

FYNBOS FORUM

ANNUAL

RESEARCH MEETING

P R O G R A M M E

5-6 December 1995
Mispah Youth Centre, Grabouw

TABLE OF CONTENTS

	Page
Programme	2
Abstracts of Paper Presentations	7
Abstracts of Poster Presentations	27
List of Participants	31

TUESDAY, 5 DECEMBER 1995

08:00-08:40 Registration

08:40-08:50 Welcome - *Christo Marais*

08:50-09:00 Opening - *Roger Krohn*

PRACTICAL & SOCIAL ISSUES

Chairperson: *Maryke Middelman*

09:00-09:25 Devil's Peak fire 1991. Post fire "mudslides", flooding erosion and hysteria. What happened? - *Paul Britton*

09:25-09:50 Making Fynbos visible to stakeholders: do the people care? - *Caroline Gelderblom* *Sapper contribution to uphold the aims of nature conservation.*

09:50-10:00 Poster: Multi-media as a marketing/educational tool in conservation - *James Jackelman* *cancelled.*

10:00-10:10 Poster: Plant-based ecotourism in the Western Cape: A blooming future? - *Penny Mustart* / *Richard Cowling*

10:10-10:30 TEA →

10:30-10:55 An investigation of land-use practices on the Agulhas Plain - A project proposal - *Barry Heydenrych* ✓

10:55-11:20 Communication in the public participation process: from rhetoric to reality - *Paul Britton* / *J Jackelman* / *Julia Wood* *James.*

11:20-11:55 Wolfgat Nature Reserve - A joint Cape Town City Council and community project presented by the *Interim Management Committee* *Paul Britton. introduce team.*

11:55-12:05 Poster: Fynbos in a jar! 'In vitro' culture of Fynbos - *Hildegard Crous* *K'boosh Technician. Propagator K'boosh lab.*

12:30

THE ENVIRONMENT & GEOGRAPHY - *Dr Neil Fairall*

12:05-12:30 Micro-climatic observations at some Hex river mountain summits - *Jan Boelhouwers*

12:30-12:55 Coordinated Remote Sensing studies in mediterranean type ecosystems: The south west Cape region and southern California - *Allen S Hope* / *Douglas A Stow* / *Janet Franklin* *El Natal now at San Diego.*

12:55-13:05 Poster: Climate, vegetation, soil moisture relationships in the Fynbos region - *Mark Jury*

13:05-14:00 LUNCH

14:00-15:00 Annual General Meeting - Chairperson: *Christo Marais*

15:00-15:20 TEA

MONITORING & DATA MANAGEMENT

Chairperson: *Dr Charlie Boucher*

15:20-15:45 Monitoring Fynbos vegetation with Landsat images, the effect of scale - *Neil Fairall*

15:45-16:10 Progress report on Inventory of datasets pertaining to the Fynbos biome - *C Boucher* / *D Erasmus* / *C Marais* / *DJ McDonald* *Diane*

16:10-16:35 The development of user friendly information systems for Cape Nature Conservation - *Peter Hill* / *Catherine Feast*

17:30-19:30 SOCIAL : Wine Tasting - *Plasir de Merlé*

WEDNESDAY, 6 DECEMBER 1995

08:00 COFFEE / TEA

RESOURCE ECONOMICS - Chairperson: *Rudolf Andrag*

08:30-08:55 An Ecological Economic Simulation Model of Mountain Fynbos Ecosystems: Dynamics, Valuation and Management - *SI Higgins / JK Turpie / R Constanza / RM Cowling / DC le Maitre / C Marais / G Midgley*

* Model discuss with Richard

08:55-09:20 An Economic Evaluation of the Invasive Alien Plant Control Program in the Mountain Catchment Areas of the Western Cape Province - *C Marais / JB Eckert / HJ van Hensbergen / WJ Bond* (IAP)

09:20-09:40 Are there any prospects for biocontrol on pines? - *D Donnelly*

09:40-10:05 A survey on the extent of the Fynbos industry in South Africa - *G Malan*

TEA

ECOLOGY - Chairperson: *Dr Penny Mustart*

10:05-10:30 Invasion and persistence of bird-dispersed, subtropical thicket and forest species in fire-prone Fynbos - *RM Cowling / D Kirkwood / JJ Midgley / SM Pierce*

