Session 3			
13h00	Lunch			13h00	Lunch				
14h00	Workshop 1	Workshop 2	Workshop 3	14h00	Parallel Session 1 <i>cont</i>	Parallel Session 4			
				15h00	Invasives workshop				
15h30	Tea			15h30	Tea				
16h00	Workshop 4	Workshop 5		16h00	Poster Session				
17h00	Poster Session			17h00	Fynbos Forum AGM				
	Brief Welcome								
18h00	Johan Burger								
19h30	Dinner			19H30	Dinner		19H30	Special Dinner	

Fynbos Forum 3rd-6th August 2010 Programme

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

Time	Tuesday 3 August		
12h30	Registration and Lunch		
14h00	Workshop 1: Restoration research and practice <i>Pat Holmes</i>	Workshop 2: A facilitated screening of biodiversity films for education and advocacy <i>George Davis</i>	Workshop 3: Game farming in the Fynbos and the management of resultant risks to the receiving environment <i>Kas Hamman</i>
15h30	Tea		
16h00	Workshop 4: Fynbos riparian zones: is restoration of function implicit in restoration of structure? <i>Shayne Jacobs & Karen Esler</i>	Workshop 5: Launch of the conservation and environmental managers forum. <i>Augustine Morkel & Dean Ferreira</i>	
17h00	Poster session		
	Julia Wood: Brief Welcome		
18h00	Johan Burger Greater Cederberg Biodiversity Corridor: Reflection on the establishment of a corridor		

19h30	Dinner
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Time	Wednesday 4 August	
7h00	Late Registration	
8h00	Welcome: Julia Wood	
8h10	Opening Address – Chair: Xola Mkefe	
8h40	Keynote address: Ed February Is the Clanwilliam cedar doomed to extinction? Chair: Xola Mkefe	
9h10	Mandy Barnett CAPE Phase 2: The Road Ahead	
9h35	Louise Stafford CAPE Invasive Alien Species Strategy: the future	
10h00	Tea	
10H30	Parallel Session 1: Invasive Alien Species Symposium Chair: Louise Stafford	Parallel Session 2: Species Level Studies Chair: Pat Holmes
10H30	<i>Mfuno Tafeni</i> Eradicating the Indian House Crow in the City of Cape Town	<i>Ethan L Newman, B A Anderson S D Johnson</i> Floral Batesian mimicry leads to morphological divergence in <i>Disa ferruginea</i> (Orchidaceae)

10h45	<i>M Thabiso Mokotjomela, C F Musil, K Esler</i> Bird species composition and functional groups foraging on alien and indigenous shrubs in the Cape	<i>Lize von Staden, & Roberts R</i> The Red List of South African Plants at your service
11h00	<i>Indrani Singh, J J le Roux, M A Geber</i> Testing three hypotheses for the success of weedy <i>Oxalis pes-caprae</i> in the native and introduced range	<i>Annelise Schutte-Vlok</i> <i>Podalyria</i> – Trojan horse of the fynbos
11h15	<i>Brian van Wilgen</i> Priorities for managing invasive alien plants in the fynbos biome	<i>Rupert Koopman, A R Magee</i> Demystifying <i>Marasmodes</i>
		Parallel Session 3: Resource Utilization Chair: Augustine Morkel
11h30		<i>Martina Treurnicht, K J Esler, M Gaertner</i> Wildflower farming in the Agulhas Plain – friend or foe for fynbos?
11h45	<i>Therese Forsyth, Helen de Klerk</i> Cost-effective, tangible approach for mapping invasive alien plant species on reserves and applying best practice criteria to guide management actions	<i>Helanya Vlok, M de Wit, A van der Merwe</i> The socio-economic value of restoring natural capital through alien removal on the Agulhas Plain
12h00	<i>Guy Palmer</i> Integrated invasive alien plant management	<i>H Knoesen, Beatrice Conradie</i> Are we creating false expectations about the economic potential of wildflower harvesting? The case of landless contractors on the Agulhas Plain
12h15	<i>David Le Maitre, Colin Yates, Ashua McNeill et al.</i> Modelling alien plant species invasions in the Cape Fynbos and Western Australian Kwongan : yours, ours and theirs	<i>Frieda Lloyd, R Bailey, W Rabe</i> Certifying compliance with a best practice code: the Flower Valley experience

12h30	<i>Megan S Nowell</i> , David Le Maitre, Karen Esler, J M Kalwij Kernels, convolution and tasseled cap: methods for mapping and monitoring land use and invasive vegetation on the Agulhas Plain	<i>Rhoda M Malgas</i> , J H J Schaminee, S M Hennekens et al. SynBioSys Fynbos: the wild rooibos case-study
12h45	<i>Rachel Botes</i> , Louise Stafford Mainstreaming invasive alien plant considerations: City of Cape Town	<i>Fiona Koch</i> , E E Campbell J C Steenkamp The contribution of the FSC (Forest Stewardship Council) certification expressed in terms of costs and benefits to the conservation value of species diversity in the Southern Cape, South Africa short paper
13h00	Lunch	
	Parallel Session 1: Invasive Species Symposium (continued) Chair: Louise Stafford	Parallel Session 4: Education & Outreach Chair: Timm Hoffman
14h00	<i>Tony Gordon</i> Four decades of biological control of <i>Hakea sericea</i> : Can a stem-boring beetle make a significant difference?	<i>Alice Ashwell</i> Beyond senior science: engaging with youth in nature
14h15	<i>Fiona Impson</i> Biological control of three Australian <i>Acacia</i> species: impacts, implementation and integration	<i>Matthew J Zylstra</i> , A T Knight, K J Esler, L Le Grange “God won’t make bad things”. Insights into children’s perspectives on Black Wattle and clearing
14h30	<i>Alan Wood</i> The gall rust <i>Uromycladium tepperianum</i> on Port Jackson (<i>Acacia saligna</i>) – is it still working?	<i>Paula Hathorn</i> , Mzwandile Fulani Introducing the book: Growing together: thinking and practice of urban nature conservators

14H45	tea	<i>A Morkel</i> Biodiversity Expo Model: the public face of the Fynbos Forum?
15h00	Invasives workshop	<i>Fulufhelo Mafelatshuma, Thembela Bushula</i> Adopt-a-river, in Eerste River, Western Cape
15h15		<i>Tessa A Oliver, K Montgomery</i> Hot property: what to do when it starts getting hotter short paper
		15h22 <i>Leanne Mckrill</i> A case study of the firewise community of Hangklip, a year on and one fire season later short paper
15h30	Tea	
16h00	Posters (1h)	Posters (1h)
17h00	Fynbos Forum AGM	
19h30	Dinner	

<i>Time</i>	Thursday 5 August
7h00	Late registration

08h00	Keynote address: Jonathan Silvertown	
	Eco-hydrology of Restionaceae in the Western Cape and its implications for conservation	
	Chair: Karen Esler	
	Parallel Paper Session 5: Ecology	Parallel Session 6: Environmental Management
	Chair: Karen Esler	Chair: Lee Saul
8h30	<i>Ursina D Rusch, Bruce Anderson, Jeremy Midgley</i> Seed dispersal of the Cape Spiny Mouse and the effect of seed dispersal and aridity on the fynbos protea <i>Leucadendron sessile</i>	<i>Alana Duffell-Canham</i> The South African Wind Rush: are impacts on biodiversity being underestimated?
8h45	<i>Christy J Bragg, J M O’Riain, S W Todd</i> Porcupines – drivers of diversity	<i>Samantha J Ralston</i> Land use change: an opportunity for conservation or a threat to biodiversity?
9h00	<i>Cassandra Q Sheasby</i> Interspecific competition between Helmeted Guineafowl and Cape Spurfowl at Zandvlei Nature Reserve	<i>Kevin J R Foster</i> “Conservationists just create red tape”; the EIA experience of farmers in the Cape Floristic region
9h15	<i>Sally D Hofmeyr</i> The Southern Black Korhaan: a fynbos species in trouble	<i>Beatrice I Conradie</i> Landholder perspectives on threats to their survival on the Agulhas Plain
9h30	<i>Victoria Goodall, N Allsopp</i> SAEON Data Portal – a platform for disseminating fynbos data	<i>Bentley S Kaplan, J M O’Riain, A J King</i> In pursuit of a panacea: mitigating human-baboon conflict in the Cape Peninsula

9h45	Anthony G Rebelo, S Freitag-Ronaldson, C Cheney, M McGeoch Prioritizing species of special concern in Table Mountain National Park for monitoring	Heidi-Jane Hawkins, G Pence, T von Bormann, S Frazee How viable are existing agro-environmental projects in the Cape Floristic Region?
10h00	Pippin M Anderson, P J O'Farrell The City of Cape Town surrounding the Table Mountain National Park: an historical reflection of the evolving relationships between an urban settlement and ecological processes	Ruth Kansky The status of evaluation in conservation and methods for improvement
10h15	Ismail Ebrahim Repeat sampling. How many species are we missing out on? Short paper	A Wilhelm-Rechmann, Richard M Cowling Framing biodiversity conservation for decision makers; insights from four Eastern Cape municipalities
10h22	James Ayuk The water-regime requirements and response to scenarios of hydrological change by Fynbos flora in the Cape Floristic region, South Africa.... Short paper	
10h30	Tea	
11h00	Keynote address: Kate Hardwick Opportunities for Botanic Gardens to support and promote ecological restoration Chair: Pat Holmes	
11h30	Excursion information	
11h45	Collect packed lunches and depart on field trips	

19h30	Special Dinner
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<i>Time</i>	Friday 6 August	
7h00	Late registration	
08h00	Keynote address: John Parkington Fynbos, Benguela and the origins of our species. Chair: Nicky Allsopp	
	Parallel Paper Session 7: Restoration, Fire and Ecology Chair: Rupert Koopman	Parallel Paper Session 8: Conservation Planning and Implementation Chair: Onno Huyser
8h30	<i>Phumza Ntshotsho, Belinda Reyers, Karen J Esler</i> What is the evidence-base status of restoration in South Africa?	<i>Coral Birss</i> CapeNature's contribution to a National Reporting System for Protected Area Management Effectiveness (METT-SA)
8h45	<i>Anthony Mills, Sarah-Jane Fox, Onno Huyser et al.</i> Capturing carbon and restoring renosterveld in fallow lands of the Overberg, Cape Floristic Region	<i>Julia Wood, A Pretorius, C Dorse, P M Holmes</i> Business planning for biodiversity in the City of Cape Town
9h00	<i>Karen E Marais, S M Jacobs, R B Pratt</i> Post-fire regeneration of mountain fynbos: exploring the "persistence niche"	<i>Andre S Rossouw, U Irlich, C Dorse, M Norval</i> Conservation beyond boundaries: biodiversity stewardship in the City of Cape Town
9h15	<i>C C Swift, Shayne M Jacobs, K J Esler</i> Post fire recovery in Fynbos riparian habitats Short paper	<i>Patricia M Holmes, A Stipinovich, C Dorse et al.</i> Conservation implementation plan for the False Bay Strandveld

9h22	Christine D Hugo, L H Watson, R M Cowling Wetland management within plantations on the Tsitsikamma Plateau: Can we use fire as a fuel reduction technique without compromising biodiversity? Short paper	
9h30	Etienne Slabbert, S M Jacobs, K J Esler, K J Jacobs Linking microbes to plants and ecosystem function in riparian ecotones	Jacques van der Merwe, H Preston Darling Wildflower Society: 95 years of private conservation
9h45	Nicky Allsopp, V Goodall Can mycorrhizal status of fynbos plants determine fine scale community composition?	Odette E Curtis Saving our vanishing renosterveld: crisis management or sustainable conservation?
10h00	Julia Dabush Fighting for fynbos on the Cape Flats: The Kirstenbosch Conservation Programme Short paper	Noel Oettle, N Helme, S Todd et al. Conserving biodiversity in a living agricultural landscape: the Avontuur adventure
10h07	Chandra Fick Reducing Disaster Risks from Wildfire Hazards Associated with Climate Change in South Africa.. Short Paper	
10h15	Tea	

	Parallel Paper Session 9: Climate Change Adaptation Chair: Nicky Allsopp	Parallel Session 10: Wetland Ecosystems Chair: Mandy Nofke
10h45	<i>Genevieve Q K Pence, O Huyser</i> Towards protecting key climate-adaptation corridors in the Western Cape	<i>Rory Allardice, M J D'Alton, W Louw</i> Innovation in conservation on the Agulhas Plain: the Nuwejaars wetland special management area
11h00	<i>Sarshen G Marais, M B Botha</i> Assessing climate change adaptation corridors and restoration sites	<i>Heidi Nieuwoudt, R Hiseman</i> Palmiet wetlands: wells of biodiversity economy
11h15	<i>Donna Kotze, E Marinus, B Koelle, E Moses</i> Counting for conservation	<i>Marius Kieck</i> Working for Wetlands - West Coast: what have we done and where are we going?
11h30	<i>Bettina Koelle, Annecke W, N Oettle, S Parring</i> Biodiversity conservation for livelihoods of the future	<i>Marius Wheeler</i> Is Verlorenvlei still an important waterbird habitat?
11h45	<i>Lorena Pasquini, R M Cowling, G Ziervogel</i> Mainstreaming ecosystem-based adaptation options in local municipalities: where, why and how? Short paper	<i>Kate Snaddon</i> Development of an illustrated field manual for the classification of wetlands and river channels according to the National Wetland Classification System. Short Paper
11h55	Keynote Jeremy J Midgley Heuweltjies, origins and biogeochemical consequences Chair: Nicky Allsopp	
12h15	Closing Remarks, Prizes & Packed lunch	

POSTERS FYNBOS FORUM 2010

Viewing Daily

MAIN SESSION 4th August @16h00 – 17h00

Presenters Names are in Italics

No	Title	Authors
	WETLANDS & RIVERS:	
	Working for Wetlands – West Coast: Fighting for Verlorenvlei since 2006	<i>Marius Kieck</i>
	Determining the impact of water abstraction on the distribution of <i>Heleophryne rosei</i> populations in Nursery, Skeleton and Window streams of Kirstenbosch National Botanical Garden (KNBG)	<i>Alana Hendricks</i>
	Invertebrate assemblages of the Ratel River, Olifants River Catchment	<i>Jeanne Gouws</i>
	Wadriif Saltpan: An overlooked ephemeral pan with significant conservation value	<i>Marius Wheeler</i>
	The Tsitsikamma Rivers Macroinvertebrates Research Project	McIlleron, G.W. ¹ , de Moor, F.C. ² and Bellingan, T.A. ³ (<i>Cindy Lee Cloete presenting</i>)
	EDUCATION:	
	Meaningful nature experiences: The ultimate catalyst for reconnecting to biodiversity?	<i>Zylstra, M.J</i> ^{1*} , <i>Knight, A.T.</i> ¹ , <i>Esler K.J</i> ¹ and <i>Le Grange L.</i> ²
	The Cape's most critical flora strut their stuff to save the species: Environmental awareness in a garden bed	<i>Julia Dabush</i>
	Teens need nature too: programmes, poetry and possibilities in Cape	<i>Alice Ashwell</i>

	Town	
	School-based weather monitoring	<i>Hadley Lyner & Nicky Allsopp</i>
	CONSERVATION:	
	Rediscovering the Cape Rhinkals: The search for a locally extinct species	<i>Grant Smith</i>
	Application to Land care by a Conservancy for funding	<i>Heather Epstein¹, Andreas Groenewald², Di Marais¹</i>
	CapeNatures Regional Ecological support Team –the Interface between management and science	<i>Candice Mostert</i>
	What happened to your warm fuzzy feeling? An update on the use of donations from Interfaces 2008 for spekboom restoration in the Baviaanskloof	<i>Zylstra, M.J.^{1,2} Van den Broeck, D. ¹, Zwinkels, M.B. ^{1*}</i>
	Groot Winterhoek freshwater stewardship corridor	<i>Riaan van der Walt</i>
	Threatened Erica species of the Central Section of Table Mountain National Park	<i>Smith, Richardt J.</i>
	Protected Area Sensitivity Analysis & Zonation: Application in the City of Cape Town, with relevance to assessing small protected areas in an urban environment.	<i>Purves, A. B.¹ & Holness, S²</i>
	Cape Town's unique biodiversity in peril	<i>Rebelo, A.G., ¹ Holmes, P.M.^{2*}</i>
	DATA:	
	A CYBERTRACKER Key to the alien flora of the Cape Peninsula and Cape Town	<i>Rebelo, A.G. , ^{1*} Liebenberg, L.² & Ivey P.³</i>
	Fynbos at your fingertips	<i>Heeleman S & KJ Esler</i>
	ECOLOGICAL PROCESSES:	
	Carbon stocks in fynbos, pastures and vineyards on the Agulhas Plain	<i>Anthony. J. Mills^{1*}, Sarah-Jane. C. Fox², Ryan Chisholm³, Jacqui. D. Stephenson²,</i>

		Roger Bailey ⁴ , Andrew. D.
	Drought-tolerance of the alien tree <i>Acacia mearnsii</i> and the native tree <i>Brabejum stellatifolium</i> in Fynbos Riparian Ecotones	Swift, Cheryl C. ¹ , Jacobs, S.M. ^{1*} and Esler, K.J. ^{2,3}
	Drought-tolerance of Selected Alien and Native Tree Species in Fynbos Riparian Ecotones	Crous Casper J ^{1,2*} , Jacobs, S.M ¹ . and Esler, K.J. ^{1,2}
	<i>Soil respiration in terrestrial and riparian environments in the fynbos biome</i>	Kamboj Kambal, Oliver ¹ , Jacobs, S.M. ^{1*} and Mantlana, K.J. ²
	ALIENS:	
	Is the beautiful waratah (<i>Telopea speciosissima</i>) an emerging invasive alien plant in fynbos?	Tshivhase Tshoshovho, Ernita van Wyk, Iain Olivier
	A survey of alien fish fauna in the central section of the Table Mountain National Park.	Byron Loubser
	Evaluating two Australian <i>Melaleuca</i> species as eradication targets in a fynbos reserve. Looking beyond population data.	Llewellyn Jacobs
	Ecological impacts of invasive alien plants in fynbos and its relation to fire: Lessons from the Cape Peninsula	Blanchard, Ryan ^{1,2*} , Euston Brown, D. ¹ , & Hoffman M.T. ¹
	National Invasive Alien Plant Survey	Kotzé, JDF ^{1*} , Beukes, BH ¹ , Newby, TS ¹ and Van den Berg, EC
	Seed rain and seed bank status of <i>Acacia saligna</i> across a geographical gradient in South Africa.	Strydom, M. ^{1*} , Esler, K.J. ¹³ , Wood, A.R. ²³ , Impson, F. ²⁴
	Addressing aquatic invasions in the City of Cape Town	Rhoda, Chandre.*, Stafford, M.L.
	Fynbos Riparian ecosystem function and IAPs	Minette Naudé ^{1*} , Jacobs, S. ¹ Esler, K.J. ¹
	Determining the resource requirements to eradicate <i>Amietophrynus gutturalis</i> from the City of Cape Town	Otto Beukes
	<i>Achatina zebra</i> as an alien species	Sa-eed Slamdien
	A comparison off the occurrence of <i>Linepithema humile</i> in pristine and disturbed areas at Kenilworth Racecourse Conservation Area	Qhawekazi MKabe

	The detection and spread of <i>Lythrum salicaria</i> in the Liesbeek River System	<i>Shaun du Plessis</i>
	ECOSYSTEM SERVICES:	
	An economic evaluation of the impact of restoration on ecosystem services in the Kromme River System, South Africa	<i>Katie Gull</i> ^a , Anthony Leiman ^a
	A hydrological evaluation of the effects of restoration on ecosystem services in the Kromme River System, South Africa	<i>Rebelo, Alana J.</i> ^{1*} , Cowling, R.M. ² , Esler, K.J. ¹ , Le Maitre, D. ³

WORKSHOPS

3rd August 2010:

Workshop 1:

Restoration Research and Practice Workshop

Key words: ecological restoration, threatened ecosystems, collaboration

Holmes, P.M., Biodiversity Management Branch, Environmental Resource Management Department, City of Cape Town; patricia.holmes@capetown.gov.za

The first objective is to present the outcomes of the first restoration research and practice workshop (Kirstenbosch, November 2009) that focused on threatened lowland ecosystems, and open the floor to further inputs, especially on priorities for restoration research. One goal not achieved at the first workshop was to produce a protocol for collaboration in restoration practice. A task team has since developed a draft collaboration protocol and this will be presented for discussion, with the aim of improving this protocol (second objective). The third objective is to gather information on restoration work, or attempts, and find out whether these have been documented or not. Please bring any information along to the workshop. The aim is to build up a database of information on ecological restoration to help guide future projects. Managers, researchers, landowners and others interested or active in vegetation restoration should participate in this workshop. Please email me should you wish to receive a copy of the first workshop proceedings prior to the Fynbos Forum.

Workshop 2:

A Facilitated Screening of Biodiversity Films for Education and Advocacy

Key words: film, communication, advocacy, outreach, facilitated screening

Facilitation by **George Davis**, Mainstreaming Biodiversity, SANBI, G.Davis@sanbi.org.za, and possibly Laurence Dworkin, Series Producer, STEPS

Nature Conservation is an endeavour driven by a conglomerate of human dynamics, from passion and insight, to curiosity and pragmatism. Understanding these different facets of human involvement is important for

developing good practice in the care and management of biodiversity so that it can be woven into the fabric of modern, and potentially alienated living. . Mainstreams of policy, planning and regulation, in order to be effective, are reliant on a public that is both understanding, and understood. Effective two-way communication is an essential tool .

In a collaborative partnership that explores advancing public participation in the conservation debate, SANBI has joined with a social development ngo, STEPS*, to produce a range of audio-visual material for use by both existing and prospective vehicles in biodiversity advocacy, education and outreach. A SANBI/STEPS team currently producing a set of films that profile issues that are can contribute to a broad base of understanding in the general public. CareTakers is the first tranche of contributions to this larger goal, a set of eight short films portraying the involvement of driven individuals, each deeply involved in different aspects of caring for nature in South Africa.

The STEPS model is based on a process referred to as “facilitated screening”, for which outreach agents are trained as facilitators for stimulating and guiding discussion triggered by appropriate choice of screened audio-visual material. STEPS has used this methodology very successfully over the last decade in a southern African-wide communications campaign in the field of HIV and AIDS. The SANBI/STEPS partnership is now exploring this approach to communicating biodiversity issues.

The set of eight short films (10 to 15 minutes each) comprising CareTakers, will be used to lever interest and funding for production of more material, and for the development of an outreach programme to support facilitated screening in support of existing environmental education, outreach and mentorship programmes.

In this workshop you are invited to view some of the material developed in the CareTakers series, and engage in the spirit of a facilitated screening for discussion around the content, the methodology, or any other aspects of the process that emerge as important.

The titles to be screened during the workshop will be advertised in the programme of the 2010 Fynbos Forum, but all eight will be made available for viewing during the conference.

