REVIEW OF WATER SUPPLY CATCHMENT PLANNING IN THE WIMMERA RIVER CATCHMENT:
Malakoff Creek (Landsborough) Water Supply Catchment

June 1995

D. M. McKINNON

ABSTRACT

Malakoff Creek, in the former Shire of Avoca (Victoria) and within the Wimmera River Basin, was proclaimed as a Water Supply Catchment in 1959. Widespread and intensive land sub-division and associated small-lot development in this catchment during the early 1980s posed threats to small rural water supplies, thereby requiring the need for regulation of residential development within this small catchment. The Determination of Land Use was therefore developed, in 1985, with an innovative approach in dealing with issues of possible broad-scale residential small-lot development. The provisions of the Determination were incorporated into statutory planning processes for the former Shire of Avoca. The overall effectiveness of the Determination has centred on the Planning Control, designed to reduce the density of allotments within the catchment, and the long standing nature of the policy that has remained intact for over 15 years without amendment. However, related measures in influencing land management for other uses appear to have been limited, with apparent little difference in catchment condition of the Malakoff Creek Water Supply Catchment. This probably reflects a lack of implementation objectives, detailed policy, strategies to improve catchment condition on the part of the key State agency.

1. INTRODUCTION

The Wimmera River Basin comprises over 2.4 million hectares of land in western Victoria draining to the Wimmera River and its tributaries and effluent streams (Figure 1). While the larger part of the Basin is formed by clay plains and intervening sand dunes, the more important components of the catchment from a water production perspective are the rolling to hilly sedimentary and granitic landscapes in the east and south-east portions that make up the headwaters of the Basin. These areas provide both the bulk of the flow to the Wimmera River, domestic supplies to Horsham, Stawell and a range of small rural townships and settlements, and major a contribution to the Wimmera-Mallee stock and domestic water supplies.

During the late 1970s and early 1980s, speculative land sales were on the increase within former gold mining areas of the State. In these areas, farm holdings frequently were made up of many small to medium-sized Crown allotments that under the then current planning control could each become a potential residential area.

The catchment to the water supply for the townships of Navarre and Landsborough was such an area within the former Shire of Avoca.

In the late 1970s, concerns were raised about the potential risks to the water supply from unregulated residential development following the purchase of multi-lot holdings in the Landsborough catchment by a land developer. An investigation was initiated by the (former) Soil Conservation Authority, with a view to introducing catchment controls such as a Determination of Land Use, made under the powers of the *Soil Conservation and Land Utilization Act 1958.*

The Malakoff Creek catchment (Figure 2), as the area became known, is a sub-catchment within the larger Wimmera Systems Water Supply Catchment Area, proclaimed in 1959 under the powers of the Act. This provided the basic requirement for proceeding to a Determination, the next step in the catchment planning procedure.

During the course of the investigation it became clear that an integrated approach to catchment planning using both statutory planning and catchment planning measures would be the most effective means of reaching the desired goals for the management of catchment land.

Accordingly, a draft development policy for the Malakoff Creek Catchment was prepared.

Formal controls were put into effect by the (then) Shire of Avoca in 1980 with the introduction of the Catchment Development Policy. Planning Control followed in 1982 and a Determination of Land Use was approved in 1986. The three measures complement one another, offering an appropriate level of protection through the regulation of land development and land management within the catchment area.

The different nature of this approach to catchment management was recognised by the Wimmera Catchment Co-ordinating Group. In its Final Report (Wimmera Catchment Co-ordinating Group, 1992), concerning an Integrated Management Strategy for the Wimmera River Catchment, it recommended the following action (D3) be taken:

> "The Land Use Determination for the Malakoff Creek sub-catchment should be assessed by the Department of Conservation and Natural Resources in consultation with the Landsborough and Navarre communities by the end of 1993. Assessment will determine the:-
>
> (a) effectiveness of the Land Use Determination
>
> (b) applicability of Land Use Determination controls to other areas in the catchment."

This assessment has been undertaken and is reported here. It included inspections of the catchment area, and discussion with officers of the relevant water supply authorities, local government and the (then) Department of Conservation and Natural Resources, with members of bodies with catchment interests and with members of both the catchment and water user communities.

The objectives of the assessment were:

1. to describe the approach taken in the development and application of the Malakoff Creek (Landsborough) Determination of Land Use in relation to the catchment management problems

2. to evaluate the strengths and weaknesses of the approach

   (a) in relation to the Malakoff Creek (Landsborough) Water Supply Catchment and

   (b) in relation to catchment management more generally

3. to review the effectiveness of the approach taken in resolving identified present or potential resource management conflicts in the Malakoff Creek (Landsborough) Water Supply Catchment;

4. to identify other areas in the Wimmera River Basin where a similar approach in catchment management may be applicable; and

5. to suggest actions or approaches to remedy any weaknesses of the Malakoff Creek approach.