10:30-10:55 Species' persistence in Acacia-invaded Fynbos: Evidence from the soil-seed banks - *Pat Holmes*

10:55-11:20 The influence of anthropogenic habitat transformation on birds in the Mountain Fynbos biotopes of the Elgin district, Western Cape - *RM Little*

11:20-11:45 Analysis of vegetation change on the northern slopes of Table Mountain based on multi-temporal aerial photography, 1944-1992 - *Nigel J Rossouw UWC.*

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11:45-12:10 Effects of sea-water dowsing of Fynbos fires - *Amy Spriggs*

12:10-12:35 Small mammal communities of south coast Renosterveld - *Ernita van Wyk / Bertie van Hensbergen*

12:35-13:00 Predicting plant responses to changing fire regimes - *Krystal Maze*

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13:00-13:15 Summary - *Kas Hamman*

Season
Frequency
Intensity
high temp kills seeds.

13:15-14:15 LUNCH

± 14:30 Kogelberg Excursion - *E Rode*

ABSTRACTS

OF

PAPER

PRESENTATIONS

**DEVIL'S PEAK FIRE 1991.
POST FIRE "MUDSLIDES", FLOODING EROSION
AND HYSTERIA. WHAT HAPPENED?**

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During February 1991 a fire on the slopes of Devil's Peak covered the city in smoke and caused all sorts of concerns in the public and politicians minds about the competence of the city's fire fighting staff.

After the fire it became apparent that about 10% of the burnt area was showing no signs of post fire recovery. The lack of vegetal cover and water repellency in these areas led to excessive runoff during the winter with consequent flooding, erosion and "mudslides" in the adjoining areas. Public emotion already very high, now reached hysteria and panic measures were taken to solve the problem. What really happened? What were the causes and how can future events such as this be prevented? The fire has caused negative public perceptions about fire in fynbos, how can this be corrected?

MAKING FYNBOS VISIBLE TO STAKEHOLDERS: DO THE PEOPLE CARE?

Caroline Gelderblom / David Le Maitre / Luthando Maphasa /
Sarel Yssel / Marjan van Belt
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It is well known that this unique and fragile vegetation is threatened by the expansion of agriculture, urbanisation, uncontrolled fires and by invasive exotic plant species. About 95% of the lowland fynbos has already been cleared for agriculture and housing and few of the remnants are protected. This represents a considerable loss of resources.

Fynbos provides considerable economic benefits in terms tourism and of direct use of products such as flowers. In addition, the fynbos has considerable

biological non-use value. The problem is that these benefits are poorly understood by the people who will be most affected by their loss. Their poor understanding is largely a product of the lack of suitable material on fynbos which could be used to inform the general public about its value. As a result, the broad public is largely ignorant/oblivious of any or all of the benefits of fynbos, economic and non-economic. This situation has serious implications because its only when people know and understand something that they truly care about it enough to do something. Many important non use values such as bequest value and existence value are dependant on the level of knowledge of stakeholders. The value of fynbos to stakeholders and hence its relevance to the RDP is therefore profoundly affected by the level of knowledge and for this reason we felt that it was essential to assess the current situation.

We decided to target high school pupils and went to four schools from a range of ethnic and socio-economic backgrounds. The approach was to do a rapid pilot study find out roughly what students knew and to identify areas that need to be given attention if the message of the importance of fynbos is to be relevant to the citizens of the Cape Metropolitan area. A form of contingent valuation was chosen as the best way to gauge both the existing knowledge and the response of the students to the information contained in a presentation. The final approach was to use two questionnaires: one answered before and one answered after the presentation.

Given the lack of consolidated general information of any kind on fynbos in the past, the level of interest and enthusiasm immensely satisfying; but tragic at the same time because it seems that so little is being done to satisfy it. It was evident that as a result of a lack of knowledge, very little value is currently attached to fynbos by the majority of stakeholders. Those who knew most before the study were students from wealthy historically white and coloured schools and they attached great importance to the conservation value of the fynbos but were ignorant of the economic benefits that it could provide.

