FYNBOS FORUM

Reins Nature Reserve

22 – 23 September 1999

Funded by the National Research Forum

PROGRAMME FOR FYNBOS FORUM

Wednesday, 22 September 1999

08H30		Welcome CNC Board member Opening address - Marlene Laros
Session 1		**CAPE PROJECT** **Chair :Dr Rob Little**
08H45		**Ian Macdonald:** Overview of the CAPE project, programme, timeframes and products. The role of WWF and other organisations. (20 mins)
09H05		**Richard Cowling:** Systematic conservation planning for the CFR: concepts, protocols and targets (20 mins)
09H25		**Ernst Baard:** Cape Nature Conservation's State of Biodiversity Programme: implications for lower vertebrate conservation in the Western Cape.(10 mins)
09H35		**Diekie Van Nieuwenhuizen:** REPORT ON FRESH WATER RESEARCH. (10 MINS)
09H45		**Andre Boshoff:** Distributions and estimated spatial requirements for medium to large sized mammals in the CFR. (15 mins)

10H00	**Wendy Lloyd:** "The mapping of threats to biodiversity in the Cape Floral Region using remote sensing and GIS" authors: J.W. Lloyd, E.C. van den Berg & E. van Wyk. (5 mins) ARC Soil|Climate|Water
10H05	**Dave Richardson:** Assessing the existing conservation system: gaps and priorities (15 mins)
10H20	**Tea**
10H50	**Richard Cowling:** "Towards a system of conservation area for the Cape Floristic Region: some preliminary results based on the representation of pattern." (10 mins)
11H00	**Workshop discussion:** Setting Conservation Targets (1hr 20 mins) Facilitator: **Sandra Fowkes**
12H20	**Paul Lochner:** Overview of proposed scenario planning process, stakeholder consultation and development of implementation programme (10 mins)
12H30	**Brian van Wilgen:** Results of situation assessment (title to be supplied) (20 mins)
1.30 lunch.	
13H00 – 14H00	**Lunch**
14H00 2.20	AGM and discussion
15H30	**Tea**

Coincide Finders Meeting ? Waldo apologies

Feb. Workshop "Cape" Mission

Kelbs : shell-middens fish ponds in rock

Thatch cut 2/3 - removing seeds returns nutrients to plant regeneration.

Session 2
Chair: **Christo Marais**

16H00	**Maryke Middelmann:** Alien clearing and establishing a private nature reserve.
16H20	**Patricia Holmes:** Recovery of fynbos vegetation after alien clearing and fire: best management options
16H40	**Mathieu Rouget:** The dynamics of invasion by four Pinus species in a highly fragmented Renosterveld shrubland.
17H00	**Stephanie Yelenik:** Ecosystem level feed-backs of nitrogen-fixing alien plants in acid sand fynbos.
17H20	**Godfrey Moses:** Comparison of water use by riparian fynbos and wattle infestations.

Dinner

Breakfast 7am

Thursday, 23rd September

08H~~30~~00 - 10H30 Field Trip

Session 3:
Chair **Paul Britton**

10H40	**Tony Rebelo**: Conservation Priorities in the Cape Flora: what Proteas have taught us.
10H45	**Julia Wood:** International perspective on legislation and institutional arrangements

11H00	**Guy Palmer:** Towards the Maintenance of Biodiversity in the Western Cape
11H20	**Tim Sutton:** Cape Nature Conservation GIS, taking conservation into the 21st century.
11H40	**Barry Gasson:** Biophysical Processess, Economic Responses, and Settlement Patterns in the Western Cape ProvinceSocio-Economic Challenges to Conservation in the 21st Century.
12H00	**Azwell Banda:** The Sociology of poverty and conservation
12H20	**Ruida Stanvleit:** Towards the Management of Kogelberg Bropshere Reserve.
12H40	**Steven Geldenhuys:** The Groenlandberg Conservancy
12H40 -13H40	**Lunch**

Session 4: Chair: Julia Wood

13H40	**Kristal Maze:** Conservation in the city - Why bother?
14H00	**Helen Davies:** Cape Flats Core Conservation Sites Study: Case Studies of False Bay Coastal Park and Driftsands Nature Reserve
14H20	**Mark Botha:** Economic Incentives for Landowners to Conserve in the Cape Lowlands..
14H40	**Andrew West:** Development in the Garden Route - Another Year Down the Line
15H00	**Anne Lise Schutte-Vlok:** Robbing Peter to Pay Paul? Who Provides the Water?
15H20	**Mark Saasman :** Tee up for Conservation - An Environmental Programme for Golf Courses.
15H25	**Gail Littlejohn:** What we learn Hybridizing between species of Proteas.

16H00 Thanks and Close

Medecos Stellenbosch
11-15 Sept 2000
Mediterranean-Type Ecosystems : Past, Present & Future

ABSTRACTS

IMPLICATIONS FOR LOWER VERTABRATE CONSERVATION IN THE WESTERN CAPE PROVINCE.