FIGURE 1 THE WIMMERA RIVER BASIN

FIGURE 1 THE WIMMERA RIVER BASIN

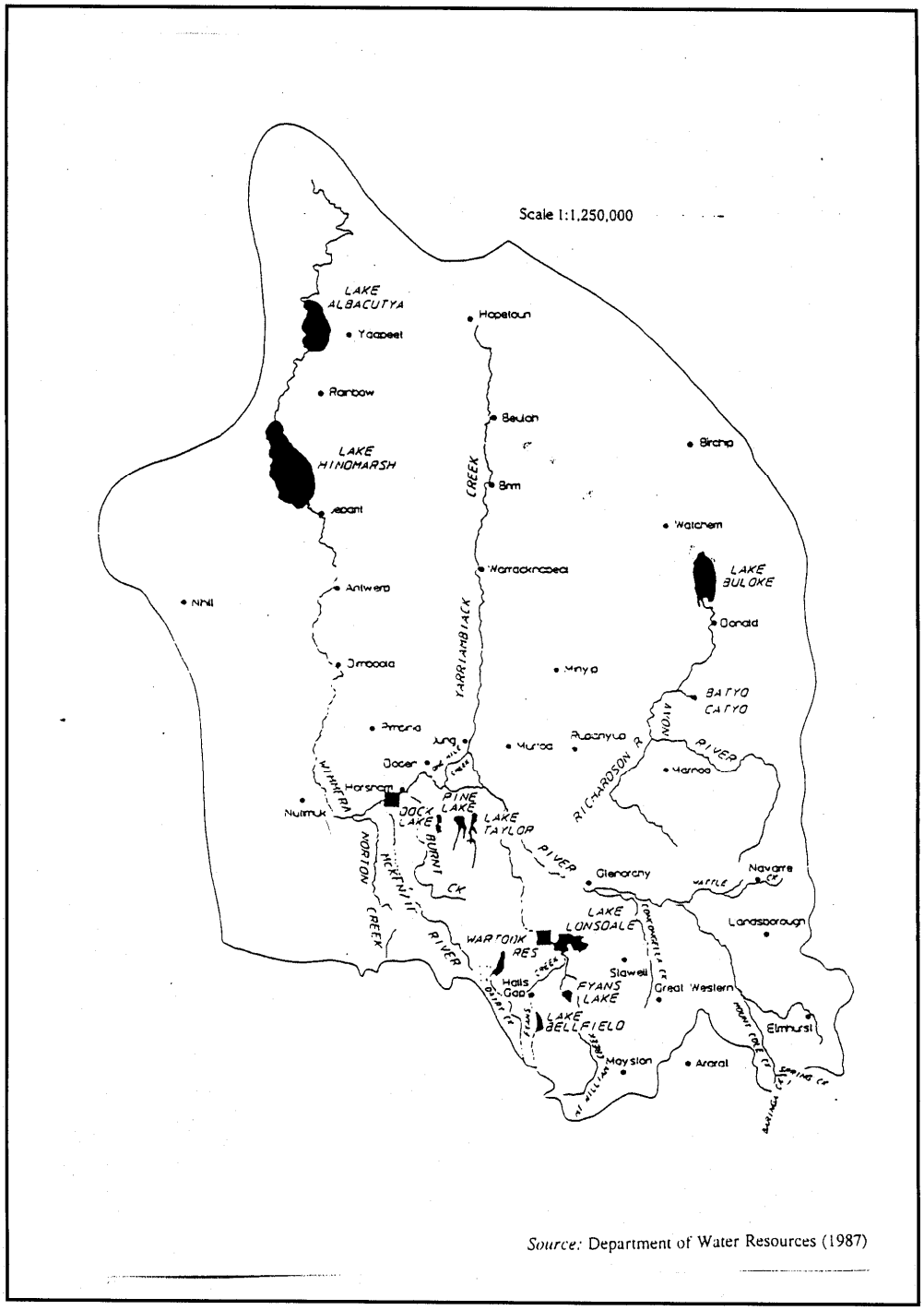
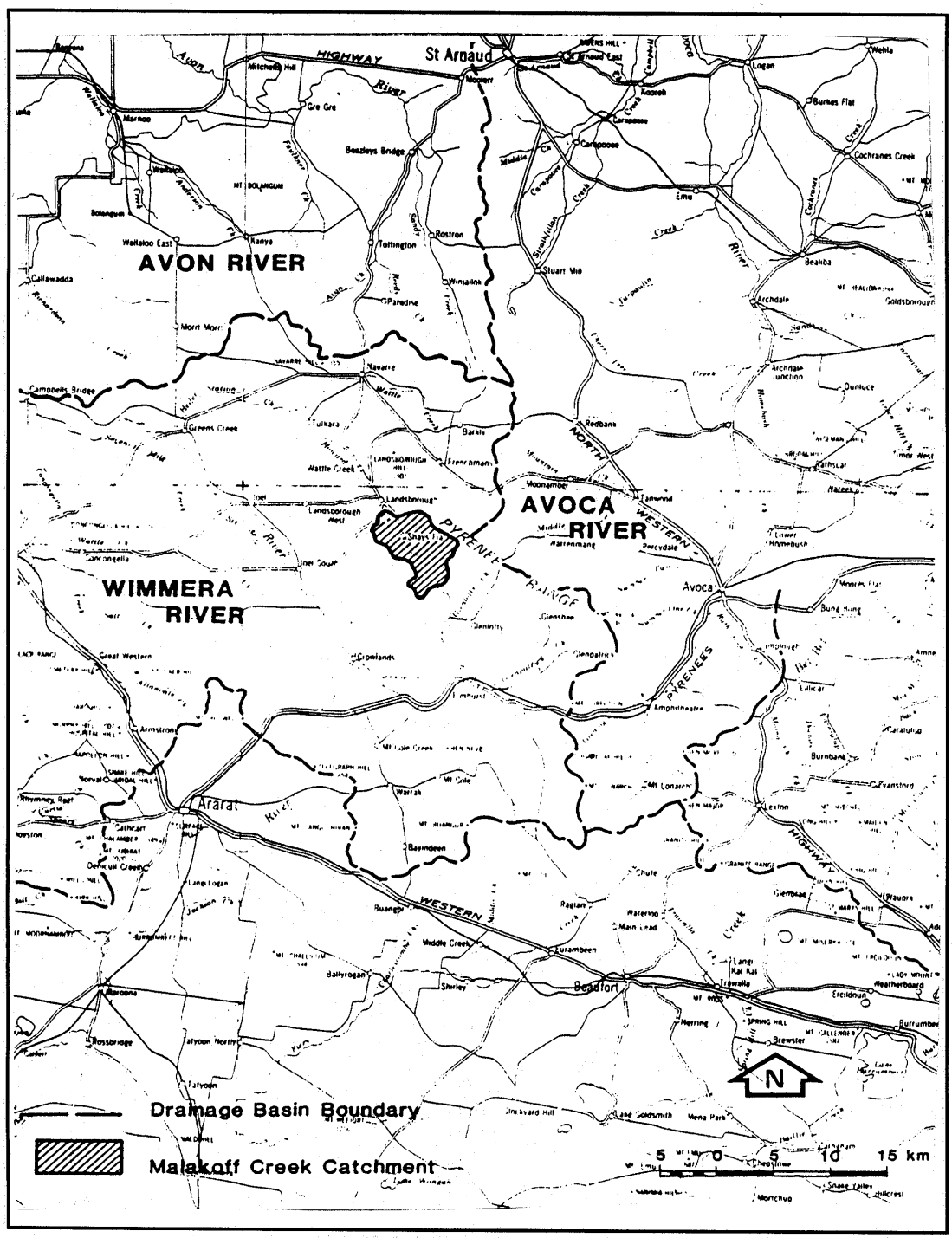


