OPERATIONAL CONSIDERATIONS PERTAINING TO A POSSIBLE REDISTRIBUTION OF THE ROAD, RIVER AND STREAM ZONES IN THE SOUTHERN FORESTS OF WESTERN AUSTRALIA

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Introduction

This paper aims to provide insights to the role of the manager who is ultimately responsible for the creation, care and maintenance of the agreed system of road, river and stream zones (RRSZ). This seminar and public participation process is the opportunity for the field manager to comment on aspects of the practicality costs and benefits of a proposed option for a network of conservation and amenity areas within the multiple use segment of the CALM estate.

Six main themes are explored in this paper:

1. Fire management
2. Dieback disease management
3. Maintenance of RRSZ health
4. Impacts upon the adjoining activities
5. Road networks
6. Visual amenity

Assumptions

For the purposes of this paper the following assumptions are made:-

1. The system of RRSZ will be a network of corridors throughout multiple use State Forest, linked to larger regional conservation reserves, Nature Reserves and National Parks.

2. The manager will be concerned with protecting the agreed primary values of the RRSZ's:

   - conservation - nature habitat and source of recolonisation.
   - maintenance of visual amenity.
   - protection of aquatic ecosystems and the water resource itself.

3. The manager will aim to minimise all the potential impacts upon the RRSZ from adjoining activities.

4. The example where harvesting and regeneration operations are planned adjacent to RRSZ's will be discussed as this activity has the greatest potential to impact upon the RRSZ's if not carefully planned and implemented.

The Example

Figure 1 illustrates the present situation with 400 metre zones (not shown) retained on some major tourist roads 200 metre zones retained on either side of rivers and 100m zones retained either side of selected streams.

Additional areas are protected during harvesting such as granite outcrops and areas of pure marri (*E. calophylla*).

Access roads for timber harvesting are constructed low in the landscape outside the RRSZ's to minimise the potential introduction of dieback (*P. cinnamomi*). Roads are built in summer when the probability of inadvertently introducing and initiating a new infection are very low. The road surfaces are well drained to maintain an environment unfavourable to the survival of the fungus. Drainage water is channelled via engineered drains to the lowest point in the landscape before being directed through a vegetation buffer into the watercourse.

Logs are brought to landings located adjacent to the access roads and low in the landscape. Generally a herring bone pattern of snigging is used when bringing logs to each landing.

Figure 2 illustrates a possible option to extend the existing network with up to 50 metre wide zones being placed on all first and second order streams. Note how the stream zones may be opportunistically extended to link with the other areas protected during harvesting, to create continuous zones or corridors for fauna movement.

1. Fire Management

Since the RRSZ's are a primary source for the recolonization of the adjoining areas, following harvest and regeneration, it is considered desirable to maintain the major part of the network free from fire - wildfire and prescribed fire which may be necessary during the early regeneration phase.

One of the aims of introducing controlled fire into the forest on a planned strategic basis is to deliberately burn away the leaf and twig litter which is constantly being shed from the tree and scrub canopy onto the forest floor. It is the accumulation of this material that causes summer wildfires to be so intense and fast moving. Should a wildfire occur where fuel reduction burning has occurred recently it is possible to safely attempt to put the fire out by directly attacking the flank of the fire or even the head fire with men and machines. In areas where fuel has not been reduced fire suppression is often extremely dangerous and ineffective. Prior to an area being harvested it may be in an area subject to periodic prescribed burning.

Most controlled burning under the forest canopy occurs when the river and steam zones are damper than the surrounding forest. As a result, a patchwork pattern of burning results in a mosaic of burnt and unburnt forest. Normally 20 % of an area is left unburnt with the major part of the unburnt forest being the moister stream and river zones.

Summer wildfires will be always be difficult to control in long unburnt areas. Unburnt RRSZ's can create a "wick effect", acting as a fuse, which if ignited, will burn quickly and fiercely, presenting a threat to adjoining areas of forest. This threat will be at its worst when the adjacent regenerated forest is between 5 and 20 years of age. During this period rapid fuel accumulation occurs in the young forest and it is still too fire sensitive to enable fuel reduction burning to be commenced. The bark of the young trees is not thick enough to protect the cambium from damage during prescribed burning, whilst the tree's sensitive growing tips are often not high enough off the ground to prevent damage from radiant heat.

