

# **Judy Fisher - September 9**

## **Science and the Community working together**

### **for Bush and River restoration**

Those of us in Sydney were lucky to be able to hear talks by Judy Fisher from the University of WA. Judy spoke on the 9<sup>th</sup> September on "Science and the Community working together for Bush and River restoration"

Judy has conducted ecological research for 10 years in Bold Park. This 450 ha of bushland is 8 km from the Perth CBD and now managed by the Botanic Gardens and Parks Authority. Judy's research has been used to direct restoration methods and guide the Adaptive Management of Bold Park.

#### **Research**

Studies have looked at the biodynamics of the Banksia Woodland community areas of differing vegetation condition. Twelve sites across the park were studied and the subsequent use of Geographic Information Systems determined the past fire disturbance histories for areas studied. Study sites were grouped into four categories

Good condition

Medium condition

Areas invaded by two dominant weed species from South Africa

- o Invaded with veldt grass *Ehrharta calcyina*
- o Invaded with *Pelargonium capitatum*.

The Geographic Information Systems studies, utilising aerial photographs between 1963 and 2000, indicated that the invaded sites were those with the greatest number of disturbance events during this period.

Work was done to investigate the soil seed bank using both the glass house and in situ using a tent to smoke-treat the soil.

In the bushland in the good condition the level of native seed was greater than weed seed but with a surprisingly high number of weed seeds still found. In all other conditions the number of weed seeds outnumbered native seed.

However where the pelargonium was present there was a very low level of native seed being much lower than the level of weed seed, which is shown on Diagram 1.

Also examined was the depth of seed in the soil. Most of the weed seed was present in the litter layer. This resulted in rapid germination of weed seed taking around 2 ½ weeks compared to 4 weeks for the seed of native species. (See Diagram 2)

Further investigations were conducted in these areas of differing condition on changes in nutrient uptake, changes in soil nutrient levels, vegetation condition, invertebrate composition and links then made between these results, disturbance and weed invasion.

### **How to use this work in Adaptive Management.**

Good management involves having a Plan or Strategy. The adaptive part is when new scientific information comes which can improve management, and this is incorporated into the plan and enables it to be changed.

An example of this was using the information found in this research to adopt new strategies to control veldt grass in Bold Park - Perth.

Judy's research had shown that after a fire caused by arson, the levels of seed in the litter layer was depleted with little being present immediately following fire. Up to 18 months after a fire the levels had become very high again.

Obviously if the grass (which is a perennial) was controlled as soon as possible after a fire, when the seed in the litter layer had been incinerated, the seed bank would not build up, resprouting specimens would be killed and recruitment of new plants would be low.

A fire, caused by arson, occurred and burnt 75 hectares of Bold Park. Management took these scientific results on board and adapted their management by changing their priorities and developing a control program for this area. This involved spraying 75 hectares of Bold Park, which had been invaded with the veldt grass, prior to the fire. The glass house work had shown that after the onset of the wet season, resprouting of the grass and germination of new weed plants would start prior to native species responding

to rain. This was used as the window of opportunity for spraying so that damage to native species would be minimised. The selective herbicide 'Fusilade ®' (which affects grass species with a specified photosynthetic pathway) was also a tool to minimise effects on other species.

Spraying was continued in the following two years. The results of this have been spectacular with the native species responding well, and little weed growth occurring. The area which was a field of veldt grass prior to the fire has become a diverse native system. Those weeds which do occur are now at an easily controllable level and being out competed by the native species.

Bold Park has been recently handed over to the Botanic Gardens and Parks Authority to manage. This had meant an increase in funding to implement the additional management responsibilities. The recognition of the importance of research into ecological restoration is noted with 11 positions being created to continue the above research in a number of areas of ecological restoration over the next three years. For example positions have been established to conduct research into seed banks, disturbance ecology, weed ecology, tree decline, greenstock and broadcast seeding, seedbanking, floristics, provenance, fauna, and benchmarking.

There are challenges for management with regard to the ongoing health of the bushland and its restoration. Loss of species especially *Banksia* have occurred with little recruitment. Judy's research shows that this is likely to be linked to frequent fires and their impacts on the biodynamics of the ecosystem influencing, nutrients, weed invasion, low native seed bank levels, tree canopy decline, loss of biodiversity.

Effective restoration can occur when scientific research and education are utilised to communicate results and applications to managers and the community. It then becomes easy to incorporate this new knowledge into an Adaptive Management Philosophy and Practice.

Judy is currently writing up her work for publication. She can be contacted on 0407 984 091 or at [judyf@cyllene.uwa.edu.au](mailto:judyf@cyllene.uwa.edu.au)

The graphs below are from the following reference Fisher J L (1998). The Role of the Soil Seed Bank in Bushland Management. *Managing Our Bushland: a conference about the protection and management of urban bushland*, Cockburn Wetland Education Centre, Urban Bushland Council (W.A.).