FIGURE 2 MALAKOFF CREEK WATER SUPPLY CATCHMENT



4 Department of Natural Resources & Environment

2. CATCHMENT MANAGEMENT PROBLEMS AND METHODS FOR THEIR CONTROL

2.1 Land Development

In the application of development policy to the catchment, the Determination is a subordinate control; primary control is the province of statutory planning.

The major reason for the introduction of land development control was the potential for a large increase in the number of houses within the Malakoff Creek catchment given that the (then) Shire of Avoca at the time exercised no effective planning control. The increased risk to quantity and quality of the water supply, should such development occur, was unacceptable. Consequently a reduction in the potential number of houses was necessary.

Water supply was, and still is, untreated apart from detention in storage. Although the supply is considered to be of urban non-potable quality, it is restricted to most houses in two townships, and demands a level of protection that would not preclude the future upgrading of supply to potable standard by treatment. The principal risks to supply from residential development within the catchment arise from the potential for:

(i) increased bacteriological pollution from septic and sullage wastes;

(ii) increased levels of nutrients from waste water disposal;

(iii) contamination from the use of household and garden chemicals;

(iv) turbidity and sediment in run-off from the greater area of bared surfaces, roads, tracks, and so on;

(v) increased human contact with catchment waters, and

(vi) reduced run-off following construction of large dams.