In view of this situation it is considered desirable that not all road, river and stream zones should be retained fire free. Some need to be burnt to reduce the hazard described above whilst others will need to be burnt to enable safe and cost effective regeneration operations using fire.

Figure 3 illustrates the use of fire in the regeneration process. Logging debris is ignited when the wind is blowing from the direction indicated. This enables the bulk of the previous network of stream and river zones to be kept fire free. Sparks and embers are blown away from this critical area. On the leeward side of the areas being burnt the uncut forest will have had a recent fuel reduction burn to enable fire crews to rapidly suppress any fires which initiate as a result of sparks or embers being blown across the boundary track.

The options described above also minimise overall soil disturbance and cost for construction of additional mineral earth firebreaks.

The "perimeter to area" ratio of the burning operation is kept practical, the area will not be broken into numerous difficult small burns which will require additional commitment of resources - funds, staff and equipment.

Reduction of the fuel loads in some of the extended RRSZ's will ameliorate the problems of future wildfires and the "wick effect" described earlier. Introduction of fire under controlled conditions is preferable than risking fire escapes from regeneration burns which will result in an intense destructive fire. Also if previously regenerated forest is killed by wildfire, the objective of creating a diversity of forest structure is foregone.

Figure 3 also illustrates the situation where some trees considered unsafe (shown as crosses) will need to be removed during the harvesting and regeneration phase. Unsafe trees are those which may fall over or catch alight and burn down during fires or burning operations, thus threatening fire fighters. These trees also have a high probability of catching alight from flying sparks or embers, and acting as a source from which further sparks may be showered into adjoining areas of forest.

Any tree within a buffer zone felled for safety reasons should have any commercial log timber utilized rather than be left as waste. Logging equipment would not be permitted to enter the zones to remove any such logs. A cable would be used to winch the logs out.

2. Dieback Disease Management

There should be little extra cost or difficulty associated with dieback disease management in an extended RRSZ network. Essentially the existing strategy for disease management will apply.

Risk of introduction of the disease into RRSZ's and adjacent areas being harvested and regenerated can be minimised by constructing hard surfaced roads low in the landscape, careful engineering and control of drainage and attention to vehicle cleanliness, in particular the cleaning down of heavy machines before they enter each sub-catchment in the logging coupe.

Provided the option to allow some burning in extended RRSZ's is used and additional roads or firebreaks are not required around each of the extensions, then the disease management strategy will not be changed or incur any additional cost by the retention of unlogged segments within the area previously designated as available for harvesting.

3. Buffer Health

The maintenance of the health and condition of an extended network of RRSZ's is not expected to be a significant problem.

Earlier papers touched on the issue of establishing a viable zone width. The manager's task will be to ensure that the use of intense fire when regenerating adjacent areas does not result in excessive scorching of the edges of the zones. This will be more difficult to achieve in stream zone enclaves within the area to be burnt.

Wherever possible operations should be sequenced as far apart in time as possible. For example road building, harvesting and regeneration burning should not be scheduled in the same year .

The removal of isolated dangerous trees should not significantly reduce the value of the zones. The number of trees involved is small and it is known that the value of dead trees as habitat trees (roosts and nesting sites) is low.

The requirement for some sections of RRSZ's to be periodically burnt should also ensure that there is a diversity of understory structural types represented within them thus adding to their value as a source of recolonization of adjoining regenerated areas.

4. Impacts on Adjoining Operations

In some cases there will be a need to cross extended stream zones during the harvesting phase. Figure 4 illustrates the example where the traditional herring bone snig track pattern has been interrupted by the extension to the stream zone. The desired option is to select a single crossing point which will be carefully planned and engineered.

The linking of other habitat patches and strips by an extended network of RRSZ's is expected to add to the sustention of wildlife values during harvesting and regeneration operations.

There would be a requirement to train staff (CALM staff and contractors staff) to recognise the ecotypes boundaries and aesthetic boundaries to be demarcated in the field under the guidelines provided in any earlier paper. The increased "perimeter to area" ratio and boundary length would cost more to implement and maintain. However the small cost involved in implementing these changes are acceptable when the improvement to other forest values is considered.