DR ERNST BAARD
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During 1998, Cape Nature Conservation launched the State of Biodiversity (SOB) programme which aims to describe, map, analyse and interpret the Biodiversity of the Western Cape Province in order to promote and ensure the maintenance thereof. To begin with, this programme has produced an extensive GIS-linked database on the freshwater fish, amphibians and reptiles of the Cape Floristic Region (CFR), one of the six floristic regions of the world. The programme's first products are two reports reviewing conservation status of the freshwater fish, programme's first reptiles of the CFR. These reports provide important specialist input into the Cape amphibians and reptiles of the CFR. Cape Action Plan for the Environment (a Global Environment Facility funded project) which aims to consolidate strategic Biodiversity conservation planning in the CFR. The lower vertebrates of the CFR were evaluated according to the new IUCN Red List Categories and important sites, biodiverse areas and critical catchments in need of conservation attention were identified and mapped.
Part 1 analyses, via a sequence of maps, the most important biophysical constraint and resource patterns across the province. It points up the harsh and high-risk nature of the natural environment, and the uneven distribution and varied quality of the resources that have traditionally counted in the province's economic development ie. Water, fertile soils, fisheries, and scenery.

Part 2 analyses the structure and distribution of primary economic sector activities (agriculture, forestry, fishing and mining), and relates these to the biophysical base and to the resultant settlement patterns which can be synthesised into three broad regional types: those of the arid interior and coastal plains, those of the most grainlands and fishing rimland, and those of the wet mountain - valley lands.

Part3 considers the potential for economic expansion in the various branches of the primary sector, in relation to the economic imperatives of the job creation and poverty alleviation, and traces the possible consequences of this for economic development in the three settlement regions.

Part4 discusses some of the challenges arising from sustainable resource utilisation: inter-sectoral and intra-provincial competition for water; expansion of agriculture and forestry versus the protection of habitats and biodiversity; extension of mining into the coastal and shelf zones; the appropriate form and location of settlements in relation to resource conservation and the enhancement of regional sense of place.

THE SOCIOLOGY OF POVERTY AND CONSERVATION

MR AZWELL BANDA
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A brief survey of the issues around poverty, gender, community and participation in conservation. Critical sociological/philosophical questions around traditional conservation theory, practice and modern demands, particular emphasis on Third World Countries. The Question of designing sustainable community models of conservation practices will be raised. The paper will generally aim to flag off some of the issues, controversial and otherwise, around conservation and holistic community development and participation in conservation.

DISTRIBUTIONS AND ESTIMATED SPATIAL REQUIREMENTS FOR THE MEDIUM TO LARGER SIZE MAMALS IN THE GAPE FLORESTIC REGION

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As a component of the Cape Project, the extent and historical occurrence, Red Data book status and present conservation status of 42 species of medium size to large size mammals was documented. The species habitat requirements, in terms of broad habitat units identified by the Cape Project, were identified. The adjacent agriculture stocking rates were matched with 102 broad habitat units and used to derive estimates of spatial requirements for three population sizes of the species.

Population sizes of 50, 200 and 2000 individuals were used to plan for a minimum breeding population to reduce genetic problems, and the population that would allow evolutionary processes to take place, respectively. The potential for metapopulation management through reintroduction's and translocations, is discussed for each species. Done to a paucity of information of biology and ecology of most of the species in the C.F.R, the exercise had to rely heavily on a number of assumptions and extra populations and the results must be treated as hypothetical until such a time as they can be tested in the field, and further information becomes available.

ECONOMIC INCENTIVES FOR LANDOWNERS TO CONSERVE IN THE CAPE LOWLANDS

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The lowlands of the western Cape have long been identified as an urgent Conservation Priority, and several research reports have focussed on identifying priority areas for conservation. However, after 15 years there has been very little progress in securing the conservation status of critical areas on private land. This project was initiated to identify incentives to encourage conservation in these systems, by drawing on regional and international experience, as well as eliciting wants and needs from farmers.

Financial assistance often surfaced as a motivating factor, but given Government's current stance on subsidies, this is unlikely to be forthcoming. Alternative incentives mentioned included better information transfer and communication from Government Departments (CNCB and Directorate: Resource Conservation in NDA); assistance in ecosystem management (especially alien clearing); assistance in initiating cooperative management schemes such as conservancies.

Threats and disincentives to conservation are varied and increasing. Novel crops (like Honey bush tea and Chardonnay grapes) and flower farming are pushing agriculture into previously undisturbed areas. Ineffectual agricultural permit control and almost complete absence of litigation for offenders are causing greater numbers of farmers and landowners to disregard protective legislation. A proposed land tax would well affect landuse decisions by marginal farmers, by forcing to achieve some returns from every hectare.