Workshop 3:

Game farming in the Fynbos and the management of resultant risks for Biodiversity Conservation

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Improved translocation techniques have made it increasingly safe to translocate game taxa over large distances, even between continents. Unfortunately many game translocations have taken place without due consideration of actual and potential consequences. Inappropriate and irresponsible translocations of closely related taxa into the natural ranges of one another poses major genetic risks. These risks include the possibility of outbreeding depression, of hybridization between species, between subspecies, and the mixing of ecotypes with the possible resultant loss of local genetic fitness due to the modification or loss of local gene adaptations (or alleles). A further great risk is the transmission of diseases and parasites to areas where they previously did not exist and these pose considerable threats to the wildlife, and in some instances even to domestic livestock, of the areas into which they have been introduced. Yet another major risk is that an introduced taxon often has the potential to cause considerable and, in some instances, irreversible ecological damage whether it be in the form of substrate or habitat destruction, or even out-competing local taxa. There is thus a need for those interested in the maintenance of natural biodiversity to establish guidelines and principles for the translocation of biota so that no one element poses a conservation threat to any other. It is with this in mind that we would like to facilitate an engagement with the game industry and interested and affected parties to explore the development of sound norms, standards and incentives to regulate the movement of those mammals which are of the greatest importance to the game industry, namely indigenous South African mammalian herbivores, and those mammals which could pose a threat to them and which may pose a threat to Fynbos communities.

Target audience: Authorities, Land-owners, game-industry and interested individuals.

Outcomes: The aim of the workshop is to create a platform for the relevant authorities and representatives of the industry to exchange ideas on principles and to agree on a practical way forward for all involved.

Workshop 4:

Fynbos riparian zones: Is restoration of function implicit in restoration of structure?

Key words: riparian ecotones, ecosystem services, soil processes, microbial diversity,

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Riparian zones are some of the most threatened ecosystems on earth, the result of a multitude of disturbances acting singly or in concert to change structure and function. In South Africa riparian degradation due to invasion by woody alien invasive species has received much attention due to the declines in water supply and threats on native biodiversity. Large landscape-scale restoration programmes such as Working for Water have set out to restore riparian structure in fynbos riparian zones, however, it is more complex to measure whether ecosystem function has also been restored, or indeed whether and how the ecosystem services associated with riparian zones have changed with invasion and clearing of alien species. In addition, one has to ask whether all woody alien species are the same? *Acacia* spp. invading fynbos riparian zones are putative nitrogen fixers, and are known to change ecosystem functioning elsewhere, yet the consequences of elevated nitrogen and modified microbial diversity has not been adequately quantified. On the other hand, some *Eucalyptus* spp. are allelopathic, which may have consequences for soil functioning and plant species diversity in restored riparian zones. Restoration trajectories may be modified by other disturbances such as fire, lowering of surface runoff and agricultural activities. We intend to discuss these challenges within a workshop setting. Specifically, we will explore what ecosystem function means for riparian zones, and links to ecosystems services, how these parameters change with invasion of woody alien invasive plants and the consequences of clearing for riparian functioning and water resource management, especially given potential synergistic effects of alien invasives, fire, agricultural modifications and global climate change. Our target audience is river ecologists, conservation ecologists, conservation managers, restoration ecologists and water resources managers. We aim to summarize the main conclusions from the workshop in the form of a popular article accessible to all stakeholders.

Workshop 5:

Launch of the Conservation and Environmental Managers Forum

Key words: Communication Network, Resource Network

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When initiated in 2009, the Conservation and Environmental Managers Forum was designed to complement the Fynbos Forum community by allowing conservation and environmental managers to discuss crucial conservation activities taking place and sharing this information with others so that there is efficient and effective information assimilation in the conservation sector of South Africa. The basis of this approach is that biodiversity science and conservation management are very complex and specific disciplines that need to be housed in appropriate forums. The scientific community networks are very organised but the management community needs a platform.

With conservation managers and environmental practitioners spread throughout South Africa, some very experienced and others new to the sector, the Forum's purpose is to debate the application of the biodiversity science within a management context where managers first work through and tease out the issues related. Thus when presenting work at the Fynbos Forum, the issues have been debated amongst managers before we bring the 2 disciplines together for debate on the issue. Example: if a conservation manager is sitting in George and needs help on a matter which he needs a broader perspective on, he can send the query to the forum. The Forum administrator will then distribute the query to the forum for feedback which then goes to the manager in George. The manager in George then decides what information he wants to use to take his decision, but we then know that he has been given a wide range of options to choose from, from experienced sources in real time for him/her to take efficient decisions.

WORKSHOP 6: (Wednesday 4th)

Invasive Alien Species Symposium

Key words: challenge, collaboration, prioritization and integration

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Invasive species is the second biggest threat to biodiversity, this is a well-known fact. The challenge lies in our response to invasives and the level of collaboration and communication amongst stakeholders. The objective of this symposium is to reach out to different stakeholders by providing a platform for communication between the various organizations through sharing lessons and building partnerships.

Two of the most important aspects of winning the battle against alien plant invasions are clear priority setting and integrating various management options. Working in the right place, at the right time, focusing on the right species and choosing the most appropriate management options are ongoing challenges that managers grapple with. At the first CAPE IAP Planning workshop in April 2009 the national alien plant survey and prioritization process were presented to a wide range of stakeholders. CIB post-doc students presented their research results on more efficient priority setting and optimizing the priorities. Integrating the different management options were discussed with the focus on integrating fire and bio. What happened since April 2009? This workshop is to reflect on the progress with implementing the recommendations of the previous workshop and to continue the conversation on IAS management options and priority setting. The workshop will be preceded by presentations relating to IAP management options and priority setting.

FIELD TRIP OPTIONS

Thursday 5th August 2010

Leave @ 11h45 with packed lunches

1. **CapeNature Corridors Program, Greater Cederberg Biodiversity Corridor and West Coast Working for Wetlands project:** **NO COSTS**

Focus: GCBC & working on wetlands in this area.

Leaders: Johan Burger, & GCBC Team

Route: Citrusdal, Eendekuil, Redelinhuis, Vensterklip & back (about 100 km, and about 3.5hrs)

Features: From Citrusdal to Eendekuil view the start of the WfWet project
Eendekuil to Goerap bridge confluence where three rivers meet.
Redelinguys to Vensterklip to visit the WfWet birdhide
Vensterklip to baboon point to view the rock art paintings

Participants: Maximum 25 people

Transport: Share transport and on roads so bakkies and sedans are fine.

2. **Groot Winterhoek Freshwater Corridor – freshwater and biodiversity issues of the Twee river:** **NO COSTS**

Focus: Freshwater and biodiversity issues of the Twee river

Leader: Riaan van der Walt, Martine Jordaan and Jean Gouws

Route: Citrusdal – over Middelberg pass to Twee river (two stops) and Tanffontein farm (future Stewardship site) one stop (about 60 km and taking about 2.5 hours))

Features: Threats to the Twee river redfin and Twee river Galaxias and conservation efforts in Twee river catchment

Participants: Maximum 25 people

Transport: **4 x 2 Bakkies**

3. Potato and Rooibos best practice initiatives – Biodiversity & business: NO COSTS

Focus: Visit to Rooibos and Potato Biodiversity Best Practice Farms

Leaders: Sean Ranger and Gert Pretorius

Route: Citrusdal to Clanwilliam to Graafwater to Leipoldtville.

Features: We will travel to Sandberg where we will view a typical commercial potato production system that is participating in the Biodiversity Best Practices Initiative. We will also stop at Seekoeivlei between Clanwilliam and Graafwater to look at some Rooibos Best practices in action. Also how we try to implement an ecosystem-wide approach by getting neighbouring farmers to collaborate on certain issues.

Participants: **Max 40**

Transport: **4x4 vehicles will be required.**

4. Rock Art at Warmhoek farm, Clanwilliam: Transport & R60 - R80 numbers dependent

Focus: Rock art

Leaders: Prof John Parkington

Route: Citrusdal to Clanwilliam. (50 km) and 3 hour walk

Features: Rock art at Warmhoek farm, Clanwilliam

Participants: Maximum number 40

Transport: Shared transport

5. Pollination research in agricultural and natural areas around Cederberg: NO COSTS

Focus: Pollination research in agricultural and natural areas around Citrusdal

Leaders: Roseanne Stanway and Madele Mouton

Route: Farming areas around Citrusdal

Features:

We will visit deciduous fruit orchards and natural areas around Citrusdal. On the interface between agriculture and nature, we will look at how nature is supporting agricultural production through pollination and discuss whether or not there is room for ecosystem services as conservation incentive.

We will visit natural areas around Citrusdal to investigate interactions between indigenous plant species and their pollinators. Hopefully there will be spring flowers in abundance and there will be a diversity of plant species to look at. In the veld we will look at how floral traits are used to predict pollinators, and we will discuss whether this game played by all field biologists is actually an accurate prediction of pollinator visitation. We will also discuss the roles of specialists and generalists within a community context, and what these interactions mean for community resilience.

Hopefully it will be a sunny day and the pollinators will be out in action in the veld. You can count on beautiful scenery on this fieldtrip!

Participants: No restriction

Transport: Traveling on gravel road, so sharing high clearance vehicles preferably.

PAPER ABSTRACTS

Tuesday 3rd August: Opening Presentation:

Greater Cederberg Biodiversity Corridor: Reflection on the establishment of a corridor

Key words: partnerships, corridors, awareness

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Historically biodiversity conservation was focused at the reserve or park level. The challenge was that most of the biodiversity and ecosystems under threat were outside the formally protected areas and in addition to that

specific challenge the anticipated impacts of climate change would exacerbate the problem. The expansion of agricultural lands has been a key factor in the loss of biodiversity, fragmentation of habitat, degradation of ecosystems and the associated ecosystem function loss. In order to address the challenge of biodiversity loss, degradation of ecosystems and fragmentation efforts had to be scaled up to the landscape level and the scaling up effort would have to include private and communal land and various other stakeholders.

The Greater Cederberg Biodiversity Corridor (GCBC) is a landscape level conservation approach to address these key issues. The GCBC was implemented under six strategic directions i) expansion of protected areas, ii) industry engagement, iii) local economic development, iv) human well being, v) awareness and vi) coordination. Corridors are partner dependent and the successful implementation of these types of initiatives relies heavily on its ability to mobilize civil society as a means to support biodiversity conservation and sustainable livelihoods.

Wednesday 4th August: Opening Plenary Session:

Is the Clanwilliam cedar doomed to extinction?

Key words: Cedarberg, cedar, endangered species

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The Cedarberg Mountains are situated approximately 200 km north of Cape Town on the west coast of South Africa. *Widdringtonia cedarbergensis* is a rare tree endemic to these mountains listed as an endangered species, threatened with extinction, if the causal factors for its decline continue to operate. Since the 1800's there have been many accounts of human exploitation and fire as the primary reasons for the decline of the species. Here I look at the results of ecological, physiological and genetic research on this species over the last 20 years to ascertain the extent to which the causal factors for the decline have been identified and are being addressed.

CAPE Phase 2: The Road Ahead

Keywords: Cape Action for People and the Environment/ CAPE, Cape Floristic Region, Partnerships

Mandy Barnett, CAPE, SANBI, Private Bag X7, CLAREMONT

Formalised in 2001, the CAPE partnership has catalysed and led an astonishing number of initiatives over the past nine years. These have been supported through large donor investments from the GEF in the Agulhas Biodiversity Initiative and the Biodiversity Conservation and Sustainable Development Project, investments from the CEPF and TMF, and through the realignment of partners' own resources.

C.A.P.E. Invasive Alien Species Strategy: the future

Key words: implementation, sustainability, challenge

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The Global Environmental Facility/World Bank funded C.A.P.E. Invasive Alien Species strategy was produced in 2009. Producing a strategy does not automatically imply implementation. Key questions are to be answered before one can be reasonably sure that a conducive environment for sustainable implementation has been created. Who will assume responsibility for implementation? How will the strategy be incorporated into the business plans of the implementing agencies? How will cooperative governance actually play out in practice? How are we tracking progress – or the lack thereof?

The C.A.P.E. Invasive Alien Species strategic implementation model has been designed to ensure sustainability and provides a framework for collaboration and alignment. The challenge is now to collectively work towards realizing the vision "By 2020, the negative impacts of Invasive Alien Species on the Greater Cape Floristic Region's economic, ecological and social assets will have been significantly reduced; no further indigenous species will have been allowed to be driven to extinction by IAS, and sustainable programmes will be in place so as to minimise impacts in the future."

The future might require stakeholders to critically evaluate their priorities to ensure alignment with the priorities identified by the representative working groups and task teams. Closer collaboration with academic and research institutions and thereby building the research-management interface is imperative for the future success of management actions. Ongoing communication and coordination is required to ensure alignment and monitor progress.

The goal of CAPE, which is a 20 year programme, is that the cooperation of capable institutions ensures that the biodiversity of the CFR is conserved, restored, effectively managed and sustainably utilised, delivering significant benefits to the people of the region in a way that is embraced by local communities, endorsed by government and recognised internationally.

2010 marks the start of Phase 2 for the programme, and a time when we are taking stock, noting achievements and disappointments, and planning to reenergize and refocus the partnership for the years ahead.

This presentation will showcase some of the highlights and challenges faced over the past few years of implementation. This will include the partnership's insights into governance, our breakthroughs in biodiversity mainstreaming, our work in corridor initiatives across the CFR, our commitments to capture the learning and to continue to build participation, our successes in building capacity and the new leaders who are emerging as a result of some of our efforts, and the challenges we face in being able to definitely conclude that we are in fact making a difference.

PARALLEL SESSION 1: Invasive Alien Species Symposium:

Eradicating the Indian House Crow in the City of Cape Town

Key words: threats, support, combined effort

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The Indian House Crow (*Corvus splendens*) an invasive alien bird species originating from the Indian Sub-continent successfully invaded many countries around the world, including South Africa. House Crows were first recorded in Durban in 1972 and 12 years later the population was estimated to be in the region of 8000. This alarming situation triggered a successful control programme reducing the population to less than 30 birds in 2010.

The Cape Town House Crow population established itself in the early 1980's and increased to approximately 10,000 in November 2008. Attempts over the past seven years to eradicate the species were unsuccessful mainly due to unsustainable funding. In 2009 the City finally took note of the mounting problem and associated threats and committed to support complete eradication of the species. The programme restarted in December

2009 under the auspices of the C.A.P.E. Invasive Alien Animal Working Group and with support from the National Working for Water Programme, Cape Nature, the PercyFitzPatrick Institute of African Ornithology DST-NRF Centre of Excellence, BirdLife South Africa and the Cape Bird Club. This joint effort by the City of Cape Town and NCC Environmental Services is finally starting to produce results.

This presentation will discuss the management strategies, control methods and results the project achieved so far.

Bird species composition and functional groups foraging on alien and indigenous shrubs in the Cape Floristic Region.

Keywords: Alien invasions, birds, seed dispersal

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Alien shrubs with fleshy fruit displays may out-compete indigenous species with similar fruits for dispersal of their seeds ingested by birds. We examined this premise by comparing the numbers of different bird species and those included in different frugivore classes and body mass subclasses as foraging fleshy-fruits of two alien (*Solanum mauritianum* and *Lantana camara*) and two indigenous (*Chrysanthemoides monilifera* and *Olea eurpaea subsp africana*) shrubs. Observations, comprising 1748 records spread over 270 surveillance hours, were conducted on mixed populations of the alien and indigenous shrubs at four different sites (Cape Town, Paarl, Hermanus and Swellendam) in the Cape Floristic Region. A residual maximum likelihood variance components analysis (REML) tested for significant differences in the total numbers and composition of bird species richness foraging on alien and indigenous shrubs as well as for in differences in frugivore and bird body mass. There were no significant differences in the total numbers of bird species foraging fruits on the alien and indigenous shrubs, but differences in the relative abundance of different bird species foraging on the alien and indigenous shrubs were apparent. For example, the Cape White-Eye *Zosterops capensis* and the Speckled Mousebird *Colius straitus* displayed a greater preference for fruits on alien than indigenous shrubs whereas the Red-winged Starling *Onychognathus morio* foraged selectively on indigenous fruits. Comparisons between the different frugivore classes of birds showed that the greatest numbers of birds included in the heavily and lightly frugivore classes foraged fruits of the indigene *O. africana* followed by the aliens *S. mauritianum* and *L. camara* and the indigene *C. monilifera*. Within each frugivory class, there were also significant differences between bird species of different mass foraging on the alien and indigenous shrubs. For example in the heavily frugivore class heavy birds (>150g) foraged *S. mauritianum* fruits in significantly greater numbers than other shrubs whereas moderately heavy (50-150g) and light (<50g) birds foraged *O. africana* fruits in significantly greater numbers than other shrubs. Differences in bird foraging times, foraging intensities and dispersal indices between alien and

indigenous shrubs for the different bird frugivore classes, body mass subclasses and individual species are also being examined.

Testing three hypotheses for the success of weedy *Oxalis pes-caprae* in the native and introduced range.

Keywords: disturbance, herbivory, competitive ability

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Understanding why some exotic species flourish more than others and how they establish greater densities in their introduced ranges relative to their native ranges are important issues for basic community ecology and the management of invasive species. Proposed hypotheses to explain successful establishment and spread of invasive species include advantages that invasive species experience in their introduced ranges, such as release from natural enemies, increased competitive ability, and increased colonization due to disturbance. Most research exploring these hypotheses has focused exclusively on communities into which invasive species have been introduced, however, we can attain a better understanding of processes underlying successful invasions by employing comparative studies of invasive species in their introduced and native ranges. Furthermore, species that are also invasive in their native range may provide a novel opportunity to examine the processes promoting invasibility by allowing comparisons between native non-weedy populations and weedy populations and populations invasive elsewhere.

We will test three hypotheses for exotic plant invasions success: (i) escape from specialist insect herbivores, (ii) the evolution of increased competitive ability (EICA), and (iii) a greater response to disturbance in the introduced range using the South African native species *Oxalis pes-caprae*, a cosmopolitan weed in many parts of the world, including its native range in South Africa.

These hypotheses will be tested using parallel manipulative experiments across distribution ranges in South Africa and USA, and by conducting reciprocal transplants between weedy and non-weedy populations within South Africa. We will experimentally manipulate insect herbivore pressure, interspecific competition, and create small-scale disturbances to determine how these factors affect the performance of *Oxalis pes-caprae*.

Examining the role of these three factors in the invasion success of *Oxalis pes-caprae* can help develop management strategies that are specific in both its native range in South Africa as well as its introduced range elsewhere.

Priorities for managing invasive alien plants in the fynbos biome

Key words: Biological control; pines; fires; Working for Water; forestry

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Invasive alien plants are a serious threat to the sustainable conservation of fynbos ecosystems, and their control forms a major component of the management of these ecosystems. Control operations need to be prioritised to ensure that the maximum impact on the problem is obtained from limited funds. This paper outlines the invasive alien plant problem in fynbos, with a focus on the “big 3”(hakeas, pines and wattles), and the drivers of invasion (fire, forestry and development). It then explores the issue of prioritization from three angles: spatial, species, and methods.

Spatial prioritization takes place over a range of scales, from national down to individual land parcels, but other issues have to be considered as well. These include how to deal with land parcels that include both state and privately-owned land, and how to prioritise and trade off forms of land use that may promote invasions (eg forestry with pines or wattles).

Prioritization exercises need to rank the target species in terms of their importance as well, and to develop suitable species-specific strategies to control these species. This could include the identification of weeds of national significance (WONS – a strategy followed in Australia), and approaches to deal with species where conflicts of interest exist (for example with pines or wattles).

Managers have a range of approaches from which to choose when controlling invasive alien plants, including mechanical clearing, fire, chemical control and biological control. The relative contribution of each of these approaches needs to be prioritised.

Based on the above synthesis, a number of broad principles need to be agreed on. These include the need for adequate planning (setting explicit, measurable, time-based goals, and regular revisions); building in flexibility to accommodate unforeseen circumstances (for example wildfires); and maximising benefits at a landscape scale, including finding ways of making trade-offs between forestry, fire, invasion, and water impacts; and between job creation through mechanical clearing, and biological control.

Cost-effective, tangible approach for mapping IAP species on reserves, and applying best practice criteria to guide management actions on reserves – Kogelberg case study

Keywords: Densities; Invasive Alien Plants; Mapping; Prioritization; Veld age

Therese Forsyth, Helen de Klerk (CapeNature, Scientific Services)

Invasive alien plant (IAP) species pose a major threat to the biodiversity of the fynbos, as they can cause the fragmentation, as well as the destruction of natural habitats. Clearing and controlling these IAP species is very costly and the funding is limited. Therefore, prioritisation of areas to be cleared should be considered carefully to maximise benefit. The occurrence of wild fires also affects where clearing should take place. Studies have been undertaken to prioritise clearing at both primary and quaternary catchment level, but these priorities are too coarse to guide activities at natural biology aliens (NBAL) area level on reserves. Knowledge of the distribution of IAP species on the reserves is therefore essential for such prioritisation. CapeNature has recently developed and implemented a standard spreadsheet to capture data in a consistent format across all reserves in the province using spatial mini-compartment layers that cover the whole reserve. This mapping was undertaken mainly as a desktop exercise using reserve-based experts, and then followed by field verification where necessary. Recent high-resolution aerial photography guided the desktop mapping as some IAP species are quite visible. A prioritisation exercise was undertaken for Kogelberg as a case study. The criteria used for this exercise were workshopped based mostly on expert opinion and experience. The criteria ultimately selected looked at assessing slopes, accessibility, species densities, and veld age. The main input layers used were the IAP species map, veld age map, and 20m digital elevation model (DEM). The IAP species map highlighted three main species, namely *Pinus*, *Acacia* and *Hakea* spp. and therefore only these species were used. The analyses summarised four final layers; slopes, *Pinus* densities and veld age, *Acacia* densities and veld age, and *Hakea* densities and veld age. Individual weights were allocated for each criterion in each of these layers, and then an overall weight for each of the four layers. The final product is a map showing priority areas for clearing.

What is needed to maximise the efficiency of our Invasive Alien Plants (IAP) Management in the Cape Floral Region (CFR)?

Keywords: Invasive alien Integration

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IAP management in the CFR is complex and expensive. In order to make the most efficient decisions relating to when, where and how some critical issues need to be addressed. It is essential that there is integration of the planning of the various funding sources and the implementing agents, and that a common strategy is adopted. This needs to be backed up by some critical information including accurate vegetation maps, veld age maps and IAP species distribution, age and density. We also need to understand which catchments are our priorities as well as information regarding the distribution and effectiveness of our Biocontrol Agents. What we have and what is still needed and the implications will be discussed.

Modelling alien plant species invasions in the Cape fynbos and Western Australian kwongan: yours, ours and theirs

Keywords: invasive alien plants, distribution modelling, climate change

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The Cape fynbos and Western Australian (WA) kwongan vegetation have experienced reciprocal species introductions which have resulted in some alien plants becoming major invaders. We modelled the distributions of: *Watsonia meriana* (Cape to WA), *Anigozanthus flavidus* (WA to Cape), *Acacia cyclops* (WA to Cape), and *Acacia pycnantha* from eastern Australia (to both WA and Cape). We used three modelling approaches: Boosted

Regression Trees which uses presence and absence, *Maxent* which is a presence-only machine learning technique and *Climex* which uses basic plant physiology to project distributions. We projected distributions for South Africa and Australia using the home range information and some basic climatic variables. The potential distributions were generated for three points in time: current conditions, 2030 and 2070 using climate change projections produced by two models (CSIRO, MIROC) and two emissions scenarios from the IPCC assessment. We used information on climatic similarity and the modelled response functions for the driving climatic variables to understand and assess how realistic the projections were. All three modelling techniques resulted in models that matched the data well and gave reasonable projections of the current potential distributions except for *Acacia cyclops*. The issue with this species was that it naturally occurs along the western and southern coasts of WA. When the models were fitted using a domain based on Köppen climate zones, the response functions were biologically unrealistic and the projected distribution included most of northern Australia. When all of Australia was used, there was a better fit but with limited robustness. Modelling of species distributions is fraught with numerous difficulties which make predictions highly uncertain. The use of climate matching tools together with an understanding of the response functions enabled us to make predictions for both current and future climates with much greater understanding of the strengths and limitations.