It some cases it may be extremely difficult to "get it right" in an absolute sense when demarcating extended zones as proposed in the field. An acceptable standard to be achieved in the field would need to be established. When all the discussions and planning are finished it is the field technician who actually makes something happen or change in the forest. Once that alteration is in place the person responsible is held accountable for the result and is subject to criticism, irrespective of their level of endeavour and the sincerity of their intentions, if the field result is not perceived as acceptable.

As discussed earlier provided some burning within an extended zone network occurs then the regeneration and future fire suppression processes should not be any more difficult or expensive than the present system.

5. Road Networks

If an option such as the one outlined above is chosen then figure 4 illustrates the need for small breaks in the network of RRSZ's to facilitate the movement of vehicles. Apart from the log snigging example described earlier there should not be any other significant change or cost associated with building and maintaining an effective road network.

Stream and river crossings are already identified as operations which require very careful planning and sensitive engineering. Detailed procedures and guidelines for these activities have been developed over many years. High standards would continue to be applied in the construction and maintenance of all stream crossings.

6. Visual Amenity

The visual resource management principles and procedures described in an earlier paper would not greatly increase the cost or difficulty of conducting activities adjacent to extended RRSZ's.

In some cases there would be simple extensions of zones, relocation of boundaries, or edge modification to enhance and/or maintain visual resource values. In some areas harvesting may be excluded altogether. Elsewhere modified activity may occur. The main effect in the field would be the increased involvement of the professional staff who would need to translate their skills and knowledge to a technical level and help impart that knowledge to the field technicians. Again, there may be some additional costs incurred by the increased "perimeter to area" ratio in some harvesting operations, but the benefits derived from visually acceptable operations would more than compensate for any additional costs. All field staff would derive a greater sense of job satisfaction for carrying out more skilful and aesthetically pleasing work.

Conclusion

There would be clear benefits from an extended system of RRSZ's, whilst existing standards will be maintained or improved.

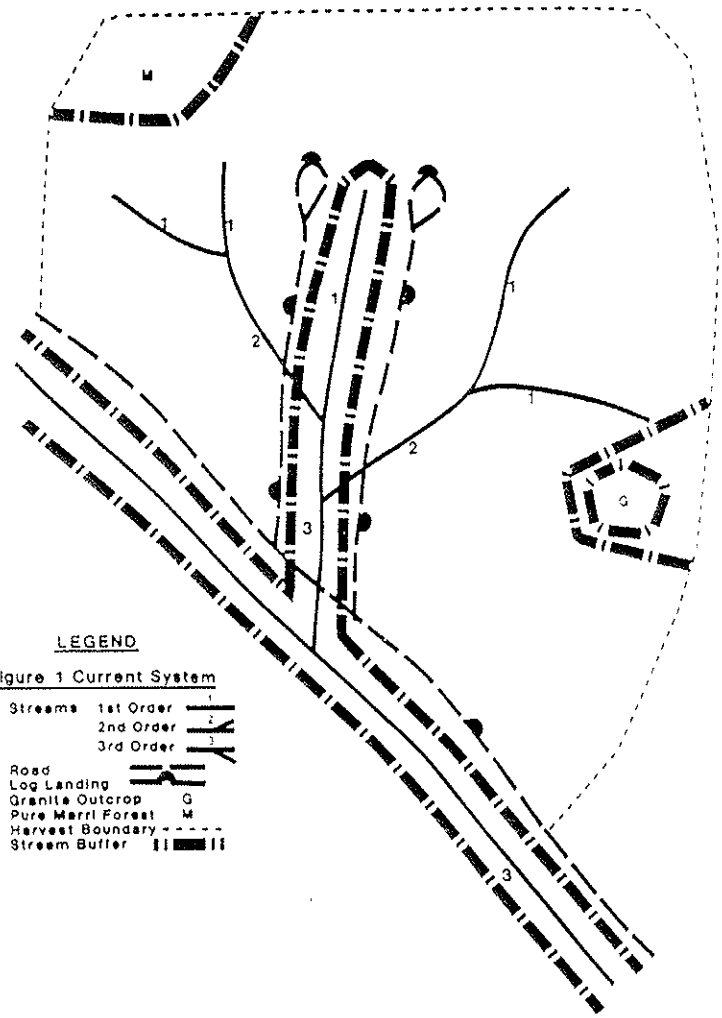
Benefits would include:

- enhanced value for wildlife
- greater protection to aquatic ecosystems and the water resource itself
- enhanced amenity value both in the RRSZ's and in the adjoining forests
- skills acquisition and improved job satisfaction by field staff.