When given further information on the diverse economic benefits of fynbos there was a clear increase in appreciation of the value of fynbos across the board. The students from less advantaged communities felt that the most important benefits were economic (use values) whereas those from advantaged communities indicated that conservation and aesthetic factors (non-use values) were most important to them.

What is evident from this survey is that great investment needs to be made in improved environmental education if the fynbos and other natural resources are to be appreciated by the stakeholders. The conservation of the fynbos can play a vital role in the reconstruction and development of South Africa but as a result of this lack of knowledge it is in danger of been marginalized.

AN INVESTIGATION OF LAND-USE PRACTICES ON THE AGULHAS PLAIN - A PROJECT PROPOSAL

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The vegetation of the Western Cape is internationally recognised as having the highest concentration of plant species per unit area anywhere in the world. The Agulhas Plain, situated at the southern most tip of Africa, forms part of this very important region. Although there is a lot of information concerning the natural vegetation of the Agulhas Plain and many reports which make recommendations as to how the area should best be conserved, the natural integrity of the area continues to decline. This is due to various factors including the spread of invasive alien plants, non-sustainable farming practices, bad fire management and inappropriate coastal development. It is believed that the biodiversity of the Agulhas Plain has the potential to generate income in an economically and ecologically sustainable way. Current and potential uses include cut flowers, dried flowers, thatching reed, ecotourism and medicinal plants.

What is proposed is an in-depth study on the Agulhas Plain which will examine land-use practices, particularly with respect to the Elim community; investigate the value of the biodiversity of the area; and explore the proposals for a reserve network for the area. The study will take the form of meetings and questionnaires involving local people, consultation with various technical experts, visiting farms to assess the condition of the vegetation, and mapping the natural resources of the area on a geographical information system (GIS) data base.

The product will be a document which describes the current situation and

makes recommendations and suggestions about land-use options for the area. It will essentially be taking the proposals for the area, particularly the recently-completed Southern Overberg Structure Plan, to the next logical step - i.e. to that of a management plan.

COMMUNICATION IN THE PUBLIC PARTICIPATION PROCESS: FROM RHETORIC TO REALITY

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Communication is one of the fundamental cores of the whole public involvement process and potentially one of the most damaging areas. Effective communication does not necessarily mean achieving all-round agreement on an issue but it does mean achieving a high level of understanding. Communication problems can seriously affect the level of participation and commitment of people. Public reaction arising from a lack of meaningful information or an inadequate involvement process often becomes emotional rather than objective. It is within an environment that could be described as a "communication vacuum" that rumours are generated and incorrect information passed around.

Public involvement programmes must be tailor-made and the communication process suited to the specific audience or situation. As a part of this it is important that participants know the rules of the game, the limits of their power, who controls decision-making, and how to influence decision-making.

In this paper we introduce a number of communication techniques, used by the Nature Reserves Planning Section of the Cape Town City Council, for enabling public participation in the development of management plans for nature reserves in the city.

Theory and reality are sometimes not compatible.

**WOLFGAT NATURE RESERVE -
A JOINT CAPE TOWN CITY COUNCIL AND COMMUNITY PROJECT**

presented by

The Interim Management Committee

Wolfgat Nature Reserve lies between Mitchells Plain and the False Bay Coast. It is the largest reserve conserving the unique habitats of the False Bay coastline and surrounding areas.

Because of lack of commitment from Cape Town City Council (under whose jurisdiction the reserve falls) and the community, no *in situ* manager and no dedicated finance; this reserve was destined to become a wasteland. Since then and through a process of community participation, the reserve is now run as a joint partnership between the community and Council. The presentation will start with a brief introduction (setting the scene) followed by short talks from members of the Interim Management Committee.

**MICRO-CLIMATIC OBSERVATIONS AT
SOME HEX RIVER MOUNTAIN SUMMITS**

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Ground climates exert an important control on a variety of environmental processes, including sediment movement, soil-forming processes and thus, directly and indirectly on the habitat characteristics for local vegetation. To date, no comprehensive data exist for the micro-climatic environment of the mountain summits of the Western Cape. In order to provide such information two climatic stations were established in the Hex River Mountains. The first was installed on the Peninsula sandstone at Waaihoek Peak (1900m a.s.l.) in February 1990. Recording is ongoing at this site. A second station was established on Cedarberg shale near Mt. Superior at 1850m a.s.l. and operated during 1993 and 1994. Parameters reported on in this paper include precipitation, soil moisture, air and soil temperatures.