Kernels, convolution and tasseled cap: methods for mapping and monitoring land use and invasive vegetation on the Agulhas Plain

Key words: remote sensing, invasive alien plants, land use mapping

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Land cover is by no means static. Urbanization, spread of agricultural practices, fire and invasive alien plants (IAPs) are some examples of factors which transform land cover over time. Conservation planners and land management agencies need up-to-date information on land use and land cover change in order to formulate policies and make appropriate resource management decisions. Typically, land use information is not updated often enough because it is a time consuming and expensive process. Mapping landscape regimes must be a regular process.

For programmes such as Working for Water, land use and land cover mapping needs to be performed frequently to keep up with the change in the spread and eradication of IAPs. This study will focus on mapping and

monitoring changes in the distribution of IAPs using remote sensing (RS). RS is an inexpensive and time effective technique. Three RS techniques are evaluated to determine a suitable means of classifying land use, namely: NDVI, tasseled cap, and supervised classification. The results indicate that NDVI is the most accurate method for mapping vegetation, while tasseled cap and supervised classification are more suited to monitoring agricultural land. The extent of invasion on the Agulhas Plain will be presented as a case study.

Mainstreaming Invasive Alien Plant considerations : City Of Cape Town

Key words: important threats, challenges, mainstreaming

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The City of Cape Town is home to 9 of the 24 Critically Endangered ecosystems (as defined by the National Environmental Management, Biodiversity Act of 2004) in South Africa. Almost 13 of the plant species found in the city are globally extinct (at least in the wild), out of a total of 47 in South Africa: Thus 3.4% of the world's 380 extinct plant species occur within Cape Town. A further 152 threatened species (Red Data List: Critically Endangered, Endangered and Vulnerable) occur in the area. The most important threats to this exceptional biodiversity asset are land transformation and invasive alien plants (IAPs).

Managing IAPs in an urban environment poses unique challenges to managers and decision-makers. These challenges not only include the potential impacts of IAPs on the biodiversity and socio economic well-being of the City of Cape Town, it also includes dealing with the various role-players' needs and aspirations. The various city departments, government institutions and private landowners found within the boundaries of the city, are responsible for managing IAPs on their land, without the necessary capacity and understanding required to effectively address the problem.

Mainstreaming IAP management into decision-making, policies, budgets, planning and prioritization is a prerequisite for successful response to these challenges. The City of Cape Town's Biodiversity Branch embarked on a venture to turn the current unsustainable situation around in order to reduce the threats posed by IAPs.

Four decades of biological control of *Hakea sericea*: Can a stem-boring beetle make a significant difference?

Key words: *Aphanasium australe*, *Hakea sericea*, biological control

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A number of biological control agents have been introduced to control the alien invasive weed, *Hakea sericea* Schrad. & J.C. Wendl. (Proteaceae), in South Africa over the last four decades. These agents include a fruit weevil, *Erytanna consputa* Pascoe (Coleoptera: Curculionidae), a seed moth, *Carposina autologa* Meyrick (Lepidoptera: Carposinidae), a shoot-boring weevil *Cydmaea binotata* Lea (Coleoptera: Curculionidae) and more recently a flowerbud-feeding weevil, *Dicomada rufa* Blackburn (Coleoptera: Curculionidae) and a stem-boring beetle, *Aphanasium australe* (Boisduval) (Coleoptera: Cerambycidae). A strain of a local fungus, *Colletotrichum acutatum* (Penz) Sacc., has also been exploited as a mycoherbicide. Despite these biological control efforts the weed still persists and forms dense monocultures in mountain catchments, including remote areas, which makes mechanical control operations extremely difficult, and thus its potential to increase its range is greatly enhanced. Between 2001 and 2007 a stem-boring beetle was released into 57 *H. sericea* infestations in the Western and Eastern Cape. The beetle has successfully established at 36 of the release sites, five of the sites have been destroyed by wild fires, three have been chopped out and 13 showed no signs of establishment. An intensive long-term study at three of these sites, Slanghoek, Genadendal and Waboomskraal, is presently being undertaken. The beetle is looking particularly impressive at Slanghoek where 6.4% of the trees have died as a result of larval activity compared to 2.5% last year. Although it is still too early to predict the likely success of the beetle on *H. sericea* in South Africa the prognosis is good given the early signs of mortality at some of the sites.

Biological control of three Australian Acacia species: Impacts, Implementation and Integration

Keywords: Biocontrol, seed-reducing agents, Acacias

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Acacia mearnsii De Wild., *Acacia cyclops* A. Cunn. ex G. Don and *Acacia saligna* (Labill.) H. Wendl., are three of the most invasive and problematic Australian *Acacia* species in the fynbos biome. All three of these species have been the targets of biological control programmes for a number of years. Utilisation of some Australian *Acacia* species for commercial and agro-forestry has limited the selection of biological control agents for the group as a whole, and for the most part, agents which reduce the reproductive capacity of the plants have been the focus of the programme. Host-specific seed feeding weevils in the genus *Melanterius* have been released against each of the three *Acacia* species, and in one case, *A. saligna*, this is in addition to a gall-forming rust fungus, whereas gall-forming flies supplement the control of *A. cyclops* and more recently *A. mearnsii*.

This paper reports on the impacts of the agents on their respective hosts, as well as highlighting the importance of implementing agencies for re-distribution of control agents, and the necessity for an integrated approach in the management of these invasive plants.

The gall rust *Uromycladium tepperianum* on Port Jackson (*Acacia saligna*) – is it still working?

Keywords: biological control, long term monitoring, weed management

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The percentage of trees infected by the rust fungus, and average number of galls per infected tree, has been calculated from annual monitoring at permanent sites in the Western Cape for the period 1991 to 2010. Since 1995 almost all trees with a stem diameter greater than 50 mm at ground level have been infected. Trees reach this size at approximately 4 years. The incidence of infection of smaller, younger plants is lower. When consolidating the data for all the years, the average number of galls per infected tree increases exponentially with size of tree. Initially the average number of galls for the largest trees increased rapidly to approximately 800 in 1995, but has decreased since. This is associated with a decrease in density, confirming that infection levels is density dependent as is the case for many pathogens, and follows a typical predator-prey relationship curve. Average annual mortality rates remain high, but there appears to be increasing levels of recruitment into populations. Observations indicate that the survival of recruits may differ in different vegetation types, resulting in differences in tree density. It is concluded that *Uromycladium tepperianum* remains a highly effective biocontrol agent.

PARALLEL SESSION 2: Species Level Studies:

Floral Batesian mimicry leads to morphological divergence in *Disa ferruginea* (Orchidaceae)

Key words: Batesian mimicry, local adaptation, colour divergence

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About one third of all orchids have no rewards for pollinators and many of these attract their pollinators by superficially resembling other co-occurring plants which do offer rewards; This is known as Floral Batesian mimicry, and has been shown to occur in the orchid *Disa ferruginea*, which seems to mimic red *Tritoniopsis triticea* on Table Mountain and orange *Kniphofia uvaria* in the Langeberg mountains. We tested whether the red and orange coloration found in *Disa ferruginea* is indeed a result of local adaptation to different colored floral models in different geographic localities. Using a paired experimental design, we made reciprocal translocations between red *D. ferruginea* on Table Mountain and orange *D. ferruginea* on the Langeberg. Fitness of the paired red and orange plants was estimated at each site by recording pollinator visitations and time spent probing flowers for nectar. We also tested whether flower color and shape affects visitation rates by using paper models which differed in either colour or shape. Our reciprocal translocation experiments revealed significant native site advantage in both color morphs of *Disa ferruginea* and color experiments. In addition, a preference for pyramid-shaped inflorescences was observed in the Langeberg and cube-shaped inflorescences were preferred on Table Mountain. We conclude that local colour preferences by pollinators for different coloured model plants has driven divergence in the flower colour of *Disa ferruginea*.

The Red List of South African Plants at your service

Key words: Red List, threatened species, biodiversity information systems

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More than six years of effort culminated in the publication of the Red List of South African Plants earlier this year. This milestone publication is the first complete assessment of the South African flora, and the large volume of supporting data captured as part of the assessment process is already in use informing a broad range of conservation efforts.

A Red List is most valuable and relevant to conservation when it reflects up to date knowledge of species' status, and this knowledge is accessible to all. Since the completion of the plant Red List, at least eight species considered possibly extinct have been rediscovered, and new information on many more has become available. SANBI's Threatened Species Programme, together with the Biodiversity Information Management Unit are committed to ensuring that the Red List of South African Plants remains up to date and accessible by making available six-monthly updates on the SANBI website.

It will be presenting the Red List data available on the SANBI website, how to search and navigate to the data you need, as well as a few other useful online tools relating to Red List data developed by the Biodiversity Information Management Unit.

***Podalyria* – Trojan horse of the Fynbos**

Key words: Fabaceae, fire-survival strategy, morphological variation, species concepts

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Podalyria Lam. is one of the most impressive legume genera of the fynbos, easily recognized by its sweetly-scented, brilliant pink or white flowers and simple, often silvery hairy leaves. The genus is restricted mainly to the winter rainfall Cape Floristic Region, with one species extending eastwards into the summer rainfall area to southern KwaZulu-Natal.

Unlike the genus, which is easy to recognise, the species concepts within the genus have been problematic and uncertain ever since the genus was established in 1793. This is mainly due to the effect of fires on the plants and the time that herbarium specimens were collected. The marked difference in the leaves on old mature branches versus those on young vigorously growing coppice shoots (produced from a woody rootstock after a fire), together with the limited information given on herbarium sheets have resulted in a proliferation of species descriptions and names. The genus has therefore been in dire need of a thorough revision for over a century.

A taxonomic study of the genus *Podalyria* has recently been completed. Extensive field investigations of the taxa in their natural habitats formed an integral part of this study. The main findings of this research are presented.

Demystifying *Marasmodes*

Key words: Asteraceae, taxonomy, threatened species, threatened habitats

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The Cape Floral Kingdom's (CFK) riches are not just about show-stopping geophytes, ericas and proteas. Smaller, inconspicuous members of the flora also play an important role and are just as rewarding to study (if, of course, you can find them). One such example is the frequently overlooked CFK endemic genus *Marasmodes*, a member of the Anthemideae (Asteraceae). They are all rather inconspicuous woody shrubs or shrublets with sclerophyllous ericoid leaves and sessile discoid heads. As a result they are indistinguishable from the surrounding vegetation when not in flower. Furthermore, considering that they all flower during the dry autumn months, when few botanists are in the field, goes a long way in explaining why the species have been so poorly collected. Until 2009 only 7 species had been described but these have since been teased apart (Ortiz 2009) so that 11 species are now recognised (Magee & Manning 2010). All of the species are highly localised and largely found in agricultural landscapes where there is significant development pressure. It is for these reasons that focussed fieldwork in the form of CREW's Marasmodes DayTM was initiated in 2007. Through this campaign 7 of the 11 currently described species have been located, resulting in an increased understanding of the biogeography and ecology of this highly threatened genus.

PARALLEL SESSION 3: RESOURCE UTILIZATION:

Wildflower Farming in the Agulhas Plain – Friend or Foe for Fynbos?

Keywords: fynbos management; augmentation; plant conservation

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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. Fynbos wildflower farming is widely practiced, covering the second largest surface area, in the Agulhas Plain. Fynbos wildflower farming is associated to be a potential threat to fynbos conservation and at the same time seen as an opportunity for biodiversity conservation. This contradiction can be partly solved by the role fynbos farmers can play in conserving pristine fynbos areas, managed as intact wildflower populations on private property. By performing a vegetation survey, we focused on evaluating the impact of augmentation practices (burning, ploughing and broadcast sowing) on the structural and floristic attributes of wildflower veld. Although fire (or burning) has been thoroughly researched, augmentation practices unique to wildflower farming have not received similar attention. Consequently, current ecological understanding as to how such farming practices impact on fynbos structure and diversity is severely limited. Results suggest that natural and augmented fynbos differ in terms of growth form composition. Additionally, strong correlations exist between certain environmental attributes and specific growth forms. This investigation emphasises, once again, the complex interplay of ecological components prevalent in the fynbos community. The insights gained from this study will aim to facilitate sustainable fynbos farming activities for the Agulhas area.

The socio-economic value of restoring natural capital through alien removal on the Agulhas Plain

Key words: Ecosystem goods and services, valuation, Agulhas Plain

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The study estimates the value of the change in ecosystem goods and services which will be affected by the removal of invasive vegetation on the Agulhas Plain in the Western Cape. It assumes the sowing of indigenous fynbos species as part of the restoration process, and that the cleared areas will be used for sustainable wildflower harvesting. Ecosystem goods and services measured in the study include the additional income that landowners and non-landowners can make from the productive use of invaded land through fynbos and related industries, the value of the increase in water supply, the impact on employment, the opportunity cost of firewood, and the energy generating capacity of removed biomass as a possibility for cost recovery. Appropriate valuation

techniques attach monetary values to each of the abovementioned ecosystem functions. Subject to a comprehensive sensitivity analysis, a cost benefit analysis tests whether alien removal would add value to the Agulhas Plain.

Are we creating false expectations about the economic potential of wildflower harvesting? – The case of landless contractors on the Agulhas Plain

Keywords: wildflower harvesting, landless contractors, job creation

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CAPE has high expectations of the wildflower industry to be a driver of biodiversity-based rural economies (Gelderblom et al, 2003). It has been shown that wildflower harvesting is competitive amongst extensive land uses, but that it cannot compete with cultivation (Knoesen & Conradie, 2009). Here we investigate if fynbos is a viable livelihood for the landless contractors on the Agulhas Plain. Flower Valley Conservation Trust became a landless contractor after losing its farm in a fire in 2003. Despite industry experience and secure market access, the operation still took three years to turn profitable. During their third season, in 2008, variable costs claimed 63% of turnover. A further 27% went to fixed costs leaving 10% of turnover as remuneration for the contractor. Thus, on a turnover of R645, 621, the operator would earn R64, 000 a year, which is about the same as a farm foreman's salary. The difference is that a foreman takes very little risk, while the contract harvester bears all the risk of a fickle flower market and is not able to pass on any of it to his employees. Flower Valley employs nine workers at a rate of R70 per day (40% above agriculture's statutory minimum wage). Fourteen more contractors similar to Flower Valley could be accommodated on the Plain and they would generate 126 additional jobs. These extra jobs would bring additional wages of about R1.7 million per year into the community, but wildflowers still is an insignificant employer compared to agriculture.

Certifying compliance with a best practice code:

the Flower Valley experience

Key words: fynbos markets; best practice; certification

Lloyd, F., Bailey, R. and Rabe W.

Flower Valley Conservation Trust, Bredasdorp

Flower Valley Conservation Trust took its first steps on the sustainable harvesting journey in 1999. In 2003 the Agulhas Biodiversity Initiative (ABI) provided the Trust with the platform for a sizeable programme of research into the impacts of harvesting and the development of accredited training in methods of harvesting. Resources were provided to improve picker compliance with legislation as well as for an innovative on-line database for the recording of harvested fynbos for the industry.

A vital component of the programme is the development of incentives through markets for certified “sustainably harvested” product. Since 2005 a reliable outlet through a major retailer in the United Kingdom has changed the pattern of exports (and employment) of the packshed on the Flower Valley Farm on the Agulhas Plain. With funding support from the Table Mountain Fund, more markets are being explored and opened up. In May 2010 a major South African retail chain launched a Flower Valley range of bouquets. Central to the acceptance of product from the Flower Valley farm packshed by both these retailer chains is the assurance that harvesting is being done according to a code of best practice.

We will report on progress in setting up a support and verification system by Flower Valley Conservation Trust with input from other biodiversity-based businesses under the Green Choice Alliance. Challenges of branding will be touched on. Integration with CapeNature’s licensing system will be explained.

SynBioSys Fynbos: the wild rooibos case-study

Keywords: information system, wild rooibos, Fynbos management

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The Cape Floristic Region is a highly valued natural asset increasingly under threat from land-use pressures. *Aspalathus linearis* is one of the 68% of species endemic to the region, and is one of several Fynbos species harvested for commercial and livelihood purposes in the CFR. Ensuring the sustainable management of such wild-harvested species requires tools that ideally allow data storage, spatial visualization and functions for basic analysis. SynBioSys Fynbos is an information system containing data and information on wild rooibos and associated biodiversity. Based on the strengths of similar projects in Europe, and later in South Africa's Kruger National Park, the system is entirely custom-built for the Fynbos and South African contexts. Members and potential users from local conservation agencies have offered input for its refinement and have expressed support for the system. Its clean interface, simple GIS capabilities and easy functionality will appeal to a wide range of users, from science researchers to land-users and managers. SynBioSys Fynbos links into existing databases such as ALUKA and the SANBI database, but also to other web based applications such as Google pictures and Google Earth. As such the software offers a portal to existing information and databases to support sound land management decisions. The system will be launched in October with a series of training courses and is available free of charge to any land manager in the CFR.

The contribution of the FSC (Forest Stewardship Council) certification expressed in terms of costs and benefits to the conservation value of species diversity in the Southern Cape, South Africa

Keywords: FSC; plantations; species diversity

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The question that arises is whether Forestry Stewardship Council (FSC) certification is worthwhile for the South African plantation forestry companies, particularly in terms of the conservation value of species diversity. Plantations have been scrutinized over the years about their impacts that they have on the environment. However; FSC certification aims at sustainable development, through tackling economic, social and environmental issues. Uncertainties are arising concerning the direct and indirect benefits that the companies are supposed to be receiving by adhering to the 10 principles and 56 criteria (P&C) of the FSC. A cost-benefit analysis is used to determine whether the land set aside, set out under the FSC's principles and criteria, yields any benefits for the forestry companies. Currently the forestry companies are not receiving any price premiums for their certified products, and feel they are incurring more costs than benefits. Various vegetation types are found in the Southern Cape region, which are important in terms of species diversity. The Garden Route Critical Biodiversity Areas Map is used to determine the extent of the land-use impacts on the various vegetation types, described under the following categories: Protected areas; critical biodiversity areas; ecological support areas;

other natural areas; and no natural areas remaining. The extent of the natural vegetation remaining on the property will be assessed and the monetary costs and benefits of these areas will be determined. This study sets out to assess the species diversity of the set-aside conservation areas; and determine whether the FSC P&C are having a positive contribution to the conservation of biological diversity.

PARALLEL SESSION 4: EDUCATION & OUTREACH:

Beyond senior science: engaging with youth in nature

Key words: nature, youth, eco-social community

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Many nature conservation organisations offer educational programmes and activities for children, but teenagers are less well served. Psychosocially, adolescence is a key stage of identity development. Cape Town youth valued nature as a place to escape from stressful situations and peer pressure, to reflect on their lives, and to make their own decisions – in other words, to engage with the process of identity development. However, for many teenagers in the city, natural areas and the benefits they offer are practically inaccessible.

This presentation briefly introduces a growing body of literature on the benefits of contact with nature to people's physical and emotional health and wellbeing. It then provides an overview of a small number but diverse range of nature-based programmes on offer to teenagers in Cape Town. Five types of programmes are identified, based on how they supported the process of youth identity development and represented the human-nature relationship.

Based on the aspects of nature that teenagers valued, approaches for engaging with youth in natural areas are suggested. In response to the concerns of education officers about the difficulty of developing programmes based on the high school curriculum, most of these ideas are not curriculum related. Finally, the possibility of the nature conservation community providing support for adolescents during the period of identity development is discussed.

“God won't make bad things”

Insights into children's perspectives on Black Wattle and clearing

Key words: alien invasives, youth, conservation, education

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In conservation circles and beyond, the issue of Black Wattle (*Acacia mearnsii*) eradication is a moot point. Most of us accept that, one way or another, these trees must go in order for us to be able to sustain our social-ecological systems. But try explaining that to the 'nature-in-deficit' urban child who, in a newly revealed world of natural wonder, has difficulty grasping the concept that any living creature could in fact be 'bad'. As a budding outdoor educator, you may try and demonstrate to youth the surprising length of the Black Wattle root, the proliferation of its seeds in the surrounds, the extent of this invaders spread, the water-deprived river bed, or the absence of fynbos flowers. You may also try and attempt to articulate an abridged version of its history and how Black Wattle came to be 'a problem' in this country. And before long you begin to inadvertently hear yourself re-telling a metaphorical story of European colonisation in South Africa. You decide to give up – and just let the children revel in the spontaneous experience of the outdoors.

This paper presents insights revealed from action research conducted with children of mixed cultural backgrounds participating in an experiential environmental education weekend in the Baviaanskloof Mega-Reserve. The core aims of this pilot exercise were to understand: a) how the invasive Black Wattle was perceived by participating youth; b) how the presence of Black Wattle affected the experience of nature in this context; and c) how environmental education should be designed in order to effectively communicate an understanding of interconnectedness and respect for life but, simultaneously, raising awareness of ecological realities. Some humbling lessons were learned.

This research forms part of broader doctoral research being carried out on the implications of meaningful nature experiences for conservation education and management.

Introducing the book: Growing together: thinking and practice of urban nature conservators

Key words: urban, nature, community

Paula Hathorn and Mzwandile Fulani, Cape Flats Nature, SANBI, Edith Stephens Wetland Park, Lansdowne Rd, Philippi.

Through successes and failures of the Cape Flats Nature partnership, a solid practice of community development orientated urban nature conservation has begun to emerge, and in order to advance this we felt it was essential to capture some of these lessons in a book for urban nature conservators. However, this complex field demanded a

lot more than a simple ABC or a one-size-fits-all blueprint. Experience has taught us that every situation is different:

what works in one place may not work somewhere else and what works one year may not work the next. It requires, like nature conservation, a careful and restrained hand, a light tread and an instinct for knowing when to intervene and when to step back.

Urban nature sites have a significance disproportionate to their size or to their biodiversity. Every year, a higher proportion of the population is born into city life. Most of these people have never set foot in a large national park. Many do not have gardens, or even a pot plant.

For these individuals, the urban nature conservation sites represent an opportunity to have contact with nature, and this means these sites have a critical role to play. Not only to conserve biodiversity, or to sustain environmental health – although both of these are essential. They are also places that can offer the spiritual and emotional healing which only nature can provide to highly stressed and impoverished communities.

Apart from what they offer citizens, these sites are also critical for the continued conservation of nature anywhere whether it is in large wilderness reserves or through more sustainable agricultural, mining and forestry practices. For without some opportunity to discover nature and to learn its value, our citizens will lose the political will to ensure that policy makers protect it.

Biodiversity Expo Model: the Public Face of the Fynbos Forum?