A significant incentive would be to get Government to agree to a significantly reduced or entirely waived rural rate for properties of conservation value, on which the owners show determined commitment to conservation and ecosystem management. Assessing properties and conducting environmental audits could well become an attractive new profession

ASSESSING THE CURRENT INSTITUTIONAL,LEGAL, SOCIAL AND POLICY FRAMEWORKS FOR BIODIVERSITY CONSERVATION IN THE CAPE FLORISTIC KINGDOM

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This presentation will serve to provide an overview of module 3 of the CAPE project to date. The overall objective of module 3, as described by the Terms of Reference is to:- develop an agreed long-term strategy to ensure the conservation of the Cape Floral Kingdom and adjoining marine ecosystems, in conjunction with stakeholders and consultants from the terrestrial and aquatic modules; and- to prepare an agreed 5-year implementation programme focussed on first priorities within the conservation strategy, which will be presented to financial agencies, private and public, national and international, including GEF.

The module comprises five overlapping phases (Box 1) which run from July 1999 to September 2000. The module requires the integration of a wide variety of expertise, making use of specialists from the legal, policy, institutional, financial, socio-economic, public participation and conservation sectors.

Box 1: Phases of Module 3
Phase 1: Situation Assessment and Review
Phase 2: Strategy Formulation
Phase 3: Implementation Programme
Phase 4: Business Plans and Final Report
Phase 5: Conference

The first of the five phases is currently being undertaken and is expected to run until November 1999. Phase one is intended to provide an assessment of the current situation affecting biodiversity conservation in the Cape Floral Region. Broadly, financial and socio-economic sectoral specialists will assess how the flow of benefits from the use of biodiversity can create opportunities or constraints for conservation initiatives which benefit the people of the region. Legal and policy sectoral specialists will evaluate the existing legal and policy framework at international, national, provincial and local levels to identify key gaps, inconsistencies and opportunities. The institutional sector will be viewed as the vehicle for integration, and will play a major role in determining the long term success of the CAPE project. To this end, the public participation process has initially focussed on organizations implementing projects or

affecting the outputs of the CAPE project. With this in mind, implementing agencies have been incorporated into the project team itself.

Through specialist input and the public involvement process to date we have identified several key issues affecting biodiversity conservation of the Cape Floral Region. These issues will be evaluated and will form the basis of the strategy formulation process in Phase two, which is due to begin this month and will continue until February 2000.

SYSTEMATIC CONSERVATION PLANNING FOR THE CAPE PROJECT: CONCEPTS, PROTOCOLS AND TARGETS

Professor Richard Cowling
Institute for Plant Conservation
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Private Bag
RONDEBOSH, 7701

This contribution reviews the conceptual background, a planning protocol, available data, and target setting for conservation planning for the Global Environmental Facility - funded Cape Action Plan for the Environment (CAPE) Project. This approach and strategy is being used by the Institute for Plant Conservation to design a system of conservation areas that is representative of the terrestrial biodiversity of the Cape Floristic Region.
Most systematic conservation planning focuses on representation of biodiversity patterns and assumes rapid implementation of the reserve system. This strategy is far-removed from the real world where implementation is invariably gradual and ongoing biodiversity loss inevitably compromises the attainment of representation goals. There has been virtually no research on designing reserve systems intended for long-term persistence of biodiversity in the face of global change. Such a strategy, which we are using form conservation planning for the CAPE project, must embody the representation and retention of both biodiversity patterns as well as the processes that maintain and generate these patterns.

In addition to discussion planning concepts and protocols, I review the available data on terrestrial biodiversity patterns and processes. Particular attention is given to problems associated with presence-only data sets and to difficulties in identifying salient ecological and evolutionary processes. The depiction of spatial surrogates for these processes - a key step in the planning protocol - is also discussed. Finally, I discuss approaches for setting explicit targets for biodiversity representation, and briefly touch on the thorny problem of trade-offs between the representation of pattern and process in a reserve system.

TOWARDS A SYSTEM OF CONSERVATION AREAS FOR THE CAPE FLORISTIC REGION: SOME PRELIMINARY RESULTS BASED ON THE REPRESENTATION OF PATTERN.

Professor Richard Cowling
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Effective and strategic conservation planning requires that all available options are considered when locating and designing a system of conservation areas that achieves targets for the representation of biodiversity pattern and process. Here I report on preliminary results for minimum sets of areas, selected by a standard iterative procedure, that achieve representation targets for species data. The data sets are:

1. Red Data Book plant taxa, plus all (additional) species of Aspalathus, Bruniaceae, Ericaceae, Geissolomaceae, Grubbiaceae, Muraltia, Penaeaceae, Proteaceae, Restionaceae and Stilbaceae comprising 3 163 taxa and 23 377records at the quarter degree scale (QDS).