Precipitation totals differ greatly between the two sites and reach well over 2000mm/yr at Waaihoek Peak. Snowcover duration in winter is estimated at about 31 days per year between April and September, but also experiences high inter-annual variation. Moisture levels in the shallow soils remain close to saturation throughout the wet season. Seasonal air and soil temperature patterns indicate that soil frost is not important in sandstone strata, but causes major disturbance at the surface of shale-derived soils in winter. Soil surface maxima in summer range from over 50°C in sandstone to over 80°C in shales.

**COORDINATED REMOTE SENSING STUDIES IN MEDITERRANEAN TYPE
ECOSYSTEMS: THE SOUTH WEST CAPE REGION
AND SOUTHERN CALIFORNIA**

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Remote sensing studies in Mediterranean-type ecosystems often address similar ecological problems (e.g. habitat loss, fire, water relations) and need to deal with similar issues pertaining to data acquisition and analysis (e.g. steep terrain, significant soil/rock background in the instantaneous field-of-view of the sensor, substantial landscape heterogeneity at a variety of scales). The choice of appropriate spatial, spectral and temporal resolutions of the remotely sensed data for specific research objectives is critical to optimize the information content of the data and to minimize the acquisition costs. Over the next ten years, the data available from satellite platforms is expected to increase dramatically, with choices in spatial resolution ranging from a few meters to kilometres and some sensors having spectral bands numbering in the hundreds. Furthermore, the apparent consensus from recent research forums is that remotely sensed data are likely to be more integrated into geographic information system (GIS) applications, automated mapping and ecosystem and global models.

This paper will outline biophysical and biogeographical remote sensing studies in Southern California that are being conducted by scientists at San Diego State University and that may have relevance to research efforts in the Cape Floristic Region. Particular attention will be given to the use of remotely sensed data for the study of alien plant invasions in fynbos catchments and

water use by vegetation in the riparian zones of catchments. The studies presented will be discussed in the context of anticipated future developments in remote sensing technologies and the integration with GIS and modelling studies.

MONITORING FYNBOS VEGETATION WITH LANDSAT IMAGES, THE EFFECT OF SCALE

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In the past there has been some doubt about the value of satellite imagery to evaluate vegetation and specifically the complex fynbos.

This paper illustrates that structural classes can be identified and that observed patterns can be related to such classes. It is contended that the fragmentation of these classes can be used to evaluate change in the vegetation, both long term due to climate or short term due to management.

Because each class has a unique reflectance and values can only be illustrated over a limited scale, the effect of scale is critical in the accurate evaluation of the fragmentation patterns. Over a large area (Km²) coarse patterns can be evaluated, at a smaller scale (1000 Ha) more detail is possible. It is at this last level that monitoring on large nature reserves should be done.

PROGRESS REPORT ON INVENTORY OF DATASETS PERTAINING TO THE FYNBOS BIOME

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The Fynbos Biome, occupying almost 6% of South Africa, has one of the highest plant diversities in the world. It is of considerable value, not only for its potential to attract tourists and its wildflower industry, but also as a world nature conservation zone. There are, unfortunately, many threats which

continually need to be researched, monitored, assessed and controlled. These include, amongst others, invasive alien plants, fire, encroaching agriculture, urban and residential development, water schemes and illegal flower picking. Over the last twenty years there has been considerable research into developing an understanding of the fynbos and how best to manage it. The Fynbos Forum, constituted in 1990, is an association of voluntary scientific researchers and resource managers who are concerned about maintaining a focus on the Fynbos Biome and its problems.

Environmental research generates new information and often provides insights into the complexities of environmental problems. Efficient and effective decision-making requires ready access to quality research information. One of the best strategies for strengthening environmental decision-making is to improve the control and availability of this information. However, many environmental managers and researchers of the Fynbos Biome have commented that the information they require is fragmented, often difficult to access and time-consuming to collect. Thus, a major requirement of both resource managers and researchers is the identification of information sources. This inventory, a product of the Fynbos Forum, has made a major contribution towards demonstrating the value of sourcing information.