Key words: Mainstreaming, Conservation Marketing

Morkel, A ,Project Manager, Biodiversity Expo's 2008 – 2010, Kirstenbosch National Botanical Garden, South African National Biodiversity Institute

When initiated in 2008, the Biodiversity Expo was merely another conservation education event that school kids attended. However, over 3 years, the Expo model has evolved into a strategic mainstreaming intervention which other provinces are now looking to do as well. Beside the obvious edutaining value of the Expo, what is not seen is the evolution of science into general public messages, adaptation of scientists into conservation communicators, impressive learning, growing and progressive conservation exhibits, the demonstration of the social and economic value of biodiversity conservation, the opportunity to engage and measure public perception and feedback on conservation issues, but most importantly to close the gap in the working relationship between the differing conservation agencies. The Expo model could be very well be the annual tool, that receives critical mass public attention, that scientist's and managers can use to influence the hearts and minds of the very public leaders and opinion leaders we need to further strive to a Biodiversity Economy. The Expo presents a unique opportunity for scientists to work with conservation communicators and educators to develop conservation messages to go into the general public through large, media attracting and funding attracting events.

Adopt-A-River in Eerste River, Western Cape.

Key words: Adopt-A-River, integrated water recourses, water quality

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The Adopt-a-river programme was initiated in 1994 and has been implemented through different phases. The main purpose was to create awareness and understanding of the need to protect water resources amongst all users with particular emphasis on previously marginalized communities. The idea was also to promote the concept of Integrated Water Resource Management (IWRM) and to encourage active participation in the protection and management of water resources

The Deputy Minister of the Department of Water and Environmental Affairs, Rejoice Mabudafhasi, launched the *Adopt-a-River Programme* in Eerste River during water week 2010. This is the third phase of the Adopt-a-River initiative. The aim of the event was to create awareness of the need to care for our scarce water resources and to actively participate in their protection and management. Another objective was to acknowledge communities in the vicinity of the Eerste River for their efforts in taking care of the river despite challenges they experience, especially in terms of water quality.

The idea is that Adopt-a- River in the Eerste River must be managed both from top down and bottom up which involves the political as well as the targeted group of youth and Women.

At the event a commitment in the form of pledge was signed by both the political representatives from the Winelands District Municipality and Stellenbosh Municipality.

The Department of Water Affairs Western Cape Region will co-ordinate this initiative. The Department is in the process of organising meetings with different stakeholders, including Cape Winelands District Municipality, Stellenbosh Municipality, Department of Environmental Affairs, department of education, SALGA, Businesses and community organisations. The successful implementation of this initiative will hopefully improve the Ecological state of the Eerste River and will ensure that more stakeholders participate in regular-monitoring.

Hot Property: what to do when it starts getting hotter

Key words: Firewise, firescaping, living on the urban edge

Oliver T.A. And Montgomery, K

Working on Fire Advocacy Department, Winter House, Kirstenbosch Botanic Gardens, Newlands, Cape Town

The serious fires experienced in the summer of January 2000 in the Western Cape demonstrated the need for gardeners to avoid plants that burn easily and to 'firescape' their gardens. Firescaping includes the use of plants that minimise damage to properties and the spread of fires. Firewise plants is following in the footsteps of the successful Waterwise plants initiative. The aim is to pilot a project whereby local garden centres, landscapers and landscape architects are made aware of issues relating to firescaping. More importantly, it is hoped that a group of participating firewise garden centres be established to become distributors of information on how communities can firescape their schools and gardens. In the process, a list of 'champion' firewise plants will be developed in consultation with local growers.

A case study of the Firewise community Hangklip, a year on and one fire season later.

Keywords: Fire, Firewise, Urban edge community

Leanne Mckrill , Working On Fire, Prvt Bag X7, CLAREMONT 7735

The community of Hangklip is well rooted within the Fynbos biome, well renowned for its yearly wild fire season. This community had been exposed to many fires and homes had been lost in the past. Most of the community enjoy living in nature and thus chose to become a Firewise community. This is their story one year on.

Thursday 5th August: KEYNOTE ADDRESS:

Eco-hydrology of Restionaceae in the W. Cape and its implications for conservation

Keywords: Restionaceae, niches, hydrology

Jonathan Silvertown, Professor of Ecology, Dept Life Sciences, The Open University, Walton Hall, Milton Keynes MK7 6AA, U.K.

How plant species manage to coexist with one another while competing for the same essential resources is still a puzzle, even after decades of investigation in many types of vegetation around the world. The answer to this question is of practical as well as theoretical interest because it could form a scientific foundation for conservation and vegetation management. Working in species-rich meadows in England we discovered that plants in this habitat segregate along soil moisture gradients at quite a fine scale. Working with SANBI, Cape Nature and San Parks, we have now discovered that the same phenomenon also occurs in fynbos in the W. Cape. Experiments at two recently burned fynbos sites have also begun to suggest how the segregation of restios along soil moisture gradients comes about.

PARALLEL SESSION 5: ECOLOGY:

Seed Dispersal of the Cape Spiny Mouse and the Effect of Seed Dispersal and Aridity on the Fynbos *Protea Leucadendron sessile*

Keywords: *Acomys subspinosus*, *Leucadendron sessile*, rodent, dispersal syndrome, aridity, fynbos

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Seed dispersal by rodents is a relatively new discovery to the fynbos as it was believed, until recently, that serotiny (wind) and ant dispersal were the only vectors. Rodent dispersal however, is very much present in the fynbos and may have a significant impact on certain plant communities in terms of perseverance, re-colonization and expansion. We are currently investigating if one of the recently discovered rodent dispersers, the Cape Spiny mouse (*Acomys subspinosus*), displays a seed dispersal syndrome towards *L. sessile* seeds which we know it disperses. We are placing *L. sessile* seeds and Macademia nuts of different size and hull thicknesses into the field to determine which seeds are dispersed, eaten or left untouched. We are also looking at the Cape Spiny mice's ability to re-locate seed caches by olfactory means, and its ability to recover these caches in arid soil. Lastly, we are looking at the distribution of rodent dispersed *Leucadendron* plants in the Western Cape and if a correlation between plant colonization, seed size and rainfall patterns exist. The goal is to determine whether rodent-dispersed plant species may be found in more arid areas, as seeds which are to germinate in dry soil will need to be larger in size and hull-thickness and are therefore too large/heavy to be dispersed by ants or serotiny. We have found, thus far, that a definitive seed dispersal syndrome in the Cape Spiny mouse does exist and that the selection pressure is moving towards medium sized seeds and medium-thickness of hulls in seeds. Further research still to be conducted will confirm whether a) *Acomys* can recover seeds in dry soil and b) if rodent-dispersed plants are more commonly found in arid areas. If that is the case we can successfully establish an ecological link between aridity, seed size and rodent dispersal.

Porcupines – drivers of diversity

Key words: disturbance, geophytes, selective herbivory

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For decades, people have had a negative perception of the Cape Porcupine, *Hystrix africaeaustralis*, due to the tendency of these rodents to gnaw irrigation pipes, damage crops and household gardens. However our research, conducted over the last 5 years, shows that this geophyte-foraging mammal has a positive value in Fynbos ecosystems, through the effects of its widespread digging and foraging activities, and through its disturbance impacts on the community composition of highly threatened Renosterveld patches. Permanent plots, 3-year porcupine exclosure experiments and soil nutrient analyses in Nieuwoudtville Renosterveld demonstrate a medley of surprising porcupine impacts on biodiversity and soil properties. Disturbance caused by porcupine foraging activity is an ubiquitous feature of Renosterveld, but it is the area- and species-selective nature of their foraging which underlies their significance in Renosterveld dynamics. The porcupine thus not only acts as a key herbivore but also an engineer at an ecosystem-wide level, and accordingly, conservationists need to rethink the value of the porcupine.

Interspecific competition between Helmeted Guineafowl and Cape Spurrowl at Zandvlei Nature Reserve

Keywords: Competition; Helmeted Guineafowl; Cape Francolin

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From 2003 to 2005 ad hoc removal of *Numida meleagris* (Helmeted Guineafowl) was undertaken at Zandvlei Nature Reserve, Cape Town. From 2006 to 2009 intense removal efforts were undertaken and weekly bird counts from 2003 to 2009 were statistically analyzed to determine whether the removal of *Numida meleagris* had an effect on the population of *Pternistis capensis* (Cape Spurrowl). In order to establish which resources these two species could compete for, a comparison matrix was compiled indicating possible competition for food, shelter and breeding habitat. A total of 334 bird counts were analyzed. From 2003 to 2005 a mean of between 6 and 9 birds showed an increase in the *Numida meleagris* population with a low mean increase of between 4 and 4.9 *Pternistis capensis* per count for the same period. In 2006 to 2009 (intense removal period), the *Numida meleagris* population showed a strong decrease in mean from 6 to 2.5 birds per count and *Pternistis capensis* showed a strong mean increase of between 5.5 and 11.5 birds per count. Annual means for the entire period show a strong inversely proportional relationship between the two species indicating the alien *Numida meleagris* could have a long term negative effect on the populations of *Pternistis capensis* in the Western Cape.

The Southern Black Korhaan: a fynbos species in trouble

Keywords: biodiversity; climate change; threatened endemic species

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The Southern Black Korhaan, *Afrotis afra*, has recently been split from the Northern Black Korhaan, *A. afroides*. Whereas *A. afroides* is widespread and common in several countries, *A. afra* is endemic to South Africa and largely restricted to karoo and fynbos habitats, and recent anecdotal evidence suggests that the species is in decline. Analysis of data from the Coordinated Avifaunal Roadcounts (CAR) project, a volunteer participation

project run by the Animal Demography Unit (ADU) confirms this, revealing a rapid decrease in the population in the Swartland and Overberg. Comparison of data from the ADU-run Southern African Bird Atlas Projects (SABAP1 and SABAP2), using occupancy modelling, adds further weight to this conclusion, and suggests that the decline has been especially severe in the Fynbos and Succulent Karoo biomes. The areas most affected appear to those on the edges of the Fynbos biome, where quarter degree grid cells are between 50 and 75% fynbos. The region occupied by *A. afra* is predicted to be severely affected by climate change, and possible reasons for the species' decline to date include climate change, land-use change, and the increase in abundance of some avian predators within *A. afra*'s range, for example the Pied Crow *Corvus albus*.

SAEON Data Portal – a platform for disseminating Fynbos data

Key words: dissemination, portal, data archiving

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The vision of SAEON is “A comprehensive, sustained, coordinated and responsive South African environmental observation network that delivers long-term reliable data for scientific research and informs decision-making, for a knowledge society and quality of life”. In order to deliver on this promise of data delivery, SAEON has developed the SAEON Data Portal. This is a collaborative platform to archive and disseminate data and metadata. The portal has been designed to accommodate a number of different metadata standards and it can integrate data from different sources, in different formats, scales and resolutions into an integrated product for the end-user. We showcase the portal, the benefits of archiving data and the potential for finding data for future research within the fynbos region. The portal provides an extensive searching capability which includes tailored searches. Researchers in the fynbos community can archive their data with SAEON and ensure that it is available for future research and provide potential for ongoing long-term monitoring within the fynbos region. The Data Provider can specify the conditions of access to their data, although SAEON promotes the broadest possible dissemination of data. Many data portals currently exist, but a feature of the SAEON Data Portal is that it is an integrated portal. This means that it provides searches across records stored at a variety of institutions and on a variety of portals, as well as to SAEON data. Through the presence of the Fynbos Node within SAEON, the portal provides an ideal opportunity for archiving and disseminating data within the fynbos.

Prioritizing species of special concern in The Table Mountain National Park for monitoring: the challenge of a species-rich, threatened ecosystem.

Key words: Endemic species, IUCN Red List, monitoring, prioritization, species-rich ecosystems, thresholds of potential concern

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Monitoring rare and threatened species is essential for effective conservation management. However, in the Cape Flora any reserve has a large number of such species: too many for available budgets and resources. Here we explore the results of a workshop aimed at prioritizing species for the Table Mountain National Park. Some 700 candidate species were evaluated using a modified approach used in Kruger. Some 7 biotic and 6 management variables were assigned to each species and the scores summed. Participants were generally happy with the top priority species. Using this priority list we costed the monitoring assuming that much could be done by volunteers. All species, excluding baboons at SAR4M per annum, could be monitored for SAR2M per annum, but roll out – for logistical and initial survey cost reasons, would take 5 years. However, the logistics of monitoring Fynbos plants will require careful integration of the current veld age, flowering phenology, seral prominence and monitoring requirements for each population to determine annual monitoring schedules to be compiled. In addition, a comprehensive kit of required methodology and species identification will be required for each species in the schedule. Furthermore, management action for species exceeding tolerable thresholds will require careful integration with ecosystem management.

The City of Cape Town surrounding the Table Mountain National Park: An historical reflection of the evolving relationship between an urban settlement and ecological processes

Key words ecological processes, Table Mountain, City of Cape Town

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This paper presents an historical review of the evolving relationship between an urban settlement and the ecological processes inherent to its natural surroundings. Since its establishment, Cape Town has been acutely aware of, and exploited, the natural resources presented by Table Mountain and its surrounding wilderness area. An examination of this pattern of engagement, explored through an ecological process lens, reflects a journey of the changing needs and demands of a growing urban settlement. Ecological processes, and their ensuing flow of ecosystem services, have been exploited, overexploited, interrupted, reestablished, conserved, and variably valued through time. Processes of significance, for example water provision, soil erosion control, the provision of wood natural materials, and the role of fire, are presented. This shifting dynamic is clarified through consideration of boundaries, where boundaries were initially largely ecologically defined, restricting human activity, through to an era of apparently socially constructed boundaries confining nature. The significance of this progression is reflected on in the context of the role of Table Mountain National Park today, in a time where management must meet multiple anthropocentric and conservation ends. Consideration is given to how historical interactions might inform research and management into the future.

Repeat sampling. How many species are missing out on?

Key words: threatened ecosystems, conservation, systematic sampling

Ebrahim. I¹ , CREW, SANBI, KIRSTENBOSCH

The Custodians of Rare and Endangered Wildflowers (CREW) aims to monitor and conserve rare and threatened plant species in South Africa by engaging civil society groups and volunteers. Our monitoring data thus far has been critically useful to the Red Listing process of the South African flora, systematic conservation planning and recording the distributions of these rare and threatened plant species. Due to the high number of species of conservation concern in the country (24% of South Africa's flora is either rare or threatened¹) it is challenging to collect good data to assess the population status of a species.

In this talk we will discuss case studies from the CREW project on how useful repeat monitoring of sites has been. We have found that in once off visits one can hugely underestimate the species that occur on a particular site. One of our case study sites only had six threatened plants recorded on it. After repeat visits in different times of the year our volunteers has recorded a total of 24 threatened species on the same site. This has elevated the site from being fairly important to one of the top priority sites in the area.

The water-regime requirements and response to scenarios of hydrological change by Fynbos flora in the Cape Floristic region, South Africa

Key words: Ecohydrology, Restio species, Hydrological gradient

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The Cape Floristic Region (CFR) is a priority area in South Africa's 2005 National Biodiversity Strategy and Action Plan (NBSAP) and an internationally recognised biodiversity heritage with one of the richest areas for

plants in the world. It represents less than 0.5% of the area of Africa but is home to nearly 20% of the continent's flora. The Fynbos habitats of the CFR are currently protected by a network of nature reserves managed by Cape Nature or the South African National Parks organisations. Unfortunately, this region is also faced with the challenges of rapid urban development which include rapid population growth and urban encroachment, thereby stretching the capacity of essential resources like water supply. To solve this, the Cape Town municipality is considering increasing groundwater abstraction from sandstone aquifers which underlie the fynbos habitats. Currently, little is known about the effect of such water extractions to the endemic Cape flora and there is no information about the eco-hydrology the Cape plants in general. Moreover, there is the threat of hydrologic changes as a result of climate change. Global Climate Change models predict 2050 changes in precipitation etc for the CFR. It therefore became necessary to study the water regime requirements of the endemic Cape plants and their response to hydrological changes which inherently affect ground water availability. The study would precisely quantify how species of the fynbos flora respond to fine-scale hydrological gradients caused by either abstraction or changes in climate. Such a study will involve the use of both empirical and field observational methods to deduce an eco-hydrological database for fynbos species. This database would include climate data, soil data, hydrologic data and plant data that would be derived from monitoring sites widely distributed in the region. These eco-hydrological data would be incorporated into regional models of the distribution of species, specifically the Restionaceae and used to study the potential impacts in the future. It is expected that, the results obtained on the impacts of water regime change, would be vital to inform the management or decision-making bodies of these unique fynbos habitats about most effective future planning strategies for conserving the restio sp. and the biodiversity of the Cape Floristic Region.

PARALLEL 6: ENVIRONMENTAL MANAGEMENT:

The South African Wind Rush: Are impacts on biodiversity being underestimated?

Key words: wind energy, biodiversity, landscapes, environmental impact assessment

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There is a clear need for all countries around the world to investigate and implement renewable energy sources. South Africa has targeted wind energy as a major source of renewable energy, with the South African government aiming to obtain 400MW of wind energy before the end of 2012. Investors are scrambling to find land where they can set up wind energy facilities and "Wind Farms" are set to become part of our landscapes around South Africa, particularly on the West Coast which experiences some of the highest wind speeds. Unfortunately, there is often a strong correlation between sites which are targeted because of high wind energy and the biodiversity value of that site. Environmental Impact Assessments (EIAs) are necessary for erecting wind measuring masts and wind turbines and the potential impacts on biodiversity in some areas have been

determined to be very high. In the rush for developers to find sites to set up wind farms, will these impacts be adequately considered? Does the need for renewable energy outweigh the immediate impacts on biodiversity and is the number and size of wind energy facilities currently being proposed really necessary or will they be “white elephants” permanently altering our landscapes and ecological processes? A review of some EIA applications and statistics attempted to answer these questions.

Land use change: An opportunity for conservation or a threat to biodiversity?

Key words: environmental impact assessment, development, critical biodiversity areas

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Environmental impact assessment (EIA) (and similar processes to manage land use change) is seen as a key tool to manage habitat loss, the biggest threat to biodiversity in the Western Cape. Since 2009 CapeNature has documented the details of development applications they have commented on. This information provides insight into the nature and distribution of proposed developments in the Western Cape (due to constraints with the data, the Garden Route and Karoo were excluded from analysis).

Unsurprisingly, most of the proposed developments were in City of Cape Town, Overberg, Swartland and Stellenbosch areas, but mining is of increasing concern on the West Coast. Just under half of the proposed developments were in areas where biodiversity was potentially a concern and 35% were within, or included areas identified as Critical Biodiversity Areas by systematic conservation plans. Fortunately, the majority of these applications were in habitat that was of mixed quality, or included transformed areas and had opportunities for some development to take place.

Close to 100 botanical assessments and over 30 freshwater ecology assessments were completed, a potentially valuable data source. What is concerning is that over 60% of the botanical reports were produced by only 2 specialists.

CapeNature indicated that it was satisfied with at least 77% of the decisions on EIAs, with only 2 environmental authorisations potentially resulting in high negative impacts on biodiversity. This indicates that biodiversity related concerns do seem to be taken into account in the majority of decisions. What remains untested is whether the biodiversity related recommendations, often included as conditions of approval, will actually result in protection of biodiversity on the ground.

“Conservationists just create red tape”:The EIA experience of Farmers in the Cape Floristic region

Key words: EIA consultants, policy failure, NEMA

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Amendments made to NEMA in 2006 require farmers to complete Environmental Impact Assessments (EIA) on all virgin land before it can be ploughed. This policy has been imposed on farmers, with little consultation. The result is that farmers believe that EIA consultants are biased against them and mistrust the process. As a result many are reluctant to pay a consultant to do the EIAs and choose to attempt to “go it alone” and do their own assessments without any qualifications. This is an example of a “command and control” type policy and demonstrates the typical type of failures this policy approach experiences. This alienates the subjects of the policy and reduces sustainability due to increased monitoring requirements that result. This paper studies the reports of the EIA consultants, in order to assess whether or not they demonstrate any bias. It does this by using linguistic discourse analysis techniques. It establishes whether or not the farmer’s claim of bias is legitimate and argues that if it is not legitimate, and EIA consultants have no inherent bias, then this is an example of poorly designed policy that alienates its subjects and should be redesigned with more consultation in order to improve buy from farmers and greater policy success.

Landholder perspectives on threats to their survival on the Agulhas Plain

Keywords: conservation attitudes, financial survival, landholders

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Farmers on the Agulhas Plain maintain that conservation begins after breakfast. Their view is similar to that of Australian cattlemen who claim it is hard to be green when you are in the red. While agricultural productivity for Bredasdorp has grown slowly over the last fifty years, a part of the Plain was developed into profitable farms during this period. Elsewhere on the Plain farmers are barely holding on to their land, and in these unproductive parts cheap land prices attract investors who have no immediate interest in agriculture. This paper reports on the

relative importance of each of these groupings, and how each group thinks about dangers facing their farms. Hierarchical clustering on share of income from agriculture and farm size identified three groups. For the commercial farmers (n=29) and lifestyle farmers (n=30) conservation begins after breakfast in the sense that it is not their main source of income and their farms have only very small pockets of land that could still be set aside for conservation. Large conservationists (n=10) on the other hand each hold 4,000 hectares or more and jointly control more than two thirds of the untransformed land in the sample. This group already on average makes a third of their income from biodiversity-based businesses. Each cluster's ratings of a set of potential threats the area shed interesting light on these landholders prioritise conservation. Commercial farmers are significantly more concerned about macroeconomic threats than the other groups. In addition, high levels of awareness of the Batamsklip's nuclear power station as a threat all round indicates that the community can be mobilised around environmental issues. Finally, crime linked with poverty is prioritised as a threat by all.

In pursuit of a panacea: mitigating human-baboon conflict in the Cape Peninsula.

Key words: human-baboon conflict; Cape Peninsula; food provisioning

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The chacma baboon (*Papio ursinus*) is an integral feature of Cape Peninsula fynbos. The species' ecological niche remains largely unexamined. Until their role in fynbos ecosystems is evaluated, chacma baboons should be conserved. The Cape Peninsula's baboon population is geographically isolated; enveloped by human-modified environments. In addition, large-scale transformation of natural habitats and encroaching urban, industrial and agricultural developments has increased the frequency and severity of local human-baboon conflict. This escalating conflict places the baboon population at considerable risk. Mitigating this conflict is a desirable goal for land managers, conservationists and the general public. I have implemented and tested various methods intended to achieve this end. Each method is assessed for its biological efficiency and practical and financial sustainability. Light aversion, using reflective prisms, although inexpensive and practical, was unsuccessful. A combination of noise aversion and monitors who do not herd but rather hold the urban line has achieved a 100% reduction in raiding over a seven month period. Food provisioning, adapted from King *et al.* (2008) reduced the percentage of time that baboons spent in urban areas, increased foraging in the natural environment and was most effective when access to urban food sources was simultaneously restricted. Together these results suggest that successful deterrents must be impervious to habituation, increase the risk to reward ratio of foraging in urban areas and exploit key elements of baboon biology. I am currently exploring learning and cultural transmission with regards to raiding behaviour in different troops and the implications for baboon management. This work will promote human-baboon commensalism in the Cape Peninsula and provide the time necessary to properly assess the value of *Papio ursinus* to fynbos ecosystems.

How viable are existing agro-environmental projects in the Cape Floristic Region?