2. Red Data Book taxa comprising 1 457 taxa and 3 931 records at the QDS.

3. Proteaceae (Protea Atlas data) comprising 347 species and 9 293 records at the eighth degree scale (EDS).

4. Vertebrates (freshwater fish, amphibians and reptiles) comprising 345 species and subspecific taxa and 14 006 records at the EDS.

Only data sets 3 and 4 can be regarded as approximating presence-absence status. In each case, the reservation target was to include at least one occurrence of each species in the reserve system.

Data sets 1 and 2 required 131 and 123 reserves (QDS), comprising about 81.03% and 77.22% of the CFR, respectively. However, in both cases, 90% of the species were represented in about half this number of reserves. Reserves of high conservation value (i.e. those that contributed most to the reservation target) were overwhelmingly concentrated in the western, winter-rainfall part of the CFR. Data set 3 required 46 reserves (7.98% of the CFR) that were relatively evenly distributed across the fynbos habitats of CFR. Data set 4 required 48 reserves (7.59% of the CFR) that were also relatively evenly distributed across the CFR.

Although consistent with the principles of complementary and efficiency, the results presented are problematic in a number of ways. These shortcomings are briefly discussed. It is stressed that the minimum sets based on species representation are only one of a series of options for effective reserve design. Some of the other options are minimum sets based on representation of land classes (e.g. Broad Habitat Units) and the representation of spatial surrogates for ecological and evolutionary processes.

CAPE FLATS CORE CONSERVTON SITES STUDY: CASE STUDES OF FALSE BAY COASTAL PARK AND DRIFTSANDS NATURE RESERVE

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Vlaeberg, 8018

The Botanical Society of South Africa has undertaken a study to identify the core flora conservation sites for the lowlands of the entire CMA. The information from the study will be used to prioritise areas important for the conservation which are presently under threat. The aim is then to provide formal conservation status and appropriate management for these core areas.

Two of the core sites identified are the proposed False Bay Coastal Park which incorporates the Rondevlei Nature Reserve and Driftlands Nature Reserve. The Cape Metropolitan Council is involved in the process of proclaiming Phase One of the False By Coastal a Protected Natural Environment and has commissioned a project to prepare a development, management and implementation plan for the Driftsands Nature Reserve as a multi-purpose open space catering for recreation, conservation and education.

The proposed False Bay Coastal Park (Phase1) is situated 2km east of Muizenberg and 20km south of Cape Town and includes Rondevlei Nature Reserve, the proposed Zeekoevlei Nature Reserve, the Cape Flats Waste Water Treatment Works and the Coastal Park Landfill site. Zeekoevlei, Rondevlei and the Cape Flats Waste Water Treatment Works together form an important aquatic feature of the metropolitan open space system. The extent of and close location of False Bay Coastal Park (Phase 1) to densely populated areas on the Cape Flats, and its outstanding flora and fauna combined with its link to the False Bay Coast provide significant potential as a conservation and recreation area. It is envisaged that the area will serve as a multi-purpose park catering for recreation, tourism, education, conservation, waste water treatment, solid waste management and stormwater drainage and that the area will ensure that the unique Cape Flats flora and fauna is conserved for future generations.

It has been proposed that the False Bay Coastal Park (Phase 1) be declared a Protected Natural Environment (PNE). This would facilitate co-ordinated conservation and management of the entire area and ensure a holistic integrated approach. It would enable parts of the whole part to deal with external issues and threats more effectively and efficiently. As one of the core sites on the Cape Flats, obtaining PNE status would help accomplish the goals of providing adequate conservation status and management for the identified core sites. A PNE comprises a set of directions which are agreed upon by all landowners and role players and which are registered against the title deeds of property. In order to accommodate the operational activities of the Waste Water Treatment Works and the Landfill site, it is envisaged that the False Bay Coastal Park (Phase 1) PNE will be divided into 5 zones, each of which will be governed by specific directions.

Dirftsands has, for many years, been recognised for its environmental, educational, and recreational roles. The reserve has never been formally managed. Due to increasing housing and urbanisation pressures, it was decided that a feasibility study to determine the viability of Driftsands Nature Reserve be undertaken. The first step was to formulate a development plan for a sustainable multi-use urban park. Following this would be the need to develop an integrated conservation and management plan to ensure to the long-term sustainability of the urban nature reserve.

In a context of rapid population growth and a policy of densification of development, open space will become, in the long term, a highly valued resource. Driftsands has great potential to provide an important multi-use open area, particularly in the light of the lack of amenities and positive open space in the surrounding communities. There are, however, a number of very real threats to the functioning of Driftsands Nature Reserve. These include the threat of land invasions, the presence of several informal settlements, the threat of development on the western section of Driftsands, alien infestation, wood collection, crime control, the location of the Medical Research Center, the proposed road which would bisect Driftsands, dumping and maintenance costs. The fact that there is no consensus amongst statutory, role-players poses a serious threat to the whole project.

