Results of studies into the effects of clear-felling Karri on native flora and fauna

Over the past year a concerted research effort has been directed into determining the effects of clear-falling and regenerating Karri forest on native fauna and flora. The results of this work will appear in report form in two months time. This news-sheet highlights the main findings in a condensed form. It should preferably be read in conjunction with information on flora and fauna given in the Environmental Impact Statement on the woodchip project.

Fauna

1) Introduction.

Thirteen species of native mammals (excluding bats) have been reliably recorded in the karri forest. Another, the dingo, almost certainly occurs. Karri being a fairly dense forest formation is not particularly rich in mammals and no species is confined to this forest; all occur in other forest types.

Additional species occur in the chipwood licence area. Important among these are the tammar wallaby, the woylie or bettong, and the numbat. All three are confined to the north eastern corner of the licence area where they occur in jarrah forest. The entire area occupied by these species has been excluded from chipwood cutting in the first instance. 40,000 hectares in the Perup River Fauna Priority Area which is permanently excluded, and the remainder pending results of F.W.D. investigations into the effects of chipwood cutting on stream salinity. In no case is any species of mammal or bird confined to the chipwood licence area. All can be found in other localities.

2) Effect of clear-cutting on mammals

The net result of clear-cutting is a change in the structure of animal populations due to a massive (but temporary) change in habitat. When a forest cover returns, the population structure returns to its original state before cutting. Some brief notes follow on individual species of differing sensitivity and adaptability to habitat change.

a) Grey Kangaroo. Normally scarce in karri forest due to the thick undergrowth. For two years after cutting and regeneration their number rise rapidly to up to four times the pre-cutting population. They remain at this level for about 10 years when numbers decline to the pre-cutting level.

b) Southern bush rat. Requires a dense ground cover. Remains in logged areas until they are burnt when it disappears. Returns to its original population level or higher two years after the regeneration burn.

c) Mardo (Yellow-footed marsupial mouse). A species very sensitive to habitat alteration. Normally scarce in virgin karri forest (but is more frequent in swamps within the forest). Numbers build up to a high level after cutting but before the regeneration burn. They disappear after burning and in this study were first located again in 5 year old regeneration in numbers similar to those in virgin forest. This species is sensitive to fire and its numbers in forest of 5 years or older are dependent on the fire history. The longer the area remains unburnt, the more mardos there are.

d) Quokka. Generally in low numbers in karri forest and favouring swamps. Populations apparently remain in the swamps throughout forest operations and the entire regeneration period. (N.B. very few swamps are burnt in the process of forest regeneration)

3) Effect of clear-cutting on birds.

The study indicated that resident breeding birds were sensitive to removal of their habitat but they returned when the vegetation structure had returned to the pre-cutting level. Numbers varied little throughout the various cutting and regeneration phases, but the species represented varied greatly and were dependent on the habitat levels available as is shown in Table 1.

Table 1

Percentage of the bird population occupying various vegetation levels.

Forest Condition	Vegetation level		
	Shrub layer	Mid tree Canopy	Upper tree Canopy
Cut, not burnt	33%	36%	31%
2 year old regen.	85%	10%	5%
40 years old	21%	33%	46%

The number of species and the species diversity index are shown in Table 2.

Table 2

Bird species numbers and diversity index

Forest Condition	Number of Species	Diversity Index
Clear cut, not burnt	23	2.76
2 year old regeneration	27	2.84
40 year old regeneration	20	2.56
Virgin forest	22	2.76

The species diversity index is indicative of the number of species and the number of individuals of each species. For example a large number of individuals of one species gives a low index, as does a large number of species with few individuals of each. A high index demonstrates a large number of species with numerous individuals In this comparative study the index remained remarkably constant following cutting and regeneration of the forest.

In summary, when the tree cover was removed, dwellers of the tree canopy dropped in numbers while low level dwellers increased greatly in numbers. The situation had returned to the pre-cutting level by 40 years (and probably considerably earlier, but forest of between 2 and 40 years was not included in this study).

4) Reptiles

It is interesting to note that within the karri forest the majority of snakes and lizards are associated with granitic outcrops and hills. These are to be protected, together with a frainge of forest around their edges (see E.I.S.)

The research work on reptiles has not yet been summarized, but first impressions from the studies are that lizard populations seem to remain fairly static through different ages of regeneration up to and including mature (virgin) forest. Numbers of the tiger snake undoubtedly rise for a short period after the regeneration burn.

5) Insects

Insect collection data from a range of forest conditions following clear-felling were collected over the past year. The identification of species and analysis of the results is in the hands of an entomologist of the Dept. of Agriculture.

Flora

A summary of the number of plant species and their diversity index under various forest conditions is shown in Table 3. A characteristic of native plants in the karri forest is that their seed is stored in the ground for many years. The rise in the number of plant species and the diversity index suggests that clear-falling creates an opportunity for some species to germinate and thrive; in virgin forest these species are rarely seen as the dense, shady conditions are not suitable for them.

Table 3

Number of native plant species and their diversity index following clear-cutting and regeneration in the karri forest.

Forest Condition	Number of plant species	Diversity index
Clear cut, not burnt	36	2.74
1 year old	34	3.69
2 years old	36	3.35
5 years old	44	2.56
40 years old	34	2.50
Virgin forest	32	2.45