Key words: business and biodiversity initiatives, GreenChoice, monitoring and evaluation

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About 80% of South Africa's critically endangered species and ecosystems occur on productive agricultural land outside of national parks, which cover 10% of SA. Biodiversity is thus largely in the hands of farmers. Farmers and conservationists alike face increasing threats to biodiversity such as habitat loss and change, alien invasive plant species, pollution and nutrient loading from agriculture and industry, over-exploitation of natural resources, and climate change. In response to this, various conservation bodies and industries (sugar, citrus, wine, rooibos, potatoes, flowers, livestock) partnered over the last decade to incorporate land stewardship as well as better agricultural practice into farming, i.e. agro-environmental or business and biodiversity initiatives (BBIs) were formed.

In 2008, GreenChoice, a WWF-SA and Conservation International-SA partnership was formed to play a harmonizing and supporting role for the BBIs, as well as to record the gains of BBIs to date. A recent audit of the BBIs in the Cape Floristic Region (wine, rooibos, potatoes, flowers) showed that over 72 000 ha of critical biodiversity areas and 300 000 ha overall were now under potentially better land management, and had land use plans and management guidelines in place. However, agricultural stakeholders interviewed expressed the need for a harmonizing and holistic guideline that addressed not only biodiversity but also agricultural resources as well as economic and social issues. Critically, farmer confidence in the BBIs was in danger of dropping without demonstrable economic benefits. In response, GreenChoice has developed a generic document from which sector-specific guidelines can and have been developed (The Living Farms Reference) as well as a Monitoring and Evaluation Framework, which will be used to test the business case for agro-environmental projects. The GreenChoice Reference and Framework will be presented and their potential use nationally as a tool for farming sectors, education and policy will be discussed.

The Status of evaluation in Conservation and Methods for Improvement.

Key words: evaluation, conservation evaluation, evaluation methods

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In this year of celebrating biodiversity we as conservation practitioners ask ourselves whether we have made a difference to the health of the earth's biodiversity and on the threats it faces. Some conservation practitioners argue that we would be challenged to provide anything more than anecdotal and qualitative responses to this question because only a fraction of our total investment in biodiversity conservation has been credibly evaluated. Others have noted that evaluation of the success of conservation interventions generally lags behind that of other fields such as poverty reduction, criminal rehabilitation and disease control. Furthermore, pleas for consistent collection of empirical data and better data management systems recur in assessments of the overall state of the environment. Here I demonstrate a simple method drawn from social science methodologies of how conservation projects both small and large can implement monitoring systems which allow better and more appropriate evaluation of the impacts of our activities on conservation outcomes.

Framing biodiversity conservation for decision makers: insights from four Eastern Cape municipalities

Key words: communication, mainstreaming, social marketing

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Priority maps for biodiversity conservation emanating from systematic conservation planning exercises are increasingly being developed for implementation by local governments in their land use decision-making. However, these biodiversity planning products usually rely on the implicit assumption that biodiversity and related concepts are the appropriate ones for communicating the need to safeguard nature. We investigated the level of understanding of the terms "biodiversity" and "sustainability" held by politicians in four Eastern Cape coastal municipalities and then identified the prevalent frames of interpretation they held regarding nature conservation in land use planning. We demonstrate that understanding of the term "biodiversity" is very limited; however, the term is well linked to the natural environment. Conversely, the concept of "sustainability" is clearly established – but only marginally connected to nature. The frame analysis showed that nature conservation is interpreted as fundamentally in opposition to socio-economic development. Conservation is frequently framed as being a

socially unjust endeavour, disrespectful towards people and lacking realism. We used these insights to provide recommendations on how conservationists should proceed to re-frame biodiversity issues in order to more effectively mainstream conservation plans into local land-use decision making.

KEYNOTE ADDRESS:

Making best use of botanic gardens in the science and practice of Fynbos restoration

Key words: ecological restoration, research, conservation,

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Botanic gardens are a largely untapped resource with regard to ecological restoration. Typical botanic garden skills in taxonomy, plant science and horticulture are highly relevant to restoration, while the long-term stability, local links and world-wide distribution typical of botanic gardens make them ideally placed to offer support to restoration practitioners. Habitat restoration is an emerging field, with many unanswered questions and botanic gardens can make a valuable contribution to our knowledge base by collaborating with practitioners to carry out research in restoration ecology. Examples of restoration research carried out by the Royal Botanic Gardens, Kew and its partners will be given, including: i) the effects of fire on seed survival and germination of miombo woodland tree species in Tanzania; ii) comparing high- and low- input methods for using seed to enhance grassland biodiversity in the UK; iii) using ecological data to select 'framework species' to restore a species-rich ecosystem. With over 85% of some lowland Fynbos vegetation types already lost and only a proportion of the remaining areas in good condition, it is recognized that a major programme of ecological restoration would contribute to conserving these threatened ecosystems. Potential research contributions by botanic gardens to underpin this initiative will be discussed.

FRIDAY 6th AUGUST: KEYNOTE ADDRESS:

Fynbos, Benguela and the origins of our species.

Keywords: Fynbos, Shellfish, Encephalisation

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Recent archaeological excavations around the Cape coast have revealed very early evidence for the appearance of anatomically modern people and also of a suite of innovative behaviours such as the intentional marking of ochre and ostrich eggshell and the perforation of shells as beads. These are contained in some of the worlds earliest shell middens, heaps of shellfish and other remains of marine food use. So far the bulk of this evidence is coming from currently coastal sites adjacent to the fynbos landscape of the southern and western Cape, suggesting a role for fynbos carbohydrates in the diets of these earliest members of our own species. The connections between fynbos geophytes, shellfish, innovative behaviours and the emergence of anatomically modern people is explored.

PARALLEL SESSION 7: RESTORATION, FIRE, AND ECOLOGY:

What is the evidence-base status of restoration in South Africa?

Key words: baseline information, goal setting, monitoring

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Despite its widespread practice in South Africa, with an associated annual cost ranging in hundreds of millions of Rands, ecological restoration has never been critically evaluated in terms of its evidence-base status. This study has done that. Using a literature review, complemented with an online survey, we reviewed several restoration

programs in South Africa to assess whether current restoration practice meets the following conditions that are essential for the establishment and advancement of evidence-based restoration: (1) collection of baseline information; (2) setting of clearly-defined goals; and (3) relevant and adequate monitoring. We also asked key role players to identify obstacles to the advancement of evidence-based restoration. We found that current restoration practice in South Africa falls short of fulfilling the last two conditions. Results showed good baseline collection, and goal setting that incorporates ecological and socioeconomic considerations. However, to a large extent goals were poorly defined, there was a low incidence of long-term monitoring and more monitoring of inputs than outcomes. Surprisingly, few survey respondents identified any obstacles to the fulfillment of the three conditions. The disconnect between reality and perceptions of people involved in restoration poses a major obstacle to evidence-based restoration.

Capturing carbon and restoring renosterveld in fallow lands of the Overberg, Cape Floristic Region

Key words: Renosterveld, Carbon, Restoration.

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Renosterveld is a highly threatened and fragmented, biodiversity-rich vegetation type in South Africa. Conservation priorities include the creation of conservation corridors between remaining fragments of renosterveld, and expanding the area of such fragments. Renosterveld fragments are predominantly surrounded by actively farmed wheat lands, and in order to achieve conservation priorities, some active wheat lands will need to be set aside for restoration of renosterveld. Compensation for removing marginal land and riparian corridors from production could conceivably come from livestock and sale of carbon sequestered during restoration. To investigate the latter we measured ecosystem carbon stocks in active wheat lands, fallow wheat lands and intact renosterveld at 20 sites in the Overberg, Western Cape. Fallowing is a pragmatic first step in restoration, given that indigenous bushes return to the land without any human intervention. Research is necessary to determine further appropriate steps at large scales. We found that fallow lands under a bush canopy accumulate approximately 40 t C per hectare in above ground biomass, litter, roots and soil in the relatively mesic sites over approximately 20 years, and had similar ecosystem carbon stocks to intact renosterveld. Sequestration rates varied according to climate, with mesic sites having approximately double the C returns of more arid sites. Assuming a sequestration rate of approximately 2 t C per hectare of land under bush canopy per year, net annual income from C credits is likely to be in the order of US\$ 60 per hectare, which in some years may rival wheat farming profits. If funding can be raised to cover transaction costs, we conclude that carbon sequestration is a potentially viable primary source of compensation for change in land use from wheat farming to fallow in relatively mesic Overberg renosterveld, in order to create conservation corridors and expand renosterveld fragments.

Post-fire regeneration of mountain fynbos: Exploring the “persistence niche”

Key words: life history type, post-fire mortality, predictive understanding

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Fire is a natural occurrence in Mediterranean type climate regions. Climate change, alien invasive species and anthropogenic ignitions are changing fire regimes. Understanding how native vegetation responds to fire will become increasingly important, to make predictions on how the vegetation might change under different fire regimes. Decisions on how to manage ecosystems will increasingly rely on a good understanding of their dynamics in relation to fire.

This project is nested within a bigger collaborative study between California State University and Stellenbosch University. The hypothesis tested in the bigger study is that post-fire resprout success in southern California and the southwestern Cape is linked to life history type and plant functional traits. Obligate sprouters have to resprout to persist, as their seeds are killed by fire, facultative resprouters recruit seedlings and resprout after fire and non-sprouters are killed in the fire and only recruit seedlings from a fire-stimulated seedbank.

The aim is to find predictors of resprout success and to see if there are differences between obligate and facultative resprouters. Preliminary results on mortality and survivorship through the resprout phase, one year post-fire, will be discussed. These data, along with physiological measurements collected within the larger collaborative study, will be used to gain a predictive understanding of post-fire regeneration of resprouters in mountain fynbos.

Post fire recovery in Fynbos riparian habitats

Key words: riparian ecotones, fire, resprouting, diversity

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Fire is an important driver of community composition and structure in Mediterranean ecosystem shrublands; however, little is known about how riparian habitats in Mediterranean ecosystems respond to fire. We investigated post fire recovery in Fynbos riparian habitats 10 months after fire on the Eerste River and one of its tributaries in the Jonkershoek Nature Reserve in the Western Cape Province of South Africa. We investigated how stream size influence fire intensity and re-sprouting habit, how proximity to the water influence resprouting habit and mortality, and whether dominant species in the riparian Fynbos exhibit a similar response to fire. We sampled 20 transects perpendicular to the stream channel on the Eerste River and its tributary Lang River. Transects were sampled in 1 m² plots, and distance from the water was recorded for each plot. For each woody species in the plot, we recorded number of stems, largest re-sprouting and non-re-sprouting-stem, type of re-sprouting, degree of canopy damage and smallest branch diameter. Stream size appears to influence fire intensity; the mean diameter of the smallest branch was significantly larger in the tributary, Lang River. Dominant species at both sites included *Brabejum stellatifolium*, *Meterosideros angustifolia* and *Erica caffra*. Proximity to the water decreased the percentage of individuals experiencing total canopy damage along the Eerste River, but not in Lang River. Surprisingly, mortality was higher along the Eerste River. *Erica caffra* exhibited the highest mortality at both rivers, and 100% of the individuals on Lang River were killed. Re-sprouting habit differed between the two rivers. Only 14% of the individuals at the Lang River site had crown sprouting or epicormic sprouting as compared to 52% of the individuals at the Eerste River site; basal re-sprouting was more common in individuals on Lang River where 88% of individuals had basal re-sprouts as compared to 51% at the Eerste River site. The results of this study suggest that an increase in fire frequency could eliminate *Erica caffra* which has been identified as a key species in riparian habitats.

Wetland management within plantations on the Tsitsikamma Plateau: Can we use fire as a fuel reduction technique without compromising biodiversity?

Key words: fire, wetlands, dragonflies

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The Tsitsikamma Plateau is extensively afforested with pine plantations, interspersed by wetlands, and recently a number of fires swept through the region destroying large areas of plantation. In the absence of fire wetlands within plantations accumulate high fuel loads. The wetlands moreover appear to behave as fire funnels that channel wind in between plantations and therefore pose a great risk to forestry. However, from a conservation perspective, wetlands in this region are likely to have co-evolved with fire and wetland habitats within forestry plantations provide an important framework for corridors and biodiversity buffers. The main objective of this study was to relate the patterns of plant composition and dragonfly occurrence to fire history and other environmental or managerial factors. The ultimate objective is to offer informed guidelines for wetland management regarding fire risk but without compromising the conservation value of these wetlands. Five wetland plant communities were identified by cluster analysis and preliminary analysis with non-metric multidimensional scaling suggests that fire frequency influences these communities, while wetland width and soil texture also seem to play a role. Dragonfly and damselfly abundance was significantly higher in wetlands which had not burnt in nine years or longer compared to wetlands which had burnt more recently. Thus regular burning to control fuel loads of wetlands within plantations on the Tsitsikamma Plateau is likely to compromise biodiversity.

Linking microbes to plants and ecosystem function in riparian ecotones

Key words: riparian ecosystem, nutrient cycling, soil micro-organisms

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Riparian ecotones in the fynbos of Western Cape's rivers are unique features in the landscape and contribute greatly to overall biodiversity of this area. Riparian ecotones are situated at the interface between terrestrial and the aquatic environments and play an important role in ecosystem processes. These processes are responsible for maintaining water quality by controlling the flow of water to the aquatic environment and are involved in nutrient immobilization. The ecological role of micro-organisms in this environment is often overlooked. Many of the soil processes such as denitrification, nitrogen fixation and sequestration as well decomposition and general carbon cycling associated with these riparian zones are mediated by soil micro-organisms. Very little is known about the identity of individual species, the general diversity of micro-organisms in the soil and their function in this complex environment. In addition to this complexity, soil microbial communities may also be influenced by outside factors such as fires. To further complicate matters, many riparian zones in the Western Cape are invaded by alien vegetation such as nitrogen fixing *Acacia mearnsii* which influence the soil properties and subsequently change the microbial communities responsible for these processes. Linking soil processes with the microbes responsible was impossible using traditional culturing methods. With modern molecular techniques we can now investigate these complex communities by looking at their DNA fingerprints. These techniques have recently been used in various studies to link to microbial communities with aboveground plant diversity as well as soil process.

Can mycorrhizal status of Fynbos plants determine fine scale community composition?

Key words: nutrient acquisition mutualism, niche, non-mycorrhizal plants

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The flora of the Cape Floristic Region (CFR) has a unique nutrient acquisition profile in comparison with other vegetation types. Approximately 62 % of the species form arbuscular mycorrhizas, 8 % form ericoid mycorrhizas and the rest are predominantly non-mycorrhizal. In most vegetation types world-wide either ectomycorrhizal or arbuscular mycorrhizal plants dominate and non-mycorrhizal species are generally weedy and short-lived. In the Cape flora, however, non-mycorrhizal species include long-lived Proteaceae and Restionaceae. In order for a plant to form arbuscular mycorrhizas it must come in contact with spores or hyphae growing from existing roots since the fungus cannot grow outside the mutualism. If fynbos plants dependent on arbuscular mycorrhizas fail to form mycorrhizas as seedlings, they cannot establish. We postulate that the situation can arise that dominance of non-mycorrhizal species in an area can lead to a diminution of the amount of infective material available to form mycorrhizas. Following a fire, establishment of arbuscular mycorrhizal plants will be compromised in such patches. We test this by analysing the mycorrhizal status of plants in vegetation plots established in 1966 in the Cape of Good Hope Reserve and resurveyed in 1996 following several fires cycles. The general profile of the vegetation's mycorrhizal status matches that for the CFR as a whole. However, there is a positive correlation between the mycorrhizal status of species in the plots in 1966 and 1996. This suggests that plots that are predominantly mycorrhizal or non-mycorrhizal retain that status over thirty years. Thuiller et al. 2007, on analysing the same plot data, have concluded that species distribution following fire is stochastic in fynbos. Our analysis of the data suggests that mycorrhizal status of the species occupying a patch prior to fire may determine which suite of species will successfully colonise that patch after fire.

Fighting for Fynbos on the Cape Flats: The Kirstenbosch Conservation Programme (KCP)

Keywords: Lowlands fynbos, restoration ecology, botanical gardens

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Botanical Gardens are mandated by the International Agenda for Botanic Gardens in Conservation to achieve targets set by the Global Strategy for Plant Conservation. These targets stipulate that Botanical Gardens in every country should support, promote and contribute to the integrated conservation and management of threatened species and populations *in situ*, working with protected area managers and communities at all levels of society. What is today the Kirstenbosch Conservation Programme began unofficially, about fifteen years ago when horticulturists, along with their goal to build up extensive collections of threatened plant species, recognised the need to restore certain species back into the wild. Initially on an *ad hoc* basis horticulturists would source, grow and restore species and in so doing have built up a 15 year repertoire of practical restoration experience. In 2000 the programme developed an integrated *ex situ* and *in situ* conservation approach involving a number of different role players e.g. City of Cape Town, SANBI Research, SANParks and MSBP. Now officially recognised the KCP's new *in situ* program focuses on the restoration of threatened habitats on core conservation sites on the

Cape Flats in and around Cape Town, particularly Cape Flats Sand Fynbos (CFSF). With a meagre 14% of the original CFSF area remaining, only 0.09% officially conserved and the national target set at 30%, restoration of degraded areas is our only option. This short presentation establishes the role of botanical gardens in ecological restoration and highlights what has been learnt and achieved through the KCP's practical restoration experience.

Reducing Disaster Risks from Wildfire Hazards Associated with Climate Change in South Africa

Key Words: Climate Change; Integrated Fire Management; Adaptation

Chandra Fick, Working on Fire, Kirstenbosch

The South Western region of South Africa is vulnerable to wildfires under current environmental conditions. The frequency and intensity of wildfires is expected to increase under conditions of climate change. Overall, the scientific consensus is that there is likely to be an increase in climate variability manifest in abnormal weather patterns (draughts, extremely hot days, and strong prevailing winds), which will increase the fire risk, which is correlated with precipitation, temperature, humidity and wind speed. (Midgley et al 2005). With a predicted 2°C increase in long-term temperatures & a likely 7% reduction in rainfall, wildfires in the region are forecasted to increase 3-fold. Expectations are that these factors will also result in fire intensities by about 20% owing to an increase in the fuel load (INC 2003). This situation is likely to overwhelm the existing fire fighting apparatus in the country, leading to the loss of infrastructure and life. South Africa has a fire alert-fighting system sufficient for addressing current levels of fire risk and has established a fire management programme known as Working on Fire; yet, strategies and tools for managing the increased fire hazards likely under conditions of climate change are missing. The South African government is presently planning an expansion of Working on Fire; however, the effects of climate change on wildfire frequency and intensity have not been integrated into these expansion plans. A proposed project by Working on Fire aims to play a catalytic role to bring about the paradigm shift from a conventional wildfire management focused on reactive fire fighting, when a fire occurs, to a more proactive Integrated Fire Management system, that combines fire prevention activities, prescribed burning, fire detection, fire suppression and rehabilitation of fire damaged areas. This will serve to enhance the adaptive capacity of the national/regional government and local communities to cope with wildfire risks associated with climate change.

PARALLEL SESSION 8: CONSERVATION PLANNING AND IMPLEMENTATION:

CapeNature's contribution to a National Reporting System for Protected Area Management Effectiveness (METT-SA)

Keywords: Protected Area Management Effectiveness Tracking

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The METT-SA results for CapeNature for 2008 were presented at the CapeNature Biodiversity Review during November 2009 and provided an overview of the general results and preliminary analyses of the detailed results, comparable with the 2008 IUCN / WWF report, *Management Effectiveness Evaluation in Protected Areas – a Global Study*, by Leverinton *et al*, which forms the basis for analysing the METT-SA results to inform tracking effectiveness according to the top 10 identified and ranked indicators: (1) Adequate infrastructure, equipment and facilities, (2) Effective communication, (3) Efficient production of results and outputs, (4) Effective protection of natural and cultural heritage resources, (5) Effective management planning, (6) Adequate relevant available information, (7) Effective research and monitoring, (8) Effective management of visitors and visitor impacts, (9) Effective community and stakeholder engagements, and (10) Effective administration, work program implementation and internal organisation.

METT-SA is not designed for reporting on collective performance at an organisational level, rather to track progress at individual management unit level, however, during the overall evaluation of the 2008 results, the following three indicators

were commonly represented as those which require organisational attention to promote improvements on the management unit level: (1) Effective communication, (2) Management planning, and (3) Effective research and monitoring. A National revision of the METT-SA format for all protected areas listed in the Protected Areas Register is underway and is lead by Paul Britton, who has been appointed as the consultant to DEA. CapeNature's METT-SA results for 2008 provide a substantial basis for evaluation of the application of METT-SA and the focus has been on re-evaluating the results for 2008 with the aim of providing substantial detail to include in the revision comments for implementation by DEA.

Business Planning for Biodiversity in the City of Cape Town

Key words: fine scale planning implementation; funding; budgeting;

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The City of Cape Town sits at the heart of the Cape Floral Kingdom. Covering an area of only 2400km², it contains 9 of the 24 Critically Endangered ecosystems (as defined by the National Environmental Management, Biodiversity Act of 2004) in South Africa and contains 319 threatened plant species in the latest IUCN Red List. This makes it one of the global biodiversity hotspots which is disappearing at an alarming rate. In answer to this challenge, the City and its partners have identified a network of sites, called the Biodiversity Network (Bionet), that need to be secured in order to conserve a representative sample of Cape Town's unique biodiversity and thus promote sustainable development. The City of Cape approved various targets for the implementation of the Bionet and the eradication of invasive species. The tools for conservation implementation are well known and have been reported on before. However, the exact cost of implementation has not to date been quantified. A recent exercise divided the work required into seven main projects and using various models costed the amount of funds and capacity required to reach our targets.

Conservation beyond boundaries: Biodiversity Stewardship in the City of Cape Town

Key words: planning, biodiversity conservation, stewardship

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The City of Cape Town is 2460km² in extent and is situated in the heart of the Cape Floristic Kingdom. Nineteen vegetation types fall within the City's boundaries of which six are endemic and nine are classified as Critically Endangered. Thirty percent (3250 species) of the plant species in the Fynbos Biome occur within the City. Unfortunately this unique biodiversity is under constant pressure due to the ever increasing development footprint. Effective and proactive planning is therefore paramount in order to conserve the rich biodiversity of this area and contribute to national conservation targets. This has led to the development and implementation of the Local Biodiversity Implementation Plan (LBIP) for the City. This implementation plan is guided by the Biodiversity Network (Bionet), a systematic, fine-scale conservation plan that highlights critical biodiversity areas within the City. Sound planning is part of a set of tools available to achieve conservation targets. Others include good management of existing reserves, community involvement and the enforcement of environmental legislation. However, the most effective way of securing biodiversity conservation is by growing the conservation estate. This can be achieved by obtaining ownership of the land through purchase, land swaps or conservation offsets. Public funds for land acquisition are becoming increasingly difficult to obtain. The conservation estate can nonetheless also be increased by Conservation Stewardship initiatives through agreements with, CapeNature, SANParks (TMNP) or the City of Cape Town. The Bionet Stewardship Project is a partnership initiative that comprises of the Wilderness Foundation, the City of Cape Town, CapeNature, SANParks and Cape West Coast Biosphere Reserve. The project is funded through the Table Mountain Fund and aims to coordinate all the stewardship activities within the city. The activities of the project are guided by the Bionet Stewardship Steering Committee and seek to fully explore the tool of Stewardship within the city as well as develop a viable database relating to the stewardship status of each critical area. The city has been divided into 5 priority nodes, namely: the Cape Peninsula Protected Natural Environment, West Coast, False Bay Coastline, Central and the Eastern areas. All public land on the Bionet will be handled holistically in the sixth focal area. Each focal area comprises of several priority nodes and individuals and organisations are listed as being responsible for proactively engaging with the land owners of each specific node.