A large number of studies on the Driftsands Nature Reserve have been undertaken over the past decade which have not led to tangible results for the community. This project therefore has to be an action project rather than a broad land use study if community buy - in is to be ensured. The challenge of the project is to determined. ways in which the potential of Driftsands can be fully recognised in terms of ecological functioning, education, eco tourism, recreation and urban agriculture.

The challenges surrounding both the feasibility study of the development, management and implementation plan Driftsands Nature Reserve and the proclamation of False Bay Coastal Park (Phase 1) as PNE will be discussed in this presentation.

TEE-UP FOR CONSERVATION AN ENVIRONMENTAL PROGRAMME FOR GOLF COURSES.

MS DESIREE DU PREEZ

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7613

The Tee-Up for Green Environmental Programme of golf courses is directed at existing golf courses and consists of two elements:

i) An environmental management system aimed at improving both environmental and general management of golf courses through careful planning and good record keeping.

ii) A golf course nature reserve system aimed at the conservation management of out-of-play areas that contain conservation worthy vegetation or animals.

Golf courses can contribute to the sustainable utilisation and conservation of South Africa's biodiversity through implementing this programme. The Milnerton Golf Club is a good example of this. The club grounds contain the dune system on the one side and the lagoon edge on the other. These out-of-play areas are presently degraded due to a lack of management interest in these areas. With a little effort, these areas can be rehabilitated to regain their ecosystem function, while enhancing the landscaping of the club grounds to the benefit of the club.

BIOPHYSICALPROCESSES, ECONOMIC RESPONSES, AND SETTLEMENT PATTERNS IN THE WESTERN CAPE PROVINCE: SOCIO-ECONOMIC CHALLENGES TO CONSERVATION IN THE 21ST CENTURY.

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The paper develops a provincial perspective on the relationship between ecology-economy-human settlements and the resultant resource conservation challenges. The provincial perspective has utility in terms of broad policy and as regards Fynbos issues, in particular, because 78% of the biome falls within the provincial boundaries.

The paper is organized around a four-part structure related to the title:
Part 1 analyses, via a sequence of maps, the most important biophysical constraint and resource patterns across the province. It points up the harsh and high-risk nature of the natural environment, and the uneven distribution and varied quality of the resources that have traditionally counted in the province's economic development ie. Water, fertile soils, fisheries, and scenery.

Part 2 analyses the structure and distribution of primary economic sector activities (agriculture, forestry, fishing and mining), and relates these to the biophysical base and to the resultant settlement patterns which can be synthesised into three broad regional types: those of the arid interior and coastal plains, those of the most grainlands and fishing rimland, and those of the wet mountain - valley lands.

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Par4 discusses some of the challenges arising from sustainable resource utilisation: inter-sectoral and intra-provincial competition for water; expansion of agriculture and forestry versus the protection of habitats and biodiversity; extension of mining into the coastal and shelf zones; the appropriate form and location of settlements in relation to resource conservation and the enhancement of regional sense of place.

RECOVERY OF FYNBOS VEGETATION AFTER ALIEN CLEARING AND FIRE: BEST MANAGEMENT OPTIONS

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The main aims of alien vegetation clearing in the fynbos biome are to enhance the conservation value of the land and to increase the water supply from mountain catchments, or both. In order to meet these aims, good indigenous vegetation recovery is required, with the restoration of the major plant functional guilds a necessary goal. In addition, conservation objectives may require that diversity be restored, including any species historically occurring at the site.

Potential fynbos recruitment from soil-stored seed banks is good, even in relatively old, dense alien stands. However, to achieve potential recruitment levels, germination from the soil-seed bank and subsequent establishment has to be maximised. Factors that reduce seed germination include deep burial of seeds, inadequate germination cues and death due to high soil temperatures during hot fires. Establishment failure may result from adverse post-fire growing conditions (e.g. drought, or resulting from a seasonal germination) and herbicide drift. Results from two studies will be presented. The first study investigated the effects of different alien clearing methods and fire on fynbos recovery. The second study investigated the effectiveness of post-fire soil scarification at low and high fuel microsites in promoting fynbos seedling recruitment. Results will be discussed in terms of best management options for maximising fynbos recovery at long-invaded sites.

WHAT WE LEARN FROM HYBRADIZING BETWEEN SPECIES OF PROTEACEAE?

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Proteaceae have been hybridizing on their own for many years. The inter specific hybrids seldom spread yet hybraids are very common.

Interesting lessons are learnt from attempts to hybridize by hand controlled pollination.

These will be presented for the commercially important genera of Proteaceae from Southern Africa

BIODIVERSITY CONSERVATION IN THE CITY. WHY BOTHER?