There would be additional, but acceptable costs associated with:

- road construction for timber harvesting
- skills and knowledge training for field staff
- planning and implementing prescribed fire for both regeneration and fuel reduction purposes.

In summary, the community, the consumers of timber products and CALM, as a part of the wider community, will ultimately judge the costs and benefits of changing the system of RRS zones. The cost can be measured either in terms of reduced environmental protection afforded by the present system of RRSZ's or in terms of the extra management costs associated with a system of extended RRSZ's. It is my opinion, as an operations manager, that a better result is achievable at a reasonable cost to the community.



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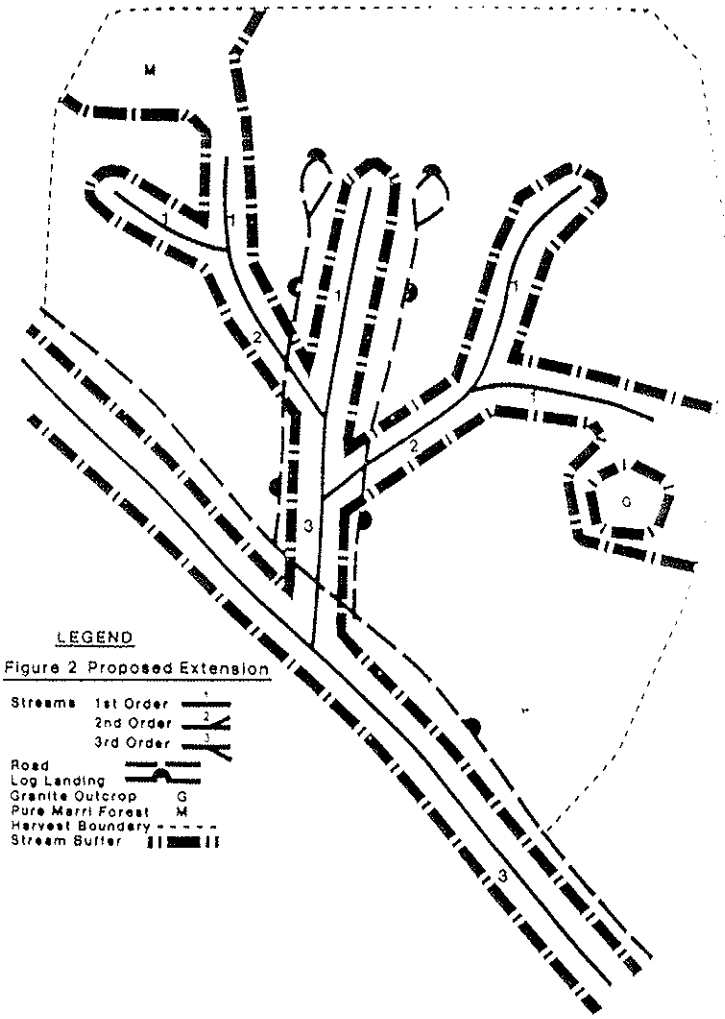