Conservation Implementation Plan for the False Bay Strandveld

Key words: threatened ecosystems, conservation, development pressures

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Owing to severe pressure for development land in the south-east metropolitan area, primarily in the False Bay subtype of Cape Flats Dune Strandveld vegetation, the City of Cape Town initiated a study to assess the natural vegetation remnants in terms of biodiversity priority, management practicalities and development needs. Currently there remains sufficient natural remnant area to meet the minimum national conservation targets (for this subtype) but the opportunity to conserve it will soon be lost as it only occurs within the city. The study area is from Muizenberg to the Lourens River Mouth and inland in an arc to the Cape Flats Nature Reserve in Bellville. The analysis included biodiversity informants (e.g. remnant condition, connectivity, natural wetlands and threatened species), the coastal protection zone and flood prone areas, and land-use informants such as mining,

development zonings, housing development areas and informal settlement hotspots. The Spatial Analyst extension in ArcGIS 9.3 was used to generate values per 1ha grid cell for each informant and these were combined to calculate an overall score. Expert interpretation of the overall scores led to adjustment of some values according to management practicalities. The methodology and draft results were presented for discussion to a steering committee comprising different City line functions as well as officials from Province and SANBI. Additional refinements were made based on input from these colleagues and the analysis was re-run. Other than the maps, the main output of the study is a table comprising the priority conservation erven, key information and the most appropriate tool to secure the biodiversity on that erf. Results will be presented and the implications discussed.

Darling Wildflower Society: 95 years of private conservation

Key words: Conservation and farming, critically endangered ecosystems, flower show

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The Darling area contains more than 10 % of the 12 000 species found throughout the CFK in less than 1 % of its' surface area with over 160 recorded threatened species. Back in 1915, Mr. Frederick Duckitt and Ds. Suzanne Malan took a look at the amazing flowers in and around the town and realized its significance for preservation and right there the Darling Wildflower Society was founded, hosting its first flower show in September of 1917 which was repeated almost every year thereafter. The DWS are involved in more than just the annual flower show and through the years, farmers like Mr. Tienie Versveld, donated land with rare and endangered wild flowers leading to the proclamation of three municipal reserves still managed and funded by the Society as well as seven private flower reserves owned and managed by its members. In 1996, the DWS approached BotSoc in an attempt to publish a West Coast version of the Wildflower Guide funding half of its publication costs. Key members got together that same year to form the West Coast Environmental Forum which later grew into the current CWCBR. In 2002 the Flora Project was initiated, aimed at compiling a list of all occurring species in the Darling area as well as the building of a herbarium which currently houses over 1500 specimens all originating from private farm lands. Next, the DWS took on the CREW project and was one of the first active groups currently monitoring 28 sites along the West Coast and have identified more than 160 threatened species. Several other projects are still ongoing with many future projects currently starting up. The group goes out twice a month and is open to anyone who'd like to join. The current membership fee was revised recently and increased to a whopping R10 per year.

304 words

Conserving Biodiversity in a living agricultural landscape: the Avontuur adventure

Key words: Conservation

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The climate and soils of the Bokkeveld plateau have driven incredible speciation of flora, and in 2008 WWF purchased the 1300ha farm “Avontuur” in order to conserve the largest single unploughed area (650ha) of Fynbos vegetation on deep sand and loam still remaining on the Plateau, including 5 seasonal pans - the only Cape Vernal Pools conserved anywhere in the Cape. About half the property was previously intensively farmed, but almost 200ha of unploughed Nieuwoudtville Shale Renosterveld and Dolerite Renosterveld shelter an impressive diversity of plants. At least 470 indigenous plant species are currently known from the property, of which 29 are Species of Conservation Concern, 8 are not conserved anywhere else, and 2 are new to science.

Avontuur Sustainable Agriculture is a not-for-profit company appointed to manage the eastern part of the property in perpetuity as a conservation and training farm. The company will apply conservation farming methods to demonstrate active restoration of biodiversity and conservation of the soil within a productive farming system.

A management plan has been drawn up, and a comprehensive database of the property is being compiled. A biodiversity corridor will link the fynbos to the remnant renosterveld. In the summer of 2009 – 2010 seeds of 11 species were successfully collected on the property with the intention of re-establishing a diverse and robust matrix of plants that would sufficiently simulate the structure and function of the renosterveld to facilitate the gradual restoration of the indigenous flora within the corridor. 50 kg of seed (<4,000,000 seeds) was spread over 3.1 ha of land in May 2010, and also used to establish a series of trial plots. The approach is one of “learning by doing”, as this is the first extensive attempt to restore areas of Bokkeveld renosterveld, and one of the first such attempts within any Fynbos habitat.

PARALLEL SESSION 9: CLIMATE CHANGE ADAPTION:

Towards Protecting Key Climate-Adaptation Corridors in the Western Cape

Key words: climate change, adaptation, corridors

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Climate change threatens the Cape Floristic Region's spectacular diversity of native flora and fauna, and the ecosystems on which they depend. Allowing nature to adapt to a changing climate is perhaps the best strategy we can employ to complement significant reductions in emissions from every sector of the economy – by protecting places that are large enough and connected enough to continue to function, and which offer a diverse range of habitats, particularly those climate refuges expected to change less than the surrounding landscape. To this end, we identified and prioritized a suite of 28 key climate adaptation corridors in the Western Cape, and modelled the potential (financial) costs and (biodiversity) benefits of protecting them. Specifically, we looked at acquisition and stewardship costs at the cadastral level in order to build a case for fundraising and implementation. Buying these corridors would cost approximately R 5.15 billion; protecting over 600 000 ha of natural veld (17% of which is Critically Endangered), over 700 different species of conservation concern, 47 000 ha of wetlands, 1 200 km of Critically Endangered river habitat, and 10 estuaries. Through a stewardship programme this could cost R 51 million, and would apportion long term management costs more favourably across private partners and different spheres of government than if the land was purchased by the state alone.

Assessing climate change adaptation corridors and restoration sites

Key words: climate change, adaptation, monitoring

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The benefits derived from conserving biodiversity features extend beyond the protection of our natural heritage, the habitats and species in the environment, to securing significant value in terms of the maintenance and improvement of ecosystem services - critical elements for human survival and sustaining livelihoods. However, long-term maintenance of these ecosystem services must also take into consideration future climate change scenarios.

Although corridors are often described as the most obvious means to allow for adaptation of conservation worthy biota to climate change, little research has been designed to verify if this is the case. Further, although many biodiversity plans have incorporated notional corridors, these are often at inappropriate scales for action or not explicitly designed with climate change in mind.

The Climate Action Partnership as part of its project portfolio supports adaptation corridors and stewardship support as well as restoration of ecosystems/forests. The aim of this specific work to be presented is to firstly establish where the most viable sites are for adaptation in the W Cape, E Cape and KZN provinces. Then the aim is verify if the creation of those corridors which have been selected under the CAP project portfolio in KZN, the E Cape and the Karoo are most suitable for allowing adaptation of biodiversity to climate change. This will encompass interrogating the layout of proposed provincial corridors at different scales, the identification of basic monitoring criteria and indicators within these corridors (to enable long-term standardised monitoring), and future directions for land management to allow for adaptation of biodiversity to climate change.

An overview of the proposed work, sites and approaches will be presented.

Counting for Conservation

Key words: Climate Change, Long-term monitoring, Capacity Development

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The Nieuwoudtville area is extremely rich in biodiversity, but little is known about the phenology of many of the rare plants. Especially considering climate change predictions for the area, it is important that selected plant species and populations are monitored in the long term to understand the impact of climate extremes and variability on the survival of the species.

In the context of the CREW programme, Indigo researchers in collaboration with Hantam National Botanical Garden staff have been monitoring the endemic orange Bulbinella (*Bulbinella latifolia* var. *doleritica*) and the perennial daisy, *Euryops virgatus*. Several populations of these species are monitored annually (detailed demographic monitoring of individuals) supported by fixed point photography and in situ and greenhouse seed germination trials.

As the monitoring is a long- term undertaking it is crucial that the youth of Nieuwoudtville also participate in the monitoring activities. Additionally a plant monitoring day is conducted annually in collaboration with CREW for scholars to monitor other local rare and endemic species. These aspects of capacity development ensure awareness raising amongst the land managers of tomorrow.

Biodiversity Conservation for Livelihoods of the future

Key words: Climate Change Adaptation, Resilience, Conservation

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Farmers of today face a range of challenges that tend to inhibit or prevent them from adopting sustainable livelihoods strategies. Economic instability (global or national), social challenges (on the personal, community or society level) and climate variability or climate extremes can present what appear to be insurmountable obstacles to sustainable farming as a livelihood. The need to find solutions to these challenges creates unique opportunities for joint learning processes involving farmers and researchers to address those issues that the farmer feels to be pressing. If farmers and scientists are able to collaborate effectively, this interaction could result in a positive learning experience for both parties, and could increase problem solving capacity (for farmers and/or scientists). This is especially pertinent in anticipation of the effects of climate change and the impact this is likely to have on biodiversity. It is imperative that we conserve the rich biodiversity resources that we have, as they might be the key to transformed sustainable livelihoods of the future. The challenges of climate change can thus stimulate us to jointly explore and develop new positive visions of sustainable livelihoods based on increased resilience, improved networks, expanded knowledge and enhanced capacities. The key elements of processes designed to increase resilience of livelihoods of farmers should thus include facilitation of active learning (involving scientists, land users and other stakeholders), and support a renewed appreciation of biodiversity and conservation so that we are collectively and individually inspired and able to conserve

irreplaceable biodiversity resources. Although their value and utility might not currently be appreciated by farmers, some of these resources might hold the key to the sustainability of their future livelihoods.

Mainstreaming ecosystem-based adaptation options in local municipalities: where, why and how?

Key words: climate change adaptation, ecosystem services, local municipalities

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Among its other effects, climate change is likely to significantly affect the ecosystem services on which life depends. Ecosystem-based adaptation options are necessary in the face of climate change, and municipalities can play an important role in the design and implementation of adaptation policies, as they are the tier of government closest to where the impacts of climate change will be felt. However, in South Africa there has not been a consolidated approach to adaptation to projected climate impacts on a municipal scale. Given the urgent need to address climate change, it is necessary to understand the factors preventing or enabling the mainstreaming of ecosystem-based adaptation options in municipalities. This research explores the socio-cognitive factors behind public adaptation, and investigates where, why and how awareness of climate change adaptation filters down to affect policies and then practices (and where and why not). Different scales and contexts of local governance are being investigated using a mixed-methods approach: City of Cape Town Metro, Eden District Municipality, and select local municipalities within Eden District Municipality. The focus is on the following classes of ecosystem services: flood, drought and storm protection. Preliminary results on the knowledge, attitudes, needs, capacity and actions of local municipalities regarding the mainstreaming of ecosystem-based adaptation options will be presented.

PARALLEL SESSION 10: WETLANDS ECOSYSTEMS:

Innovation in conservation on the Agulhas Plain: The Nuwejaars Wetland Special Management Area

Key words: off-reserve conservation; income streams; climate change

Allardice, R.¹, D'Alton, M.J.¹; Louw, W²

¹ Nuwejaars Special Management Area (Co-ordinator and Vice Chair resp.)

² South African National Parks

No two landowners are alike - so reasons differed for signing up for this innovative partnership between the private and public sectors on the Agulhas Plain, to have a "protected environment" proclaimed under the National Environmental Management Act (NEMA). For some it was the need to conserve the biodiversity of the area; for others it was to reduce the threat of expropriation; for others it looked like a good way to diversify their income streams. Regardless of the reason, all have a place in the Nuwejaars Wetland Special Management Area (SMA).

Support was provided to the SMA by the Agulhas Biodiversity Initiative (ABI). Hosted by SANParks for the past 6 years, the ABI partnership set out to develop a model for protection of biodiversity outside of the protected areas on the Agulhas Plain. The SMA is the result and through the efforts of 23 land owners who registered restrictions on a total of 110 title deeds, the Nuwejaars Wetlands have been secured for future generations. One of the landowners is the Moravian Church of SA which owns the land on which the historical village of Elim stands.

Substantial funding has been raised through the partnership between ABI and the Nuwejaars Wetland SMA. Some has come from the Table Mountain Fund, other from the Development Bank of SA and, most recently, a substantial grant (€2 million) by the German Government prompted the SMA to tackle a number of major projects to address climate change.

A development strategy, a management plan and various action plans have been formulated by the Steering Committee under the Chairmanship of Dirk Human, a leading local farmer.

Palmiet Wetlands: Wells of Biodiversity Economy

Key Words: Palmiet, drought, estuaries, local economy

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Palmiet, *Prionium serratum*, more commonly referred to as the superglue of the rivers in the Western Cape is under pressure due to poor management by landowners, Alien invasives and illegal activities. The Duiwenhoks and Goukou rivers pose an excellent example of sections of pristine palmiet wetland where land use actions led to unrepairable damage to these wetlands. These actions have a ripple-effect on the entire system. The Duiwenhoks and Goukou catchments are invaluable from an economic perspective and the management of these dynamic systems are extremely important. A normally high volume system is now drought stricken and the effects of low flow are affecting land use practices, communities and ecological processes. The Duiwenhoks and Goukou estuaries are ranked number 33 and 32 out of the 247 estuaries in our country in terms of Conservation value (State of the Rivers Report 2007). Negative actions upstream are influencing the dynamics of the estuaries which are pristine nursery grounds for a number of fish stocks. Sedimentation is also threatening the estuaries. The value of palmiet wetlands as a partner in local economics is greatly underestimated.

Working for Wetlands – West Coast: What have we done and where are we going

Keywords: Verlorenvlei, Working for Wetlands, rehabilitation, alien clearing

Marius Kieck#

#Project Manager, WfWets West Coast project, CapeNature West Coast Regional Office, PO Box 26, Porterville, 6810

The partnership between CapeNature and the Working for Wetlands programme have been actively rehabilitating the catchment of the Verlorenvlei in the Sandveld. The Verlorenvlei is one of South Africa's RAMSAR sites and is one of the country's most important wetlands.

The Verlorenvlei faces various threats the most imposing is the high infestation of alien invasive plants in the catchment of the vlei and around the vlei itself and the second is the high demand for water from agricultural practice within the catchment of the vlei.

The West Coast project has been at the forefront of addressing some of these threats. Since 2006 CapeNature, together with Working for Wetlands, has made serious inroads in controlling the alien invasive in the catchment and doing stabilisation work on the eroded banks of the Verlorenvlei tributaries.

In this presentation, you will be given an insightful overview of the hard work that has gone in to conserving the Sandveld most valued jewel.

Is Verlorenvlei still an Important Waterbird Habitat?

Keywords: Waterbird, Conservation, Habitat

Marius Wheeler, CapeNature, PO Box 26, Porterville, 6810

Verlorenvlei is one of the largest natural wetlands along the West Coast of South Africa and one of the few coastal fresh water lakes in the country. Situated in the heart of the Sandveld, it is regarded as one of the most important wetlands along our coastline. The vlei was one of the first Ramsar sites to be proclaimed in South Africa and subsequently it has also been designated as an Important Bird Area (IBA). It serves as habitat for threatened bird species such as Great White Pelican *Pelecanus onocrotalus*, Greater Flamingo *Phoenicopterus ruber*, Lesser Flamingo *Phoenicopterus minor* and Caspian Tern *Sterna caspia*. It also provides habitat for

various migratory bird species such as Curlew Sandpiper *Calidris ferruginea* and Little Stint *Calidris minuta*. The question is asked: Is Verlorenvlei still an important waterbird site? We take a look at the long-term waterbird data collected and compare present and past figures. We also look at the threats facing the system, past and present, and how these may have impacted on species diversity and numbers. Lastly, in the light of global climate change, what role is Verlorenvlei likely to play in future and what are the implications for current and future management.

Development of an illustrated field manual for the classification of wetlands and river channels according to the National Wetland Classification System

Key words: wetland classification, field manual

Dean Ollis¹, **Kate Snaddon**¹, Nancy Job², Namhla Bhona³ and John Dini³

¹The Freshwater Consulting Group, Cape Town

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The refinement of the proposed National Wetland Classification System (NWCS) is now complete (September 2009) for inland freshwater ecosystems (rivers and wetlands). The NWCS adopts the hydrogeomorphic (HGM) approach, which uses hydrological and geomorphological characteristics to distinguish primary wetland or river channel units, and has been tested in the field in several provinces. The envisaged uses of the refined version of the proposed NWCS include application to the National Wetland Map (in order to generate a National Wetland Inventory), application within the National Freshwater Ecosystem Prioritisation Assessment (NFEPA) and the 2010 update of the National Spatial Biodiversity Assessment (NSBA), as well as the classification of wetlands for regional and local-scale applications.

While there still remains some debate around some of the classification levels and definitions, the next phase of the project is to develop an easy-to-use field manual for the NWCS. The manual will include concise and clear definitions of all terms, an introduction to the HGM approach and an overview of the NWCS, and a dichotomous key for the classification of wetlands and river channels. The manual will be illustrated and will hopefully be ready for publication early in 2011.

KEYNOTE ADDRESS:

Heuweltjies; origins and biogeochemical consequences

Keywords: Mounds, biogeochemistry, nutrients, isotopes

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Heuweltjies dominate much of the landscape of the SW Cape and would have been important components of renosterveld and the more arid fynbos on shale/granite soils. They remain controversial in almost all aspects.

Within many heuweltjies a calcrete layer forms. Analysis of ^{14}C in this carbonate suggests they formed during the Last Glacial Maximum (20-30000 years BP). Calcrete ^{18}O suggests cooling from 30 to 20 000 years BP during which the C3 component in ^{13}C increases. Based on a distribution of 3.6 heuweltjies ha^{-1} and an analysis of the elements bound up in the calcrete, suggests that many tonnes ha^{-1} of Ca are rendered relatively unavailable to plants. Therefore heuweltjies could be seen as net sinks of Ca and other elements. ^{13}C of the calcrete has an atmospheric signal, suggesting that these carbonates are not reprecipitated geological carbonates and therefore that heuweltjies store atmospheric carbon dioxide. Sr ratios of the calcrete are closer to a marine signal than a geological signal, suggesting that the source of the elements in the calcrete is from atmospheric deposition, rather than from local geology. I discuss these results and on-going research in terms of some of the heuweltjie controversies.

POSTER ABSTRACTS

WETLANDS & RIVERS:

Working for Wetlands – West Coast: Fighting for Verlorenvlei since 2006

Keywords: Verlorenvlei, Working for Wetlands, rehabilitation, alien clearing

Marius Kieck, Project Manager, WfWets West Coast project, CapeNature West Coast Regional Office, PO Box 26, Porterville, 6810

The partnership between CapeNature and the Working for Wetlands programme have been actively rehabilitating the catchment of the Verlorenvlei in the Sandveld. The Verlorenvlei is one of South Africa's RAMSAR sites and is one of the country's most important wetlands.

The Verlorenvlei faces various threats the most imposing is the high infestation of alien invasive plants in the catchment of the vlei and around the vlei itself and the second is the high demand for water from agricultural practice within the catchment of the vlei.

The West Coast project has been at the forefront of addressing some of these threats. Since 2006 CapeNature, together with Working for Wetlands, has made serious inroads in controlling the alien invasive in the catchment and doing stabilisation work on the eroded banks of the Verlorenvlei tributaries.

In this presentation, you will be given an insightful overview of the hard work that has gone in to conserving the Sandveld most valued jewel.

Determining the impact of water abstraction on the distribution of *Heleophryne rosei* populations in Nursery, Skeleton and Window streams of Kirstenbosch National Botanical Garden (KNBG)

Keywords: Critically Endangered, water abstraction, perennial

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Kirstenbosch National Botanical Garden is situated on the South Eastern slopes of Table Mountain. The ghost frogs (family Heleophrynidae) are endemic to South Africa, Swaziland and Lesotho, and are considered to be the most primitive leptodactyloid frogs and are found within the streams of KNBG. This small family is comprised of only six species, of which two are Critically Endangered; Hewitt's ghost frog (*Heleophryne hewitti*) and Rose's ghost frog (*Heleophryne rosei*). The *Heleophryne rosei* species is my subject of this study. The tadpoles take approximately 12 months to metamorphosise. Early in the 20th century, dams were constructed along waterways on Table Mountain, including those that function as the habitat of *H. rosei*. The reduced water flow from these dams may lead to a decline in this species which is torrent-adapted. It is necessary that there is a continuous flow of water downstream of a quantity sufficient to preserve *H. rosei* sites. In order to determine the distribution of this species in the KNBG the full extent of stream habitat utilized by this species, both past and present, will be mapped based on tadpole observations of this species, and this will be related to water abstraction points within the Nursery, Window and Skeleton streams. Visits to the dam in order to record water levels, meter readings and consumption levels will be gathered. This will be compared to when and how much water is abstracted from the relevant streams. One of the important aspects to investigate is as to whether the KNBG is able to abstract and

store all the water they need for the year from the Window stream weir during winter. If this is possible, there would be no need to dam the water at the weir during the critical summer months and the stream could be allowed to become a perennial stream again below the weir.

Invertebrate assemblage distribution in the Ratels River, Olifants River Catchment

Key words: SASS 5, biotopes, habitat availability

Gouws, E.J. and Impson, N.D.

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The Ratels River catchment is located in the Groot Winterhoek Mountains within the Olifants-Doring Water Management Area. In itself, the Ratels River is a perennial bedrock dominated fynbos river found in primarily Winterhoek Shale Fynbos. It is surrounded by a steep gradient mountainous area. Although it is an important system for indigenous fish conservation, housing both endangered and vulnerable fish species, it also plays home to a plethora of fauna and flora, including macro-invertebrates. Here, several RHP indices were used to assess the ecological health of the Ratels system, most notably SASS 5, which considers macro-invertebrate assemblages, which have been identified as good indicators of recent localized river conditions. The three selected sites represent both reference (near pristine) and impacted sites along the River. SASS 5 data were analysed and the results give a good indication as to the presence and/or absence of invertebrate families at a given site, whilst it also provides a good indication of the available habitat, ecological health and water quality of the system. When the new data is compared to older RHP data for one of the sites, there is a clear decline in overall SASS 5 scores, indicating the effects of the land-use practices on water quality and overall habitat availability.

Wadriest Saltpan: An overlooked ephemeral pan with significant conservation value

Keywords: Waterbird, Conservation, Habitat

Marius Wheeler, CapeNature, PO Box 26, Porterville, 6810

Wadrift Saltpan is a shallow medium sized saline pan situated along the West Coast of South Africa between the towns of Elandsbaai and Lamberts Bay. The pan is ephemeral of nature and only holds water in years of exceptional rainfall along the West Coast. Wadrift Saltpan is generally overlooked as an important conservation site; the pan and surrounds often comes across as dry and uninhabited. As with many seasonal wetlands, life flourishes once water enters the system and Wadrift is no exception. With the help of long-term waterbird data collected for this site it is clear that this wetland is of crucial importance for various waterbird species, not only on a local scale, but internationally. This presentation will highlight the significance of this site as a key conservation area, especially as waterfowl habitat. It is important to raise awareness about the site and work towards improving its conservation status.