KE Maze[1] and T Rebelo[2]
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The Cape Metropolitan Area (CMA) has a higher number of endemic and RDB plant species than any other city in the world. Of the two centres of endemism within the CMA (i.e. the Cape Peninsula and Cape Flats) the Cape Flats is most threatened. The remaining pockets of natural veld on the lowlands of the CMA collectively harbour a number of endemic as well as red data book species. Some of the remaining areas of natural veld on the Cape Flats have the world's highest densities of RDB species for a continental area of this size (i.e. greater than 22 RDB species per km^2).

The conservation importance of these vegetation remnants was recognised several years back, however, at this time urban conservation was distinctly unpopular among the conservation fraternity. Little progress was made toward providing conservation status and management to the important areas identified. Today, some of these important areas have been lost to development and threats to the remaining areas are greater than ever. Short of conserving most remaining vegetation remnants on the Cape Flats no pragmatic or strategic conservation plan exists to ensure the long-term conservation of the Cape Flats flora.

The Botanical Society in collaboration with the National Botanical Institute and the Cape Metropolitan Council, recently undertook a conservation planning study which aimed to identify a minimum set of areas that collectively would conserve the unique elements of the Cape Flats flora. We assessed species lists from 120 sites on lowlands of the CMA including strandveld, sand plain fynbos and resnoterveld vegetation types. Each species was categorised in terms of it endemically and RDB status. There were a total of 1466 indigenous plant species in the database, of which 76 were Cape Flats endemics and 128 listed as RDB species.

The conservation goal was to conserve at least two populations of each Cape Flats endemic and at least two populations of each of the most threatened of the RDB species using an iterative reserve selection procedure. In terms of these goals the adequacy of the existing conservation system was quantitatively assessed and found to be deficient. Factors important for ecological processes (i.e. long term persistence of species) and physical vulnerability of areas were also incorporated into the reserve selection process.

At the time of writing this abstract, final results on the number and composition of sites required to fulfill the conservation goal were not available. Progress on and suggestions for the implementation of the results within the urban context are discussed.

ALIEN CLEARING AND ESTABLISHING A PRIVATE NATURE RESERVE

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In 1994 a pine plantation which was planted in the early 1950's was felled for timber. A slide illustrated talk on how and why and what resulted, will give an indication of the resilience of Fynbos.

The owner/manger of Honingklip intends to declare a large tract of the farm as a private nature reserve. Reasons for this decision again illustrated with slides, will be presented.

COMPARISON OF YEAR-LONG EVAPTRANSPIRATION FROM A WATTLE THICKET AND A FYNBOS COMMUNITY IN TWO WESTERN CAPE RIPARIAN SITES

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There has been large scale funding by both the Government and the private sector of the Working-for Water programme which is active in many regions of the country. One justification for this programme of alien tree removal is the streamflow enhancement which is believed to follow the replacement of dense stands of invasive trees by indigenous, largely herbaceous plant communities. Often the most dense stands of invader trees occur within riparian zones, where a new change in evapotranspiration (ET) following clearing can be expected to alter rates of streamflow.

Few data are available, however, to convincingly support this assumption. Results from a number of research catchments have consistently shown that afforestation significantly decreases stream-flow where the pre-afforestation vegetation was mountain grassland or fynbos. The net difference in ET between thickets of alien trees and riparian fynbos may be quite different, however, due to the favourable conditions of soil water availability and plant growth in riparian zones, as well as the poorly known water use characteristics of the major species of alien trees. This paper reports the results of a comparative study of ET from a riparian fynbos community, and transportation from a riparian thicket of wattle (*Acacia mearnsii)* at two sites in the Western Cape.

A riparian fynbos site was chosen in the upper reaches of the Jonkershoek Valley, close to the Eerst e Rivier. A 12 month record of 20 minute evaporation rates from this site was recorded using the Bowen ration energy balance technique.

A closed canopy of self-established wattle in the Wellington area was chosen to provide comparative water use data. The heat pulse velocity technique was used to record hourly sap flow rates in six sample trees representing the range of tree sizes in the thicket. Total daily sap flow in all sample trees was very closely correlated to mean daily vapour pressure felicity of the air, scaled by the number of daylight hours. The sample trees were destroyed by a wild fire after seven months of data collection.

However, the daily sapflow/VPD relation was found to be constant over the monitoring period, which spanned wet, winter conditions in late winter as well as very hot and dry conditions in late summer. Indicating an absence of stress due to soil water deficits. It was assumed therefore that the same relationships would hold throughout the year, and could therefore be used to predict wattle transpiration at the Jonkershoek site using the VPD data collected by the Bowen ration system.

The poster provides a detailed description of the different patterns of water use, and explores some implication arising from the results.

CAEP NATURE CONSERVATIUON'S STATE OF BIODIVERSITY PROGRAMME - CAPE NATURE CONSERVATION, SCIENTIFIC SERVICES DIVISION.