THE DEVELOPMENT OF USER FRIENDLY INFORMATION SYSTEMS FOR CAPE NATURE CONSERVATION (CNC)

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Over many years information about fires within CNC areas has been diligently recorded and filed. Management benefited little from this information as it was in a form where relationships within the data could be derived only with great difficulty. A need to develop a user friendly information system, that could be distributed to all reserve centres at a minimal cost became a priority. A Fire Report System was developed in Microsoft Access, in a joint effort between CNC and Forestek. This report has now opened the way for the development of a similar style of information systems throughout CNC.

**AN ECOLOGICAL ECONOMIC SIMULATION MODEL OF MOUNTAIN
FYNBOS ECOSYSTEMS: DYNAMICS, VALUATION AND MANAGEMENT**

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The valuation of ecosystem services provided by fynbos mountain catchments is attempted by developing a dynamic model which integrates ecological and economic processes. The model realistically simulates ecosystem processes in a hypothetical 4km² mountain catchment in the western part of the fynbos biome. Model output, comprising the quantity and value of ecosystem services such as water, biodiversity, wildflowers and recreational/ecotourism activities, is evaluated in terms of two economic scenarios (low valuation, high valuation) and three management scenarios (present, proactive and pristine). The net value of the catchment varied greatly in relation to management and economic

scenario. Highest value over a 50 year simulation period was for the high valuation/pristine management combination (R300 million); lowest net value (R20 million) was for the low valuation/present management combination. Water emerged as the most valuable service under low valuation scenarios whereas a biodiversity storage function was the most valuable service under the high valuation scenarios. The model clearly demonstrated the economic advantages of proactive catchment management, irrespective of the economic scenario. The costs of catchment management (principally alien plant removal) are a tiny fraction of the economic benefits to society associated with the services derived from fynbos mountain catchments.

Keywords : Valuation, ecosystem services, mountain catchments, fynbos, alien plant invasion

**AN ECONOMIC EVALUATION OF THE INVASIVE ALIEN PLANT CONTROL
PROGRAM IN THE MOUNTAIN CATCHMENT AREAS OF THE WESTERN CAPE**

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Problem Statement

Invasive alien plants in the mountain catchment areas of the Western Cape reduce water runoff and quality, biodiversity and catchment stability. The study

will assess the economic viability of alternative strategies to reduce relative infestation levels in the catchment areas.

It is known that invasive alien plant infestations in the Mountain Catchment Areas (MCA) causes a decrease in water runoff, as well as having a negative effect on the biodiversity (Richardson et al. 1992). Van Wyk (1987) found that the overall reduction in runoff after afforestation could be as much as 50%. It is also known that the water sources of the Western Cape are already stretched to the limit to supply the demand for water for the Cape Peninsula, as well as agricultural activities in the rest of the province.

The aim of the study is to predict the optimum alien plant control programme to maximize the benefits of the clearing programme in terms of the financial implications and social benefits to the community, with specific reference to job creation (RDP) and water yield respectively.

ARE THERE ANY PROSPECTS FOR BIOCONTROL ON PINES?

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Pinus pinaster (from Europe) and *Pinus radiata* (from North America) are among the most important weeds in the Cape fynbos. Unlike *P. pinaster*, *P. radiata* is still valued as a timber species in the Cape.

One of the most important reasons for the invasive success of pines is the production of large numbers of cones and seeds. The Plant Protection Research Institute was requested to investigate the possibility of introducing biocontrol agents that will reduce the number of seeds being produced without harming the pine trees themselves. Such agents would need to be very host specific because South Africa is a major exporter of seeds of various other pine species.

A survey of the literature on pine cone-feeding insects, and correspondence with top international scientists working in this field, has revealed that

- * There is a host-specific insect on *P. radiata*, viz the pine cone beetle *Conophthorus radiatae*. This beetle causes significant destruction of *P. radiata* seed in its native habitat. Unfortunately, *Conophthorus* beetles have been implicated as vectors of disease, e.g. *Fusarium*.
- * The seed predators of European pines appear to be specific to the genus rather than to a species.