The Tsitsikamma Rivers Macroinvertebrates Research Project

Key words: tsitsikamma, rivers, macroinvertebrates

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From prior work on the Salt River, it was clear that, compared to the rest of Africa, the aquatic macroinvertebrate fauna of the southern and south-western Cape is unique. They are adapted to the cool, low nutrient, fast-flowing acidic waters typical of this region. However the aquatic macroinvertebrates present in most of the rivers in the Tsitsikamma region have not previously been surveyed. It was not known for instance to what extent these rivers contained rare and endemic species and whether the assemblages in some of the rivers which are free of freshwater fish are similar. Little is also known about the environmental requirements of the macroinvertebrates in this region, and hence their potential vulnerability to man-induced environmental changes. The objectives of the current project were to assess the relative abundance of a selection of aquatic macroinvertebrate orders, identified to species level, in 11 rivers originating in the Tsitsikamma mountains and to determine differences and uniqueness of the aquatic fauna. Further objectives included assessing the health of the rivers and prioritizing them in terms of conservation importance. From the draft project report it is clear that the findings are significant. A large number of the genera and species are endemic to the region and a significant number of undescribed species (at least 33) and genera (probably 4) have been identified. The distribution of many of these remnant species of the cold-adapted, temperate Gondwana fauna that was common to the southern land-mass during the Permian to the Jurassic periods, found in these rivers is restricted to and are considered to be endemic to this region. These findings confirm the high conservation value of the Tsitsikamma Rivers and in the further phases of the project these findings will be applied towards better conservation of these rivers and to implement stewardship.

EDUCATION:

Meaningful nature experiences:

The ultimate catalyst for reconnecting to biodiversity?

Key words: nature experience, biodiversity, alien invasives, education

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This research explores meaningful nature experiences and profound wildlife encounters as catalysts for reconnecting to nature. Amidst a convergence of crises, the growing schism between human - nature is taking its toll on the richness of our interactions with the animate world: in an information-soaked society, we are facing the evaporation of experience. Environmental psychology has long proven that information alone does not change behaviour; on the contrary, "...part of the truth cannot be told; it must be felt." (Orr 2004).

'Meaningful nature experiences' are characterized by their ability to deliver 'that' feeling of 'oneness'. An individual may experience a newfound 'interconnectedness' with their environment which may resonate with profound personal meaning. Anecdotal evidence suggests that such moments may facilitate a 'collapsing of boundaries' between an individual and their natural environment. A growing body of literature demonstrates that 'connectedness to nature' may be a critical predictor for pro-conservation behaviour.

What is the current evidence base for meaningful nature experiences? What is the influence of ecological change (e.g. biological invasions) on the richness and frequency of meaningful nature experience? What elements should be included in experiential education programmes aimed at enabling an understanding of the interconnectedness of social-ecological systems? These are some of the questions being addressed through this doctoral research.

In this International Year of Biodiversity, there is an urgent call for humanity to open up and explore the deeper meanings and sensory experiences of our interactions with the living world around us. As stated by Ian Player (2010), it may well be that "...the spiritual connection and energy that comes from it [wild nature]...will motivate people to higher ideals of conservation."

Do you have a story about a meaningful nature experience or profound wildlife encounter and wish to share it? Please contact matthew@earthcollective.net or visit <http://eyes4earth.org>

The Cape's most critical flora strut their stuff to save the species: Environmental awareness in a garden bed.

Keywords: Kirstenbosch NBG, species of conservation concern, *ex situ* conservation

Dabush, J., Kirstenbosch National Botanical Garden, South African National Biodiversity Institute

Nobody forgets the day the 'Snake Man' came to visit their school, and that photograph of you with the 6m long python around your neck still holds centre stage on your mantle. Can you imagine *Lobelia valida* (galjoenblom) stirring the same sort of devotion and excitement? Plant conservation is hard to sell but in a province with over 9000 species, 70% of which are endemic and 64% listed as being of conservation concern, Kirstenbosch NBG is serious about environmental awareness. More than 700 000 domestic and international tourists and about 15 500 guided learners visit Kirstenbosch annually putting it in a powerful position to interface between botanical research, horticulture, *ex situ* and *in situ* conservation. The 'Garden of Extinction' displays some of South Africa's most threatened plants in order to promote their use in home gardening, to act as an outside classroom for a structured EE programmes, but first and fore most, it seeks to make the process of environmental awareness one of discovery. This poster presents some tried and tested ideas on interpretation, considers the resources needed for a display of this kind and tracks the process involved in turning a threatened plant into a 'flagship' species for conservation.

Teens need nature too: programmes, poetry and possibilities in Cape Town

Key words: nature, youth, programme ideas

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A 2007 survey revealed that few organisations in Cape Town offered nature-based programmes for teenagers. Youth were surveyed regarding their feelings about nature and their responses to nature-based programmes. Most teenagers responded positively to questions about the value of nature in their lives, and some of their comments are presented as poems. Many education officers felt ill-equipped to offer science-based fieldwork programmes for high school youth, so this poster suggests other possibilities for engaging with teens in nature, based on aspects of nature that youth particularly valued.

For more information please see the abstract of the talk by the same author: *Beyond senior science: engaging with youth in nature*.

SAEON Fynbos Node: Environmental Science Education Outreach Programme

SCHOOL-BASED WEATHER MONITORING

Key words: education, environmental monitoring, hands-on science activities

Lyners, H. and Allsopp, N.

SAEON Fynbos Node, Environmental Science Education Outreach Programme, South African National Biodiversity Institute, hadley@saeon.ac.za

SAEON (South African Environmental Observation Network) runs an education outreach strategy which seeks to get learners engaged with science through schoolyard monitoring. This is aimed at addressing the low pass rate in science subjects at matric and the low level of enrollment of students in science subjects at universities. Long-term monitoring enables us to understand impacts of global climate change on our environment, to adapt, manage and plan for impacts on our environment and to inform policy on conservation of fynbos in a changing world. By monitoring in the school, learners are involved in collecting weather data which can stimulate enquiring minds to gain knowledge, solve problems and become scientifically literate. Maths and science are applied to real world issues and learners acquire skills that they can use in their futures. The SAEON Fynbos Node is working with teachers from four high schools to support them to develop practical, hands-on science interventions for the benefit of school learners. SA Weather Services scientists and forecasters support the programme by presenting content knowledge to the teachers who in turn, through creative co-creation, develop hands-on activities for use at their schools. Information around SA weather influences, temperature, precipitation and wind are related to the fynbos region and the school environment. Through an interdisciplinary research project approach using scientific method and experiments, schools are encouraged to present their findings

based on the weather data that they have collected. The weather data collected, together with developed hands-on activities can enhance learners' learning experience. Examples include the identification of cloud types and the associated weather, plotting and interpretation of data graphs; calculations e.g. mean, median, mode; investigating variations between predicted weather data from media (newspapers, TV, radio reports) and recorded data from the weather instruments at school.

CONSERVATION:

Rediscovering the Cape Rinkhals: The Search for a Locally Extinct Species

Key words: Rinkhals, local extinction, conservation

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At present the Rinkhals, *Hemachatus haemachatus*, is believed to be extinct from the boundaries which constitute the City of Cape Town (CCT). Historically this snake, a southern African endemic, is known to have occurred at various sites within this locale including, but not limited to, the Kenilworth racecourse and the area today known as Marina Da Gama. However, personal communications with both Dr Tony Phelps and Marcel Witberg (2010) indicate the possibility of sporadic populations within the CCT. Comparatively low detection rates, along with misidentification, may play a significant role in the number of and frequency at which individuals are recorded. Thus the lack of official records may not necessarily infer confirmed absence of the Rinkhals from the CCT but possibly that the lack of data has failed to indicate its status accurately. At any rate, these declines are of conservation concern and at present meaningful conclusions due to insufficient data are unable to be drawn. Consequently, before additional studies are conducted concerning the causal factors for its local extinction or conservation management strategies established to prevent further decline, quantifiable data first need to be analysed to infer the presence/absence of this unique snake with any statistical confidence.

Application to Land care by a Conservancy for funding

Key words: threatened ecosystems, conservation, alien clearing

Heather Epstein¹, Andreas Groenewald², **Di Marais**¹

¹ Schapenberg Sir Lowry's Conservancy, Sir Lowry's Pass

The Schapenberg Sir Lowry's Conservancy (SSLC) was founded in 2000 and lies on the outskirts of Somerset West along the Schapenberg hills, and incorporates the lower slopes of the Helderberg up to Sir Lowry's Pass Village and includes CapeNature's Hottentot's Holland Nature Reserve. Within the Conservancy area are 11 vine/wine farms including 2 Biodiversity and Wine Initiative (BWI) champions, Wedderwill and Waterkloof, and some are BWI members. The granite foothills below the Hottentot's Holland Mountain range support Boland Granite Fynbos (Endangered) and Swartland Granite Renosterveld (SGR) (Critically Endangered). The City identified biodiversity corridors across the extent of the Conservancy area in their Biodiversity Map of 2008. The main aim of the Conservancy at present is the restoration and preservation of the land within these biodiversity corridors. To this end the SSLC set up guided walks between the wine farms where participants can also taste the wine of the region. All monies from these walks are directed towards our conservation initiatives. Income is however meagre at present and we require financial assistance with setting up bush clearing teams to clear the vast tracts of alien vegetation on the Schapenberg and along the Sir Lowry's river. We have approached LandCare and are putting forward a project proposal to LandCare for assistance with our conservation efforts. Areawide planning will be implemented within the Conservancy area concurrently with the application.

This presentation will detail the steps followed by the SSLC in applying for funding from LandCare and appointing bush clearing teams.

**CapeNature's Regional Ecological Support Team:
The interface between management and science**

Keywords - Ecological support, interface, standardisation

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The Regional Ecological Support Team (REST) concept has evolved due to an organisational need to collect and curate relevant and reliable biodiversity data, and the analysis thereof to inform management and directive decision making. The concept is to provide a viable bridging mechanism between field staff, management and Scientific Services to ensure the efficient flow of accurate, reliable and relevant data, as well as scientifically process such information and data, between the relevant components. Management interventions of CapeNature's core business are carried out within eight areas within the Western Cape, namely the Boland, Cape Metro, Garden Route, Karoo, North West, Langeberg, Overberg, Breede Berg Area's. The objectives of the REST's are to support biodiversity planning and review, to support effective data management, to provide ecological decision support, to create and maintain a scientifically sound biodiversity monitoring and evaluation system, to facilitate staff development and to promote biodiversity coordination and networking. To achieve this integration the REST comprises a Regional Ecologist, two Area Ecological Coordinators and a GIS Technician reporting to four different supervisors, namely the two Area Managers, the Knowledge Manager and the

Biodiversity Manager. The REST management plan will provide the basis for the development of regional work plans that will incorporate the organisational priorities and area focussed priorities. The REST's primary focusses in quarter one have included the Invasive Alien Plans and Management Unit Clearing Plans, the compilations of the individual component Ecological Matrices and standardising of Ecological Plan of Operations but as a few of the means by which to address the REST's primary objectives.

What happened to your warm fuzzy feeling?

An update on the use of donations from Interfaces 2008 for spekboom restoration in the Baviaanskloof

Key words: restoration, financing, living landscapes

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The Interfaces 2008 conference brought the Arid Zone Ecology & Fynbos Forums together for the first time. In line with its theme of interfacing across biome boundaries, the event also offered attendees an opportunity to 'green' their conference footprint and invest in the restoration of the subtropical thicket biome. Many participants took this opportunity and gave themselves a 'warm fuzzy feeling' by making a charitable donation toward spekboom-driven restoration in the Baviaanskloof.

A total of R1877.00 was gratefully received by Interfaces attendees and this amount was subsequently 'topped-up' by Living Lands to a total of R5350.00. Every rand went to healing land: No transactions costs were levied nor was any other (overhead) revenue derived. An area of 1.1ha was rehabilitated in the Baviaanskloof Nature Reserve with 2750 new spekboom cuttings. Conservative estimates suggest that these actions will result in 2.6 tonne of C per year for 30 years being sequestered. This work has been carried out by a team comprised of local community members formerly trained through the Working for Water (Woodlands) programme.

Building on these earlier pilot initiatives, Living Lands has recently launched Elemental Equity as a charitable fund targeted at restoring 'living landscapes.' Elemental Equity adopts the intuitively, holistically and cross-culturally understood notions of 'Air, Water, Earth & Fire' to act as an interface for attracting and up-scaling investment in carbon (e.g. spekboom reforestation), water (e.g. black wattle clearing), biodiversity (e.g. wetland

re-creation) and energy (e.g. fire management) as interconnected vehicles for 'mainstreaming' restoration. Elemental Equity additionally seeks to build on the strong basis of the public 'Working for W' programmes and stimulate renewed private sector interest in innovative forms of natural capital investment and incentive-based ecosystem services schemes (e.g. PES). More information about Elemental Equity and ways to invest can be found online at: <http://elementalequity.org>

Groot Winterhoek freshwater stewardship corridor

Key words: Olifants River catchment, biodiversity awareness, ecosystem services

Van der Walt, J.A., CapeNature, Porterville

The Great Winterhoek freshwater stewardship corridor is a landscape level conservation project linking Cederberg and Groot Winterhoek wilderness areas through a biodiversity corridor. The building blocks of this corridor are stewardship agreements with individual landowners. Through biodiversity agreements the project aims to mitigate the negative effects on the aquatic and terrestrial ecosystems within this corridor. Water from this catchment is the main agricultural driver for the Olifants River valley and it is also important in terms of supplying water for mining, domestic and recreational use. The Olifants-Doring River system is also a biodiversity hotspot in terms of the aquatic diversity. All eight endemic freshwater fish species in the Olifants River has become so scarce or threatened that they all have been included in the IUCN Red List. Important tributaries of the Olifants River including the Noordhoeks-, Thee, Oudste, Twee and Ratel River have their origins in the focus area of this freshwater corridor. Threats to the biodiversity in this corridor are: alien fish, bulldozing of river banks, excessive water use from rivers, in stream dams, alien plant species and an increased fire frequency. As part of the awareness raising campaign, landowners, farm workers and local school learners are educated about the value of the corridor in terms of its rich biodiversity and ecosystem services that this catchment delivers.

Threatened Erica species of the Central Section of Table Mountain National Park

Key words: threatened Erica's, rise of systematic biology, conservation status

Smith, R.J. Silvermine Homestead, Ou Kaapse Weg, Table Mountain National Park.

Table Mountain National Park is one of 12 sites in eight countries of the world that has been nominated to become a world heritage site for the rise of systematic biology. In order for it to be named as the official site of taxonomy, sufficient information and data needs to be collected on plant species identified and named by Carolus Linnaeus (1707 – 1778). If the species are still in existence in the park and they can be located, this can contribute to the selection of the park as a world heritage site under Criterion VI of the world heritage committee. Some of the threatened Erica species of Silvermine named by Linnaeus are chosen as the species of interest. The conservation status of Erica capitata, Erica limosa, Erica paludicola, Erica salteri and Erica socorum will be determined by applying the IUCN measurements. A systematic survey which covers the whole study area will be done before the sampling effort starts. This is to establish the location and distribution of the species. The locations will be recorded on a GPS with a monad map of 1min. x 1min. programmed on it. Total counts will be done on rare species found in isolated patches. A Plot sampling Method i.e. Quadrat Sampling will be used to determine the density (n/ha) of the species. Simple random samples will be used so that each plant in the population can contribute. Quadrats of 10 x 10 m will be used. Where individuals in the population are scattered, transects will be used. Distribution, abundance and density as well as occupancy will be determined from the data collected. Life history variables of the species will also be looked at e.g. seedling dispersal, fire, age, preferred habitat etc. Threats will be assessed and also the effects of climate change on the species.

Protected Area Sensitivity Analysis & Zonation: Application in the City of Cape Town, with relevance to assessing small protected areas in an urban environment.

Key words: Sensitivity analysis, zonation, land use planning

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The City of Cape Town's Biodiversity Management Branch is in the process of developing management plans in terms of the National Environmental Management: Protected Areas Act (NEMPA). The Land Use Planning Ordinance (LUPO) does not apply inside proclaimed protected areas, as defined by NEMPA, and as such the Act requires the development of a Conservation Development Framework that will guide development inside protected areas as well provide a zonation plan and associated land use guidelines. The sensitivity-value analysis is the landscape analysis portion of the broader Conservation Development Framework. Applying a sensitivity analysis to small urban nature reserves requires a fine scale level of information in order that the analysis accurately reflects the sensitivity values of the site. In the City, the analysis also needs to take into consideration the broader landscape context in which each protected area resides. The methodology as developed by SANParks was adapted for use in the City and this was applied to the City's Nature Reserves. The identification of use zones (zonation) provides a powerful tool for strategically controlling development and management activities. If the zoning is to provide an optimum control and ensure that reserves maintain their

required conservation values then the zoning must be based on strong biodiversity informants. The sensitivity-value process is a decision support tool for spatial planning that is designed to integrate best available biodiversity information into a format that allows for defensible and transparent decisions to be made inside protected areas. Understanding the actual contribution towards biodiversity targets made by protected areas in the City is an important informant in guiding future protected area expansion and as such, the process aims to operate within the principles and philosophy of systematic conservation planning.

Cape Town's unique biodiversity in peril

Key words: threatened ecosystems, conservation, development pressures

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The City of Cape Town sits at the heart of the Cape Floral Kingdom. Although covering an area of only 2400km², it contains 11 of the 21 Critically Endangered ecosystems (as defined by the National Environmental Management, Biodiversity Act of 2004) in South Africa. In this area some 13 plant species are globally extinct (at least in the wild) - 3.4% of the world's 380 extinct plant species occur within Cape Town. A further 319 threatened plant species (with a Red List status of Critically Endangered, Endangered and Vulnerable) occur in the City. At current rates of development, all open land within the City will be urbanized within 10 years, greatly increasing the number of threatened species and extinctions.

As part of the 2010 Year of Biodiversity, the City of Cape Town, in collaboration with SANParks, CapeNature and SANBI, is producing fact sheets and posters to publicise the dire straits of biodiversity in the City. These are available on the web at www.capetown.gov.za/environment (go to "Publications" and select "Brochures & Pamphlets."). A fact sheet has been produced each of the six endemic vegetation types and for threatened and endemic species. It is hoped that teachers, writers and tourist agencies will help disseminate the information and get the public more involved in conservation issues in Cape Town.

DATA:

A CYBERTRACKER Key to the alien flora of the Cape Peninsula and Cape Town

Key words: invasive plants, illustrated guide, palmtop, quick key

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The SANBI Early Detection Programme has commissioned the design of a electronic field key to the aliens of South Africa for use by rangers and managers. Following interest by the City of Cape Town, a prototype for the Cape Peninsula has been expanded to the city. The Peninsula is a challenge: some 490 naturalized aliens occur in the region, many of which are obscure or localized. One quarter of these were not recorded in the region in 1950.

To be easily used in the field on a palmtop or cell phone, the key has to be simple and robust. The features “growth form”, “leaf shape”, “leaf arrangement” and “leaf hairs” was found to be ideal in rapidly resolving to groups of less than 10 species, which could be displayed for visual selection. Half the species could be resolved with 4 ‘touches’: trees with simple-narrow, alternate, hairless leaves were the most difficult to resolve with 28 species unresolved after 4 ‘touches.’ The following ancillary features are also included: “leaf surfaces”, “leaf margins”, “stipules”, “thorns”, “sap.”, and the floral features “flower type” and “flower colour” are being experimented with. However, the emphasis on leaf features has obvious benefits. Grasses have a special key based on “ligule”, “flowerhead type” and “habit.”

The final selection screen contains a picture of the plant, a brief diagnostic description and notes on occurrence. We are contemplating including local maps as well. Multiple pictures are possible and for some species pictures of habit, leaf, flowers, bark and fruit are available.

We are looking for good quality pictures of aliens that can be used. If you have any quality pictures of aliens and are willing to waive copyright for acknowledgement to assist in this endeavour, please e-mail or ftp them to us.

A demonstration of the key on Cybertracker and a 5-minute crash course on its use will be available.

Fynbos at your finger tips

Key words: Communication; Wikipedia; Fynbos Ecology

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Ever found yourself at a loss on where to find information on Fynbos and Fynbos ecology? Look no further! Researchers from the Universities of Cape Town, Stellenbosch and Regensburg (Germany) have set up a Fynbos Wikipedia that is aimed at knowledge collation and exchange related to the Fynbos biome and beyond. This online resource relies on input from its users. Thus, anyone who has access to a computer can write or edit an article on the FynbosWiki. The wiki features articles of the month, introduction to projects working on Fynbos ecology, a reference data base where scientific and other articles on Fynbos are collected, a news section, blogs and links to numerous other sites. The wiki is not only aimed at everyone working in Fynbos (science, education, conservation, forestry, agriculture, government, NGOs, private sector, landowners,...), but also at those with a keen interest in Fynbos and its ecology. Visitors to the wiki can either browse through the content or contribute themselves by adding new information either by editing / adding to an existing article, or by creating a new article. Please and visit the wiki today and share your knowledge and expertise.

FynbosWiki: http://fynbos.hallowiki.biz/index.php/Main_Page

Fynbos Reference: <http://www.fynboswiki.org/refbase/>

ECOLOGICAL PROCESSES:

Carbon stocks in fynbos, pastures and vineyards on the Agulhas Plain

Key words: Agulhas Plain, Carbon, Land use.

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Above- and below-ground carbon stocks in fynbos, pastures and vineyards on the Agulhas Plain were measured in order to determine whether conserving fynbos conserves carbon stocks relative to other land uses in the region. Three fynbos types, namely Elim Asteraceous Fynbos (EAF), Overberg Sandstone Fynbos (OSF), and Limestone Fynbos (LF) were investigated

in this preliminary study. Key results were as follows: i) differences in soil carbon between land uses in different fynbos types were not statistically significant, although pastures showed a trend of having greater soil carbon than fynbos in EAF and LF; ii) root carbon was greater in fynbos than in vineyards (8.8 ± 2.2 [SE] t C ha⁻¹ vs 0.4 ± 0.14 t C ha⁻¹, results pertain only to EAF and OSF as vineyards were not found in LF); iii) root carbon was greater in fynbos than pastures (11.1 ± 3.4 t C ha⁻¹ vs 4.5 ± 1.4 t C ha⁻¹, Wilcoxon paired comparison); and iv) above-ground carbon (litter and biomass) was greater in fynbos than pastures (12.7 ± 3.8 t C ha⁻¹ vs 0.8 ± 0.45 t C ha⁻¹). The results indicate that conversion of fynbos to pastures and vineyards results in a total loss in the order of 15 - 25 t C ha⁻¹ in above-ground and root carbon and that the loss varies according to vegetation type. Additional soil sampling is required to determine whether conversion of fynbos to pasture and vineyards results in an increase in soil carbon thereby negating the loss of above-ground and root carbon. Such soil sampling was recently undertaken across the Agulhas Plain and the results will be presented in August during this presentation.