Guy Palmer
Cape Nature Conservation
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It is the mission of Cape Nature Conservation (CNC) to fulfill its obligation regarding the maintenance of biodiversity in the Western Cape Province (WCP) as required by the Environmental Conservation Act (1997), the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1998), as well as the obligations to the International Convention on Biological Diversity and the Provincial Nature Conservation Ordinance (Ordinance No. 19 of 1974) and its Regulations.

During 1998 CNC launched its State of Biodiversity (SOB) Programme which aims to describe, map, analyse and interpret the information on biodiversity of the WCP. Of necessity all persons and institutes involved with plants and animals needs to be part of this programme. An infrastructure has been created to capture, store, retrieve and manipulate current and future biological data on the animals and plants in the Province. This will be the basis from which the conservation status of all species/habitats will be reviewed and recommendations will be made, e.g., the establishment of an optimally placed constellation of representative conservation areas (both public and private). The programme also aims to continuously evaluate conservation performance, progress and achievements.

The SOB Programme is, by nature, an ongoing process and is being implemented in stages

ASSESSING THREATS TO BIODIVERSITY AND THE EFFICIENCY OF THE EXISTING CONSERVATION SYSTEM IN THE CAPE FLORISTIC REGION.

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This part of the CAPE project aims to provide an objective, and spatially-explicit, assessment of the threats to terrestrial biodiversity and the efficiency of the current reserve system in conserving the CFR's terrestrial biodiversity. These are essential requirements for the formulation of a systematic plan for conservation of the region based on irreplaceability and vulnerability.

The most pressing threats to terrestrial biodiversity in the CFR are urbanization, agriculture, forestry and invasive alien trees and shrubs. The spatial extent of these factors was assessed using satellite imagery (various other data sources were utilized to improve resolution in some cases).

We compiled an accurate GIS coverage of primary conservation areas in the CFR (those with the highest conservation status: national parks, provincial reserves and reserves proclaimed in terms of theForest Act). These data were used to assess the conservation status of 87 Broad Habitat Units (BHUs) across the CFR (the derivation of these units is discussed in a previous presentation). Using objectively-defined assessments of the proportion of BHUs that need to be conserved ("conservation targets"), we determined irreplaceability scores for remaining natural vegetation in each of approximately 3000 cells (each about 5km X 7km in extent) throughout the CFR.

Conservation priorities for each cell were derived from summed values of irreplaceability and vulnerability (separate vulnerability indices were derived for each of the main threat categories). GIS coverage's showing the distribution of conservation priorities, scored on the basis of irreplaceability and vulnerability form the basis for the objective conservation planning phase of CAPE.

THE DYNAMICS OF INVASION BY FOUR PINUS SPECIES IN HIGHLY FRAGMENTED RENOSTERVELD SHRUBLAND

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This study explored the dynamics of invasions of four *Pinus* species in a complex fragmented landscape. The role of environmental factors, natural and anthropogenic disturbance in relation to invasion history was assessed for different stages in the invasion process, using a Geographic Information System. Pines escaped from plantations over the past 50 years and spread into the natural semi-arid shrubland (renosterveld). The pattern of spread was compared with a simulated random distribution using logistic regression and recursive modeling (FIRM software). 11 environmental variables were included in the analysis: altitude, aspect, pH of soil, vegetation type, vegetation density, vegetation height, fire, grazing type, proximity to rivers, and proximity to fragment edges. Pines were more common at high altitude, on south-facing slopes and on relatively acidic soils. Less pines occur on vegetation of low density. Establishment of dense patches from isolated trees in the landscape was a function of fire history alone. Maps of habitat suitability were produced to predict the occurrence of pines. The predictions were 75% accurate using logistic regression and 85% using recursive modeling. Models calibrated with 20% of the data set, using older trees (trees >4m), were still 65% accurate. Although patterns of spread could be accurately predicted from the early stage of invasion, fragmented landscapes, strongly modified by human activities, reveal a complex situation where the spread of invasive species remains difficult to predict in a long term. The dynamics of invasion are discussed in relation to changes in land use and disturbance regime.

TOWARDS THE MANAGEMENT OF THE KOGELBERG BIOSPHERE RESERVE

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The Kogelberg Biosphere Reserve was registered by UNESCO in December 1998 and now forms part of the world network of 360 biosphere reserves in 80 countries. It is the first officially nominated biosphere reserve in South Africa.

The Kogelberg Biosphere Reserve is jointly managed by representatives from all stakeholders within the region through the management committee. Various sub-committees are responsible for the day-to-day management of specific geographical areas. The management of the core comprises co-ordination and co-operation between all the different landmanagers from the various authorities.
The biosphere reserve supplies a basis for sustainable living. Thus, as an outflow of the biosphere reserve, activities on education and communication are being implemented in the region. This includes teacher training workshops, information sessions, displays, information boards, and pamphlets on certain topics. Landowners are being informed on the benefits of wise water use, safe waste and sewage disposal and recycling. Private landowners are being drawn into partnerships, for example in forming conservancies, and also in developing various recreational facilities.