The prospects for pine biocontrol do not appear to be good at this stage.

A SURVEY ON THE EXTENT OF THE FYNBOS INDUSTRY IN SOUTH AFRICA

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An investigation was run into the status of the fynbos ornamental industry to determine the extent of utilization of natural fynbos veld for ornamental products. Secondly the extent of cultivation of these same products were determined. The investigation consisted of 3 separate sections.

1. The quantity of fresh flowers exported. The data was obtained on a monthly questionnaire completed by 12 fresh flower exporting agents for the 1993/94 export season.
2. The quantity of dried flowers exported. The data was obtained from a questionnaire filled in by 5 of 9 dried flower exporters, possibly more than 65% of export.
3. The producers supplying flowers to the above exporters were contacted and a questionnaire completed on their Fynbos farming activities. The subjects covered in the producer survey include
 - * number of farms utilized
 - * the size of natural veld available to the producer
 - * the Fynbos species/cultivars used and quantity sold

- * the origin of the product -
 - if veld harvested the percentage utilization
 - if cultivated the area planted
- * the labour employed on permanent or seasonal basis

A summary of the results will be presented, with plant species with conservation importance highlighted.

INVASION AND PERSISTENCE OF BIRD-DISPERSED, SUBTROPICAL THICKET AND FOREST SPECIES IN FIRE-PRONE FYNBOS

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Seedling distribution and abundance, germination, and response to fire of subtropical thicket and forest species (mainly obligate resprouters) was investigated. At three coastal dune landscapes, where fire-dependent fynbos was the predominant cover state, and located along a gradient of increasing summer rainfall, thicket seedlings were most common beneath emergent fynbos shrubs and thicket clumps. Seedlings of forest species were most abundant in forest microsites although some individuals were recorded beneath thicket. Very few thicket seedlings were observed in open fynbos. Avian dispersers play a keystone role in facilitating establishment of the fleshy fruit-bearing thicket flora. Seedling abundance of different thicket and forest species was generally unrelated to fruit abundance. Germination success of most species was highest under shaded conditions; soil organic content had no effect on germination. Removal of pulp and bird-ingestion enhanced the germination, relative to untreated controls, of two out of three species tested. A simple Markov model predicted a gradual increase in cover the thicket and forest component and a gradual decline in fynbos under a "normal" (20-year

interval) fire regime simulated over 10 cycles. Although inter-fire seedling establishment under emergent fynbos shrubs, that provide perches for avian dispersers, is important in the initial colonisation of fynbos by obligate resprouting thicket species, these persist and expand by vegetative recruitment after and between fires, respectively. In the prolonged absence of fire, the endemic-rich and fire-dependent fynbos flora would be replaced by species-poor forest and thicket.

Keywords :

Bird-dispersal, Fynbos, Germination, Resprouting, Seedling recruitment, Subtropical thicket and forest

Nomenclature :

Bond & Goldblatt (1984)

SPECIES' PERSISTENCE IN ACACIA-INVADDED FYNBOS: EVIDENCE FROM THE SOIL-SEED BANKS

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I sampled the standing vegetation and the soil-stored seed banks at three sites on the Cape Peninsula which each had areas uninvaded, recently and long-invaded by dense stands of alien *Acacia saligna*. In addition, at one site the standing vegetation was removed in the three stands and the recruitment monitored over two years.

Both the density and richness of the soil-stored seed banks declined with stage of invasion. However, even at the poorest site this represented 260 seed.m⁻² and 40 species over the area sampled (an equivalent of 0.8 m² soil surface) in long-invaded fynbos. Community similarity between uninvaded and invaded stands was higher for the soil-seed banks than the standing vegetation, indicating that some fynbos species form persistent seed banks. Preliminary analyses of the biological attributes of species surviving under *Acacia* as soil-stored propagules indicate that attributes such as growth form, regeneration

mode and dispersal mode explain only 13% of the variation in the seed banks. Attributes of the seed, such as seed size and morphology, may be more important in explaining the variation.

The results imply that even long-invaded areas may still be suitable for conservation action.