Drought-tolerance of the alien tree *Acacia mearnsii* and the native tree *Brabejum stellatifolium* in Fynbos Riparian Ecotones

Key words: Riparian, Drought-tolerance, *Brabejum stellatifolium*, *Acacia mearnsii*

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Exotic invasive plant species in riparian habitats in the Fynbos in the Western Cape of South Africa have reduced streamflow, compromised habitat quality for other species, and outcompeted native species. What is not clear is why the most problematic invasive species are able to outcompete native species and spread. Studies on adult plants in the riparian Fynbos of the Western Cape suggest that one of the most invasive exotic species, *Acacia mearnsii* may be more drought tolerant than native species, and that may contribute to its invasive potential. We were interested in determining whether observed differences in drought tolerance in adults would also be observed in seedlings. We compared drought tolerance of co-occurring juvenile individuals of *A. mearnsii* and a native species, *Brabejum stellatifolium*, on the Holsloot River near Rawsonville in the Western Cape of South Africa. We expected to find that *A. mearnsii* seedlings would have lower P₅₀ values; these values indicate the xylem water potential at 50% loss of hydraulic conductivity, and similar water potentials. Vulnerability curves were determined for 6 individuals of each species, and P₅₀ values were calculated. Mean values of P₅₀ for *B. stellatifolium* and *A. mearnsii* juveniles were, -1.3 MPa and -1.5MPa respectively. *Acacia mearnsii* juveniles had lower pre-dawn water potentials than *B. stellatifolium*, -0.69MPa and -0.26Mpa respectively and slightly lower mid-day water potentials, -2.45MPa for *A. mearnsii*, and -2.04 MPa for *B. stellatifolium*. These results suggest that seedlings of *A. mearnsii* are subjected to increased water stress relative to *B. stellatifolium*, yet do not exhibit increased adaptation to drought as indicated by the P₅₀ values of the seedlings. Mid-day water potentials of both species were more negative than P₅₀ values suggesting both species are maximizing stomatal conductance at

the expense of vulnerability to catastrophic embolism. Our results suggest the invasive potential of the exotic *A. mearnsii* is not linked to increased drought tolerance relative to native species in the seedling stage.

Drought-tolerance of Selected Alien and Native Tree Species in Fynbos Riparian Ecotones

Key words: Riparian, Drought-tolerance, *Acacia mearnsii*

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Riparian ecosystems of the Mediterranean south-western Cape region are projected to experience significant decreases in streamflow due to climate change and increased demands for water associated with human demographic trends and increasing living standards. Aggravating this problem are woody invasive alien plants, such as *Acacia mearnsii*, whose impacts, including those on catchment water yields, have justified extensive eradication programmes such as Working for Water (WfW). Unfortunately, the managers of these eradication initiatives often experience a lack of information on the species- and site-specific ecological properties that may aid in prioritising sites more prone to invasion, essentially inhibiting accurate management output. Knowledge, such as that associated with the possible future distribution of invasive species in a changing environment, may help to optimise eradication initiatives. We therefore determined whether woody plants portray different physiological (vulnerability to cavitation) traits across three prominent riparian zones in the south-western Cape that each differ in streamflow quantity – to gain a mechanistic understanding of how woody species, especially invasive species, adapt their hydraulic strategy across this proxy for water availability. Results supported the significant variation in drought-tolerance strategies that exist within and between taxonomically different species across different environments. Water availability thus has a strong selective effect on functional traits of species; however, minimum water potentials were more useful in describing *in situ* hydrological conditions than streamflow. This mechanistic approach to assess the invasive potential of species under projected drier conditions has great practical value. It can be used to improve species selection for restoration initiatives, and is of great value for future use in prioritizing eradication programmes.

Soil respiration in terrestrial and riparian environments in the fynbos biome

Key words: riparian ecotones, soil processes, soil respiration

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Soil respiration is an important process that contributes significant amounts of carbon to global atmospheric carbon stocks and carbon cycling; however, little is known about the factors that control soil respiration in fynbos uplands and riparian zones. We did a preliminary investigation into the rate of soil respiration and the abiotic and biotic factors controlling this process in natural, invaded and cleared riparian zones and adjoining upland areas. The absolute rate of soil CO₂ efflux is comparable to some similar ecosystems. We found weak relationships between soil respiration and catenal processes, more precisely soil moisture, however, soil temperature seem to be influential in determining the rate of soil respiration. This is in line with the decline of microbial activities and root respiration during the colder wet season in this Mediterranean-type ecosystem. Riparian zones, consistently wetter than elsewhere in the catena, did not show consistently higher soil respiration rates compared to upland areas, contrary what was found in other South African biomes. Based on these preliminary results it seems that soil temperature, rather than soil moisture is the stronger control on soil respiration in the fynbos biome, and that riparian zones make an important contribution to soil CO₂ emissions.

ALIENS:

Is the beautiful waratah (*Telopea speciosissima*) an emerging invasive alien plant in fynbos?

Key words: waratah, risk, horticulture

Tshivhase Tshoshovho (NRF/DST/SANBI)

Ernita van Wyk (SANBI)

Ian Olivier (Helderberg Nature Reserve/City of Cape Town)

A small naturalizing population of *Telopea speciosissima* (waratah) was found in the Helderberg Nature Reserve mountain fynbos during October 2009. *Telopea speciosissima* is native to New South Wales, Australia and is one of 5 species in the *Telopea* genus, family Proteaceae. The waratah is a popular garden ornamental in South Africa and is readily available in nurseries around the Western Cape. There is no record to date of this species being invasive elsewhere, yet it is showing signs of successful recruitment on the fynbos mountain slopes of the Helderberg Nature Reserve. The Early Detection Programme (SANBI) and staff of the Helderberg Nature

Reserve will start collecting data on this Helderberg population in September 2010 (flowering time for *Telopea*) to determine pollinating agents, viability of seeds, current distribution and age and size structure of the population. In general, we want to determine potential invasiveness of the species and the risk it poses to mountain fynbos. Our aim is to contain or eradicate the *Telopea* population in the Helderberg Nature Reserve, but we also want to determine the primary source of invading waratah plants in the Helderberg Nature Reserve. Since the plant is a popular horticultural species, we wish to know whether the nursery trade is a significant supplier of *Telopea* species in the Cape and specifically Somerset West. This poster reports on a preliminary study of *Telopea* ecology and a survey of its use as an ornamental species in South Africa. This work lays the foundation for determining what risk we should attach to *Telopea* as a possible threat to fynbos.

A survey of alien fish fauna in the central section of the Table Mountain National Park.

Key Words: Alien fish fauna, conservation, Noordhoek Wetlands

Loubser, B.P., Conservation Student, South African National Parks

The Table Mountain National Park has limited information regarding the alien fish fauna that occur within its boundaries. The many indigenous species of fauna and flora that occur in the Park could be negatively affected without this valuable information. Three study sites have been selected in the Noordhoek Wetlands in the central section of the Park.

Papkuilsvlei is a semi-seasonal wetland but becomes waterlogged in the winter months. The many coastal dunes separates the water body from the Noordhoek beach and the outflow discharges through the coastal dunes as well as overland in the direction of the Wildevoelveis. There is no knowledge of what alien fish fauna are present in Papkuilsvlei. Lake Michelle is a private residential area and has been stocked with alien fish fauna by homeowners. Water is emptied from Lake Michelle via a Furrow into the Noordhoek Wetlands. There are known alien fish fauna in the lake, they are as follows: Common Carp (*Cyprinus carpio*), Sharptooth Catfish (*Clarias gariepinus*) and Banded Tilapia (*Tilapia sarrmannii*). The Wildevoelveis are situated on the old Slangkop Farm in the Noordhoek Wetlands and they receive flow from the following sources: Ocean View, Fish Eagle Park, Heron Park, Masiphumele, Sun Valley and the majority coming from the Wildevoelvei Wastewater Works. Limited knowledge is available regarding the alien fish fauna in the vlei but two known indigenous fish species are known, namely, Freshwater Mullet (*Myxus capensis*) and Southern Mullet (*Liza richardsonii*).

Cast nets and line fishing will be the two methods used to sample the three study sites.

The objectives of the study are to determine what alien fish fauna occur at the study sites, to record baseline data regarding the alien fish fauna such as species and length, to compile an alien fish fauna list, to compile a comprehensive field guide to assist future researchers and to compare various water quality parameters.

Evaluating two Australian *Melaleuca* species as eradication targets in a fynbos reserve.

Looking beyond population data.

Keywords: *Melaleuca*, alien plant species, eradication

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Early detection and subsequent response is crucial in invasive alien plant management, significantly reducing ultimate resource allocation to this biodiversity threat. In this context, we present here primary surveys of the Australian, *Melaleuca ericifolia* Sm., Swamp Paperbark and *Melaleuca quinquenervia* (Cav.) S.T.Blake, Broad-leaved Paperbark, naturalised at Waterval Nature Reserve in the Western Cape, South Africa, to determine invasiveness and possible eradication. Being unlisted under the Conservation of Agricultural Resources Act, little is known about the invasiveness of *M. ericifolia* elsewhere in the world, while *M. quinquenervia* is listed in the global top 100 most invasive species. To determine invasiveness we measured population spread parameters for *M. ericifolia* (pre-clearing) and *M. quinquenervia* (post-clearing). Both species are primarily water-dispersed and have shown profuse recruitment in wetter environments, indicating potential invasiveness even though the respective population spreads have thus far been limited. We show that while estimating invasiveness with plant growth and population spread parameters are important, additional contextual information (historical introduction, site histories, herbarium records, climatic suitability and global context) informs decisions around whether a species may be an eradication candidate as opposed to a species and situation more suited to a containment type of management strategy.

Ecological impacts of invasive alien plants in fynbos and its relation to fire: Lessons from the Cape Peninsula

Key words: invasive alien clearing, fire, fynbos

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The Cape Peninsula suffered from intense fires in January 2000 where more than 8000 hectares of pristine and alien-invaded fynbos burnt. These fires were considered unusually intense, particularly in alien-invaded areas. This poster compares results from two studies conducted 7 years apart within permanently-marked plots to determine the ongoing ecological impact of invasive alien plants and fire. The results describe the successional changes experienced in these permanent plots. Similar species richness was obtained for pristine and cleared areas in 2007, which was in contrast to the 2000 study, where these differences were found to be significant. Similar results are discussed for vegetation cover, vegetation composition and changes to regeneration modes within the permanently marked plots. With regard to indigenous vegetation recovery, areas cleared prior the fires proved to mirror pristine areas better than areas where alien plants were burnt standing. Cleared sites are often left to recover naturally and this process is aided by the continuous clearing of alien plants. This serves to deplete alien seed banks and maintain alien plants at manageable levels. This poster provides insights for biologists and managers in relation to the recovery of fynbos vegetation following large fires.

National Invasive Alien Plant Survey

Key words: Invasive alien plant species, survey, Working for Water.

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The negative impact of Invasive Alien Plant (IAP) species on natural areas, as well as other areas such as agricultural land, has been extensively researched. Certain mitigation strategies and programmes have been put in place such as the internationally recognized Working for Water Programme of the Department of Water and Environmental Affairs. Such an initiative requires objectively determined spatial distribution data of IAP species at the required scale to allow for effective planning, implementation and future monitoring of IAP spatial changes. The National Invasive Alien Plant Survey project was initiated by the Working for Water Programme and implemented by the Agricultural Research Council. The aim was to establish and implement a cost effective, objective and statistically sound IAP monitoring system for South Africa, Lesotho and Swaziland at a quaternary catchment level. A complete inventory and a standard sampling approach both have limitations, mainly due to the size of the study area (127 million hectares) and variation in the natural environment, leading to high associated costs. An innovative sampling approach was therefore required. Sampling orientated along an environmental gradient, that contributes the most to species occurrence, would detect the maximum variation in an area, therefore resulting in a stratified proportional approach. A further riparian sample layer was allocated. A third regular grid point layer was created for selected quaternary catchments to serve as an independent source of verification. Different field survey approaches were simulated and the most suitable was an aerial approach. An extensive field survey was conducted of the sample points. Field data was analyzed and the relevant IAP maps were produced.

Seed rain and seed bank status of *Acacia saligna* across a geographical gradient in South Africa.

Key Words: *Acacia saligna*, seed bank, seed rain

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Introduced species pose a large threat to the environment they invade, as the invaded environment will be subject to alterations which potentially may be lethal to native species. In South Africa the fynbos biome, renowned for its high species richness, is scourged by a whole range of invasive aliens of which *Acacia saligna* (Port Jackson) was deemed the most damaging in the coastal lowlands of the south-western Cape. *Acacia saligna* populations are impacted by the Australian gall forming rust fungus, *Uromycladium tepperianum*, which has led to decreased stand density, reduced canopy density and reduced seed production. However, even with the highly detrimental effects of *U. tepperianum* on *A. saligna*, seed production is still high enough to lead to the accumulation of large numbers of viable seed in the seed bank creating the opportunity for the tree to persist in time and space and to re-establish the population in the future. This study will aim to assess the seed bank together with the seed rain of *A. saligna* over the tree's distribution range. This will give an indication of where the seed bank is potentially the largest threat and will therefore identify priority areas for management. Furthermore the study will also evaluate how rainfall, soil properties, stand density and stand age influence the seed bank and seed rain. This will be measured in an attempt to determine and describe the conditions leading to the formation of the soil seed bank and will therefore indicate areas most vulnerable to invasion by Port Jackson. Ultimately it will further our understanding on seed bank dynamics, improving our capability to manage this invader effectively.

Addressing aquatic invasions in the City of Cape Town

Key words: ecosystem services, threat, interventions

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Cape Town's rivers, wetlands, dams, and estuaries form important "green corridors" between the mountains and the coastline, and provide habitats for a rich diversity of terrestrial and aquatic life. These freshwater aquatic systems are essential components of the Biodiversity Network, they moderate floods, purify water, and generate and renew soil fertility. In addition to these natural ecosystem services, they form a vital component of the city's storm water management system, are key recreational nodes, and are used for conveyance and disposal of wastewater effluents.

Amongst the various and often overwhelming threats to the freshwater aquatic systems in the City of Cape Town, invasive alien species count amongst the most important and most damaging.

Urgent interventions are required to address the escalating invasive species threat to the freshwater aquatic ecosystems in the City of Cape Town.

This poster demonstrates the main invasive specie threats, pathways and interventions.

Fynbos Riparian ecosystem function and IAPs

Key words: riparian ecosystem function, nutrient cycling, invasive alien plants (IAPs)

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Worldwide, riparian zones have been degraded on a large scale. One important category of impacts to riparian ecosystems is that associated with plant invasions. Some of these invasions, in turn, have diminished the capacity for rivers to provide ecosystem services. During the last two decades ecologists have become increasingly interested in understanding the determinants and function of biodiversity in Mediterranean-climate ecosystems and the potential for non-native species to dramatically alter community structure and ecosystem processes. The species-rich fynbos vegetation of the Cape Floristic Region (CFR) of South Africa, one of the most nutrient-poor regions of the Mediterranean-type ecosystems, might be highly susceptible to the impacts of symbiotic N₂-fixing invaders. Soil characteristics, including nitrogen, determine fynbos community structure, and species presence or absence. Woody alien tree species, such as Australian Acacias (*Acacia mearnsii*, *A. longifolia*, *A. saligna*), form dense stands in both the wet- and dry bank lateral zones, excluding indigenous riparian fynbos vegetation and disrupting ecosystem functioning (such as nutrient cycling and water availability). Native fynbos species have shown decreases in growth rates with increased levels of nitrogen or phosphorus. Whether invasive species are drivers or passengers of change in degraded ecosystems remains a controversial subject, but considerable attention is now being focused on those species that significantly alter native composition, structure and function. After the large-scale clearing of invasive plants, changes in nitrogen cycling and secondary invasions may hinder efforts to re-establish native species, as they may not be able to grow under enriched conditions. Understanding the links between restoration, plant biodiversity, impact of IAPs, and riparian ecosystem functioning in the Fynbos Biome is currently lacking, and is the focus of our study. We present a conceptual perspective of the linkages between soil processes, plant invasion and restoration of ecosystem services in fynbos riparian ecotones.

Determining the resource requirements to eradicate *Amietophrynus gutturalis* from the City of Cape Town.

Key words: invasive; eradication; resources

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A. gutturalis, a toad species naturally occurring in the summer rainfall region of Southern Africa, was first introduced to Constantia, Cape Town presumably in 1999. The species has since established a rapidly spreading population currently covering more than 5km². Reports were confirmed of intentional introductions of Guttural Toads by members of the public to Zeekoevlei Nature Reserve in 2009.

The Guttural Toad Steering Committee (GTSC) identified *A. gutturalis* as a potential threat to the indigenous and endangered *Amietophrynus pantherinus* (Western Leopard Toad). This is due to *A. gutturalis* utilizing similar resources, habitat and having a protracted breeding season of up to nine months. In comparison to *A. Pantherinus* which are known to breed for up to one month per breeding season. This increases the success in reproductive numbers and allows for a greater consumption of resources over an extended period of activity by *A. gutturalis*.

The Biodiversity Management Branch of CoCT in partnership with the South African National Biodiversity Institute (SANBI), CapeNature and South African National Parks, formed the Guttural Toad Steering Committee (GTSC) with the purpose of facilitating the implementation of the Guttural Toad eradication project in the CoCT. Implementation is to be carried out by the Biodiversity Management Branch of CoCT.

The resource requirements of this eradication programme are unknown. By calculating the potential recourses required to eradicate *A. gutturalis* through calculating the required unit effort from resources expended on the project, the feasibility and sustainability of the eradication programme may be ascertained. Appropriate control actions can be considered by determining the cost of eradication.

***Achatina zebra* as an alien species**

Key words: Invasive alien species; distribution; control methods research

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Achatina fulica is regarded as one of the most invasive alien snails in the world and with so little information available on *Achatina zebra*, the author believes that this study is essential to understand the threat which this species could pose to the natural ecosystem of the Cape Flats. This study involves construction of snail pens on Edith Stephen's Wetland Park and to introduce different types of natural vegetation to determine whether the species is able to feed on them. Another purpose for the study is to determine how they would affect natural food chains and if it can provide food for any alien species such as the Guttural Toad which may cause an increase in population of alien species because of the abundance of food. Lastly the removal of the snail is important and testing various methods of eradication is integral to the long term management of this species.

A Comparison of the Occurrence of *Linepithema humile* in Pristine and Disturbed Areas at Kenilworth Racecourse Conservation Area

Key words: Invasive species; interruption to myrmecochory life strategy; presence/absence study

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Kenilworth Racecourse Conservation Area (KRCA) is an area of approximately 52 ha and is situated in the centre of the Kenilworth Racecourse. KRCA is regarded as the best example of Cape Flats Sand Fynbos remaining on Cape Peninsula. KRCA is home to 35 endangered species of which two are endemic. *Linepithema humile*, commonly known as argentine ants are an invasive species that were introduced to South Africa by the British during the Anglo Boer war. *L. humile* are known to invade disturbed areas, however it has been found that they are also able to invade pristine areas and as a result compete and with indigenous ant populations. This invasion has a detrimental effect on other species in the ecosystem such as native plants that depend on the native ants for seed dispersal. In Fynbos ecosystems, indigenous ants carry the plant seed underground where they will be safe from predation and fire and that process is called myrmecochory. Large seed banks are therefore impacted by fire and predation after the invasion of *L. humile* leading to a shift in the composition of the fynbos plant communities. This study will determine if there is a presence of *L. humile* in disturbed and pristine areas in KRCA, and assess whether different disturbances such as dumping and soil removal affect the presence of the *L. humile*. Through observations it will be noted if the *L. humile* is having a negative effect on the indigenous ants as a result of activities such as predation, competition.

The Detection and Spread of *Lythrum salicaria* in the Liesbeek River System

Key words: Invasive Alien Vegetation; early detection; control measures

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Lythrum salicaria, more commonly known as the purple loosestrife, is an alien invasive plant from Europe and Asia. In South Africa, *L. salicaria* is only found on the Liesbeek River system. This localized invasive alien plant species is highly adaptive to various conditions and this contributes to the reproduction of the plant, which includes vegetative growth, dispersal of seeds and pollination. This research project will look at the aspects related to detection and spread potential of *L. salicaria*, as it has not yet been studied in South Africa. It will combine biophysical and human aspects of the plant's spread potential and attempts to limit its spread via control methods that include early detection, mechanical and chemical applications. This project includes the identification of high risk wetland areas, mapping the population of *L. salicaria*, raising public awareness, identification of distribution routes and the eradication process of *L. salicaria*. The study of detection and spread potential of *L. salicaria* is expected to make an important contribution to the management of this species in the Liesbeek River and the surrounding wetlands and waterways.

ECOSYSTEM SERVICES:

An economic evaluation of the impact of restoration on ecosystem services in the Kromme River System, South Africa

Keywords: ecosystem services, water supply, Nelson Mandela Bay

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Port Elizabeth is once again experiencing water shortages and the municipality is looking for options to augment water volume and decrease the variance in its supply. Port Elizabeth currently obtains sixty percent of its water from the Kromme River Catchment. Reduced risk and increased volume can be achieved in many ways. Among these are, spreading sources geographically (e.g. to new catchments), incorporating new technologies (e.g. desalination or recycling), diverting water from non-urban users such as the Kromme River farmers (or indeed by tapping into the instream flow) or improving the management of existing water sources such as the Kromme River Catchment, which currently provides sixty percent of Nelson Mandela Bay Municipality's water demand. Improved Kromme River Catchment management may be done privately (e.g. changing land use patterns by farmers) in the catchment, or it may involve public sector activities such as the

restoration and rehabilitation undertaken by 'Working for Water' and 'Working for Wetlands'. This study aims to investigate and evaluate the economic impacts of improved catchment management. This will require the identification of the watershed services resulting from such restoration – e.g. water quality, water regulation and flood attenuation. The costs and benefits accruing to the landowners, their opportunity costs and those of other water supply options will be examined, as well as their impacts on the delivery of water related services. Once a marginal revenue product has been estimated for incremental water supplies in the Kromme River, it will be ascertained whether it is cheaper for NMBM to meet their growing demands from other augmentative options, or from the improved land management in the Kromme.

A hydrological evaluation of the effects of restoration on ecosystem services in the Kromme River System, South Africa

Keywords: catchment-scale, restoration of natural capital, ecosystem services.

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The coastal city of Port Elizabeth is in the midst of a water crisis and is searching for ways to increase water supply, and achieve water security. Port Elizabeth currently obtains sixty percent of its water from the Kromme River Catchment. Farmers have occupied the Kromme River Catchment since the eighteenth century. According to the first aerial photographs taken in 1942, the catchment had already been transformed to a degree. However it was not until after the 1940's, driven by growing economic pressures, that unsustainable farming practices increased. Activities altering the catchment included over-grazing, alteration of flood plains for crop production, planting of alien trees (mainly *Acacia mearnsii*), canalization of the river, straightening of the river, building infrastructure through and alongside the river, mechanical damage to the wetlands (ploughing) and the removal of palmiet (*Prionium serratum*). In 1996, Working for Water commenced restoration in the Kromme River Catchment. Since then restoration has comprised two approaches; firstly the construction of gabions to prevent further erosion from headcuts, and secondly the clearing of *Acacia mearnsii* from the river bed and flood plains. If it can be shown that the continuing land degradation in the Kromme River Catchment is reducing the quantity and quality of water that could be available for human consumption, the municipality may focus more efforts on restoring the catchment. This study aims to investigate the impact of restoration on several ecosystem services, both provisioning (water flow) and regulating (water purification, assurance of supply, erosion control, flood attenuation) services. The central hypothesis is that the restoration of natural capital in the Kromme River Catchment has improved water flow, water quality, erosion control and flood attenuation.