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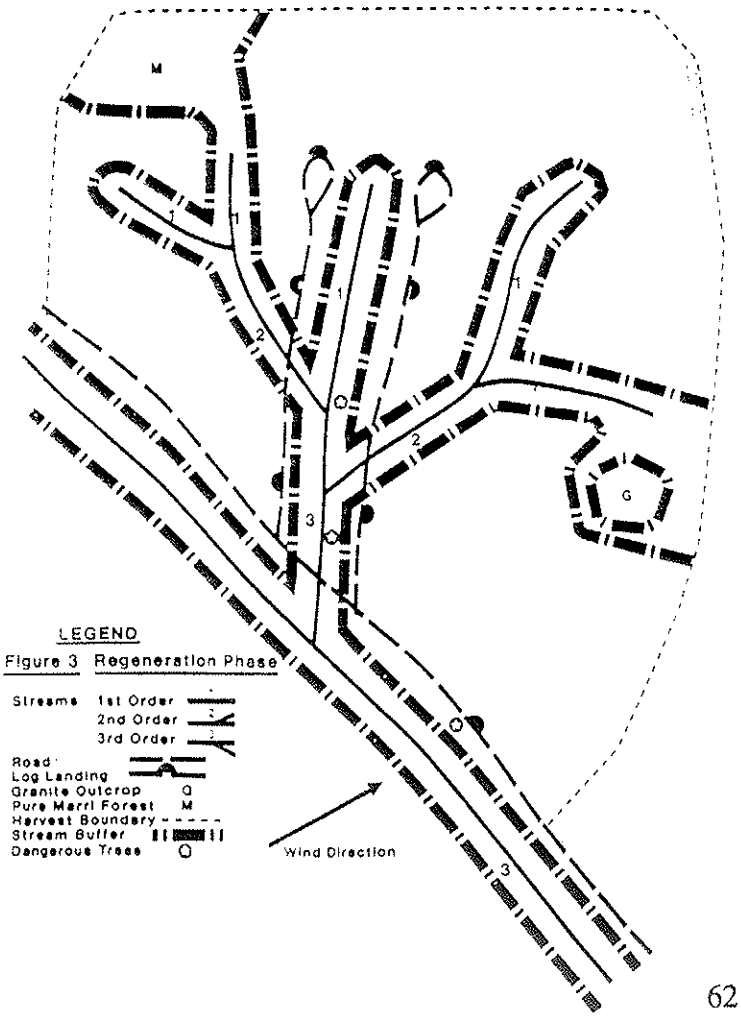

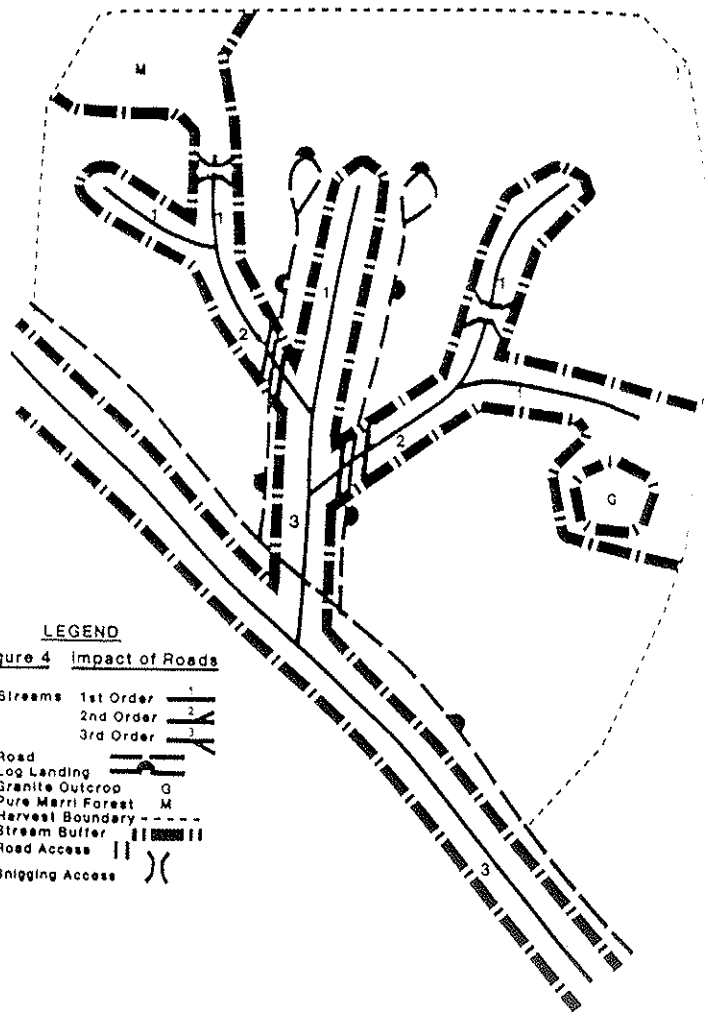

PROCEEDINGS OF A SEMINAR

A REVIEW OF ROAD, RIVER AND STREAM ZONES IN SOUTH WEST FORESTS

Held at Manjimup

Tuesday, 9 July 1991

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