THE INFLUENCE OF ANTHROPOGENIC HABITAT TRANSFORMATION ON BIRDS IN THE MOUNTAIN FYNBOS BIOTOPES OF THE ELGIN DISTRICT, WESTERN CAPE

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The influence of habitat transformation on the diversity of natural biota in southern Africa is poorly understood, and has not been quantified. We investigated the influence of deciduous fruit farming on the bird assemblages of the Elgin district, Western Cape. A total of 116 bird species was recorded in the district, of which 110 were recorded on the fruit farms and 30 in a nearby protected area within untransformed natural vegetation, Mountain Fynbos. Six species were recorded only in the Mountain Fynbos. Fourteen species were recorded during surveys undertaken within pure orchards. More species, especially those of scrub habitats, were recorded in orchards encompassing <0.5 ha fragments of natural biotopes than in orchards lacking natural biotopes. Population densities in orchards under traditional (= heavier and routine) insecticide and fungicide spraying programmes and those in which lower intensity spraying is targeted at specific pests were similar. We suggest that the placement, size and connectedness of fragmented natural biotopes, e.g. fynbos (even those infested by alien plants) within deciduous fruit farms, the addition of new biotopes, e.g. farm dams, and the presence of large (> 20 ha) protected Mountain Fynbos areas within the matrix of transformed habitats have complimented the pre-farming avian diversity in the Elgin district as a result of district-wide land use practices.

ANALYSIS OF VEGETATION CHANGE ON THE NORTHERN SLOPES OF TABLE MOUNTAIN BASED ON MULTI-TEMPORAL AERIAL PHOTOGRAPHY, 1944-1992

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Aerial photography (black and white panchromatic) is used to assess vegetation pattern and temporal change of the northern slopes of Table Mountain. Data analysis is facilitated by using a vector-based Geographic Information System (GIS) software (e.g. ARC/INFO). This permits the generation of maps and spatial statistical analysis. Changes in vegetation type on the northern slopes is mapped and described for the period 1944-1992. The results show that between 1944 and 1992, fynbos increased from 36% (343ha) to 73% (667ha) of the total area. Within this same period, dense plantations and open plantations decreased from 13% (126ha) and 29% (274ha) to 8% (73ha) and 4% (36ha) respectively. This is mainly been due to a concerted effort by the Parks and Forests Branch of the Cape Town City Council to control alien plant spread and promote regeneration of the natural vegetation. Rates of vegetation change is contrasted to better understand landscape processes. This study on vegetation change is useful for landscape management and vegetation restoration projects.

EFFECTS OF SEA-WATER DOWSING OF FYNBOS FIRES

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Aerial dowsing of fynbos fires using helicopters has proved very effective at the urban/fynbos fringe. Helicopters pick up water from the nearest source which is often the sea. We studied the physical and biological effects of sea-water dowsing to assess its environmental impact. Soil movement, salinity content, rates of vegetation recovery and plant species composition were studied at two sites where sea water had been used to dowse fires.

The sites were both on steep slopes but on different geological substrates. The effect of sea water on seed germination and seedling growth of several plant species, covering a range of seed sizes, was also studied in a glasshouse experiment. Results of the study will be reported together with recommendations for minimising deleterious effects of sea water application.

SMALL MAMMAL COMMUNITIES OF SOUTH COAST RENOSTERVELD

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Release-recapture techniques were used to study community structure, population size and survival rates of small mammals of South Coast renosterveld. Little is known of this vegetation type which has largely been replaced by wheat fields. The study concentrates on small mammal communities in cultivated fields throughout various stages of the harvest cycle, as well as different aged and sized renosterveld patches. Study results suggest that cultivated fields are important in providing food for small mammals prior to and just after harvest. Post-burn renosterveld was found to support a lower diversity of small mammals compared to older stands. The smallest renosterveld patch supported a greater diversity as well as abundance of small mammal species than a larger island of comparable age. This may indicate that surrounding habitat heterogeneity, rather than patch size, plays an important role in affecting species diversity and abundance. Different species were usually trapped in specific locations within the trap grid. This finding can be related to habitat and dietary preferences as well as social organization of the respective species. *Rhabdomys pumilio* appeared to dominate all mature renosterveld stands and was the only species trapped in sufficient numbers to warrant statistical analysis. Where estimates were possible, daily survival rate for this species was found to be relatively low. More long-term research is needed on renosterveld and adjacent vegetation in order to satisfactorily answer questions about small mammal species abundance and community structure in renosterveld.