Two of the most important projects, are the compilation of a management plan for the greater core and buffer of the biosphere reserve, and planning towards a monitoring program for the entire biosphere reserve. The monitoring program will be dealt with in phases of which the current first phase is a scoping exercise.

All current and planned activities which link to the management of the Kogelberg Biosphere Reserve will be discussed briefly.

ROBBING PETER TO PAY PAUL - WHO PROVIDES THE WATER ?

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The Klein Karoo Rural Water Supply Scheme supplies purified water to Dysseldorp and farmers in the Olifants River Valley and Gamka River Valley. The water is abstracted from 18 boreholes located in and around the Kammanassie Mountains near Dysseldorp, and the Rooiberg near Calitzdorp. The water is distributed to the rural areas via an extensive pipeline network of over 350km.

Recently, however, it was established that the yield of the scheme was substantially lower than the original estimate. DWAF is therefore currently investigating possible augmentation options, which amongst others, include the abstraction of more groundwater from TMG aquifers.

Conservation organisations are seriously concerned about the long-term effect of such groundwater abstraction schemes on springs in Cape Fold Mountains, as these springs support many habitat specialist species which are often endemic to a particular seepage area. The main environmental concerns related to this project will be highlighted and discussed.

PRIOTISING CONSERVATION ACTION FOR FRESHWATER ECOSYSTEMS IN THE CAPE FLORISTIC REGION

by G.D.P. van Nieuwenhuizen and Dr Jenny Day
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Acting as sinks in the landscape, freshwater ecosystems are greatly threatened by most anthropogenic activities that take place their catchments. This coupled with the fact that fresh water is probably the most valuable and abused resource in the Cape Floristic Region, paints a bleak picture for the biota that is dependent on it.

The freshwater component of the Cape Action Plan for the Environment aims to identify priority areas (systems and processes) for the conservation of biodiversity associated with freshwater ecosystems.

Analyses of biotic diversity and the conservation needs of specific taxa were used as a starting point. Cape Nature Conservation and specialists from JLB Smith Institute of Ichthyology and Albany Museum identified and mapped the conservation needs of amphibians, reptiles and fish. "Important Bird areas of South Africa" a study that was recently completed by the Avian Demography Unit at UCT was used to identify important areas for the conservation of birds associated with freshwater ecosystems. The Freshwater Research Unit identified important areas for invertebrates and general features of riverine ecosystems. While biotic diversity per se should not be used as the only indicator of the conservation importance of an ecosystem, it can give an indication of the conservation status of an ecosystem.

An analysis of ecosystem processes indicates the relative importance of individual communities and the processes that threaten freshwater ecosystems. The sustainable conservation of biodiversity is dependent on an understanding of these processes (for instance nutrient cycling, migration, water flow and genetic processes). Furthermore it is only through looking at ecosystem processes that we can be sure that the lesser-known organisms are also included in the conservation action plan.

The identification of threats will aid in the measurement of vulnerability of specific systems, which will indicate the conservation importance of the system and the priority value for its conservation.

The main aim of this project is to indicate priority areas for the conservation of biodiversity. The study goes further, however, in that it also identifies shortcomings in our understanding of, and data sets on, the biodiversity associated with freshwater ecosystems that will help to focus research priorities in the near future.

ECOSYSTEM LEVEL IMPACTS OF NIGROGEN-FIXING ALIEN INVASIVE PLANTS IN THE FYNBOS

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In the nutrient-poor fynbos, the specific make up of soil nutrients can have profound effects on species composition and community structure. What then happens when soils are enriched via the nitrogen-fixing activity of alien invasive plants ? We are investigating how effective two different nitrogen-fixing alien invasive plants (*Acacia saligna* and an agricultural field lupin) are at changing soils in acid-sand fynbos, how clearing alien plants effects soils, and whether any of the ecosystem level effects of alien plants can alter successive fynbos communities. Plots have been established in grassland lupin to compare annual N-fixers and non-fixers, in acacia and fynbos to compare between perennial N-fixers and non-fixers, and in cleared acacia stands to look at the impacts of ongoing restoration efforts. We will be discussing results from an ongoing study in net N mineralization using non exchange resinbags. Prelininary data show that although N mineralization and nitrification are low across all treatments, levels are higher under N-fixing plants, pr bably due to the higher levels of organic matter. Monthly comparisons indicate a peak in mineralizaition with the first rains of the winter (April/May), suggesting that this process is largely driven by water availability. Biomes and litterfall studies show that in both the annual and perennial systems, N-Fixers have greater biomes return to the soil than non-fixers. Future lab work will include quantification and decomposition rates and nitrogen levels of the different plant species , N dilution experiments to investigate gross N mineralization and immobilization,a nd a glasshouse bioassay experiment to show how growth rates of a single plant species change between the different soils.

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