PREDICTING PLANT RESPONSES TO CHANGING FIRE REGIMES

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Natural fire regimes have suffered increasing disruption by landscape fragmentation and prescribed burning. Among the least understood consequences for mediterranean-type shrublands are the effects of changes in fire intensity. Prescribed burns are generally less intense than wildfires for safety reasons. We propose a general model for predicting the effects of fire intensity on recruitment of species with soil-stored seedbanks based on seed size. We show that maximum emergence depth is allometrically related to seed size over a range of families and genera. Lethal temperatures in high intensity fires penetrate below maximum emergence depths of small- but not large-seeded species. In low intensity burns, large-seeded species may not receive the necessary heating to stimulate germination. The result is that small-seeded species will be favoured by low, and large-seeded species by high, intensity burns. The implications of these relationships are discussed.

ABSTRACTS

OF

POSTER

PRESENTATIONS

MULTI-MEDIA AS A MARKETING/EDUCATIONAL TOOL IN CONSERVATION

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In developing management strategies for the Orangethloof Valley, Table Mountain Nature Reserve, the Parks and Forests Branch of the Cape Town City Council, in a partnership with the public, motivated that the Orangethloof Valley be developed as a unique educational resource for all the inhabitants of Cape Town.

Concept landscaping and architectural plans for an environmental centre in the Valley were drawn up and costed at R500 000 and it was subsequently decided to seek private sponsorship for the project.

Bates Advertising (Bates Community Projects) and Hirt & Carter, in a collaboration venture with the City Council, undertook to compile a multi-media marketing package to be presented to potential sponsors.

This display demonstrates the power of multi-media to evoke strong emotional responses and sell the product in a dynamic innovative and unique way.

PLANT-BASED ECOTOURISM IN THE WESTERN CAPE: A BLOOMING FUTURE?

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The term "ecotourism" is often used to describe any kind of nature-based tourism. However, a narrower description of ecotourism defines it as "responsible travel to natural areas that leads to environmental conservation

and improves the welfare of local people". According to this description, ecotourism is poorly developed in the Western Cape. Many rural communities are not yet sufficiently organised to benefit from any such tourism. Furthermore, only small amounts of tour revenue flow into conserving and/or sustaining the natural environment. According to a model developed by Peter and Mary Ashton (Arnold Arboretum, Harvard University, USA) a tour of the fynbos and succulent karoo was planned and organised by members of their organisation and the Institute for Plant Conservation. Local plant, bird and archaeological specialists acted as guides, and where possible use was made of locally-owned accommodation. Part of the profit was donated to a community-based conservation project that would help to promote and conserve an endangered fynbos ecosystem found at Elim on the Agulhas Plain. Thus, the requirement that travel leads to conservation of the environment as well as improving the welfare of local people was fulfilled. It is hoped that this conceptual model will be of benefit in the future as the enormous potential of plant-based ecotourism is realised in the species-rich fynbos and succulent karoo biomes.

FYNBOS IN A JAR! 'IN VITRO' CULTURE OF FYNBOS

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A variety of fynbos species have proved to respond well to 'in vitro' culture. The successful culture methods of related exotic species and/or families have been used as guidelines and modified where necessary. So far 20 species in 8 different families have been cultured. Of these 7 species have been successfully initiated, multiplied, rooted and hardened off. Two species have multiplied and brought to point of callusing but have not yet rooted. Five species have been successfully initiated but have not yet multiplied. Of the 20 species 7 are either rare and/or endangered. All are valuable to the horticulture trade. In all cases the rate of multiplication has been radically increased when compared to conventional propagation methods.

CLIMATE, VEGETATION, SOIL MOISTURE RELATIONSHIPS
IN THE FYNBOS REGION

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The poster will present existing climatological information on rainfall, temperature, evaporation soil moisture and vegetation biomass with a view to establishing run off climate relationships. A proposal for research along these lines will be presented.

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