2.1.1 Planning Method

Ownership of rural allotments generally carries an expectation, if not an explicit right, for development by construction of a house. The 'worst-case' scenario in terms of residential development in the absence of formal Planning Controls is one dwelling per allotment, irrespective of the suitability of the land for such development, together with the possibility of further subdivision. Such intensity of development was considered to be incompatible with sound catchment management in the Malakoff Creek catchment.

To address these and other land development issues, the Soil Conservation Authority prepared a Development Policy for the catchment in consultation with the (former) Shire of Avoca and the (former) Ministry for Planing and Development.

In respect to residential development, it was therefore necessary to effectively reduce the potential number of houses that could be built in the catchment. The approach used was to designate Identified Areas within which only one house could be built. This had the effect of reducing the potential house numbers from 158 (the number of crown allotments in the catchment) to 38 (the number of Identified Areas designated). Because 16 of these Areas had land owned contiguously outside the catchment, suitable for a house, and the policy required that any such houses be built outside the catchment a further reduction to 22 potential houses was possible. In developing this solution, the pattern of ownership at the time was a primary consideration for delineating Areas. This is reflected in the irregular shape or split tenements of many of the Areas. The approach minimised the need for extensive restructure or land transfer to achieve common ownership within the Areas, a preferred but not a required outcome. The final result was reached using a systematic process that included an iterative component. The process needed to satisfy or consider the following:

- land capability related criteria;
- catchment protection criteria;
- development policy objectives;
- density planning;
- accessibility criteria;
- existing houses within the catchment; and
- suitability of large holdings for subdivision.

A simplified representation of the process is shown in Figure 3.

At the outset there were twenty-nine holdings varying in: area; the number of allotments each contained; the number of parcels making up the holding; and the proportion of the holding within the catchment. The process of delineating areas commenced with the identification of holdings or parcels already committed to residential development; i.e. an existing house or permit to build a house (Step 1) and the availability of contiguous land outside the catchment suitable for residential development (Step 2).

The balance of land following Step 2 comprised unoccupied holdings or parcels, wholly within the

catchment. To minimise risks to the water supply from inappropriate location of houses and associated developments in the future, the process now needed to consider criteria that would identify areas suitable for a house building area or building envelope.

Criteria used to specify where no house may be built were:

- within the direct catchment to the Landsborough Reservoir or the water race delivering to the reservoir; or
- within 100 metres of all drainage lines shown on the Determination plan; or
- on steep or otherwise erodible land.

In addition, house sites would need to be easily accessible from an existing sealed road and preferably with only a short length of access track, located so as to avoid crossing drainage lines.

The balance of land following Step 3 comprised the largest and some of the smallest holdings in the catchment, the larger one being potentially suitable for restructure by subdivision, and the smaller ones for aggregation into Identified Areas. The pattern of subdivision was approached using allotment density considerations and land capability criteria. The smaller Areas, or lots, occupied the undulating to flat areas with lots of increasing area across the hilly to rolling land to the largest lots on steep land. Other criteria used in the subdivision design were:

- boundaries should follow ridgelines and spurs;
- boundaries should not follow drainage lines;
- boundaries should avoid crossing drainage lines where possible;
- each Identified Area must have a suitable house building area; and
- each Identified Area must have a suitable alignment for a relatively short access track to the house site in particular and to the lot in general.

The pattern of Identified Areas resulting from the overall process is shown in Appendix A.

Detailed planning of this nature is consistent with the (small) catchment area, the need to contain the level of residential use to within acceptable limits and to clearly identify where development may take place. The result lessens the opportunities for misinterpretation or ambiguity that could arise in applying the controls, had some of the measures been discretionary or in the form of guidelines. It may also explain, in part, the good support the pattern for residential development received from the local community.

2.1.2 Implementation

The residential development model proposed became the basis of residential development policy and was implemented as part of the overall development policy for the catchment by the (then) Shire of Avoca as the responsible planning authority. The Malakoff Creek Catchment Development Policy is reproduced in Appendix A.

The policy and provisions it contains are also made provisions of the Determination (see Appendix B) dealing with residential use reflecting the complementary nature of the Determination and the statutory planning process in the catchment.

The relationship between planning controls and the Determination in addressing catchment protection in the Malakoff Creek catchment is the most integrated so far achieved in the history of catchment controls in the State.

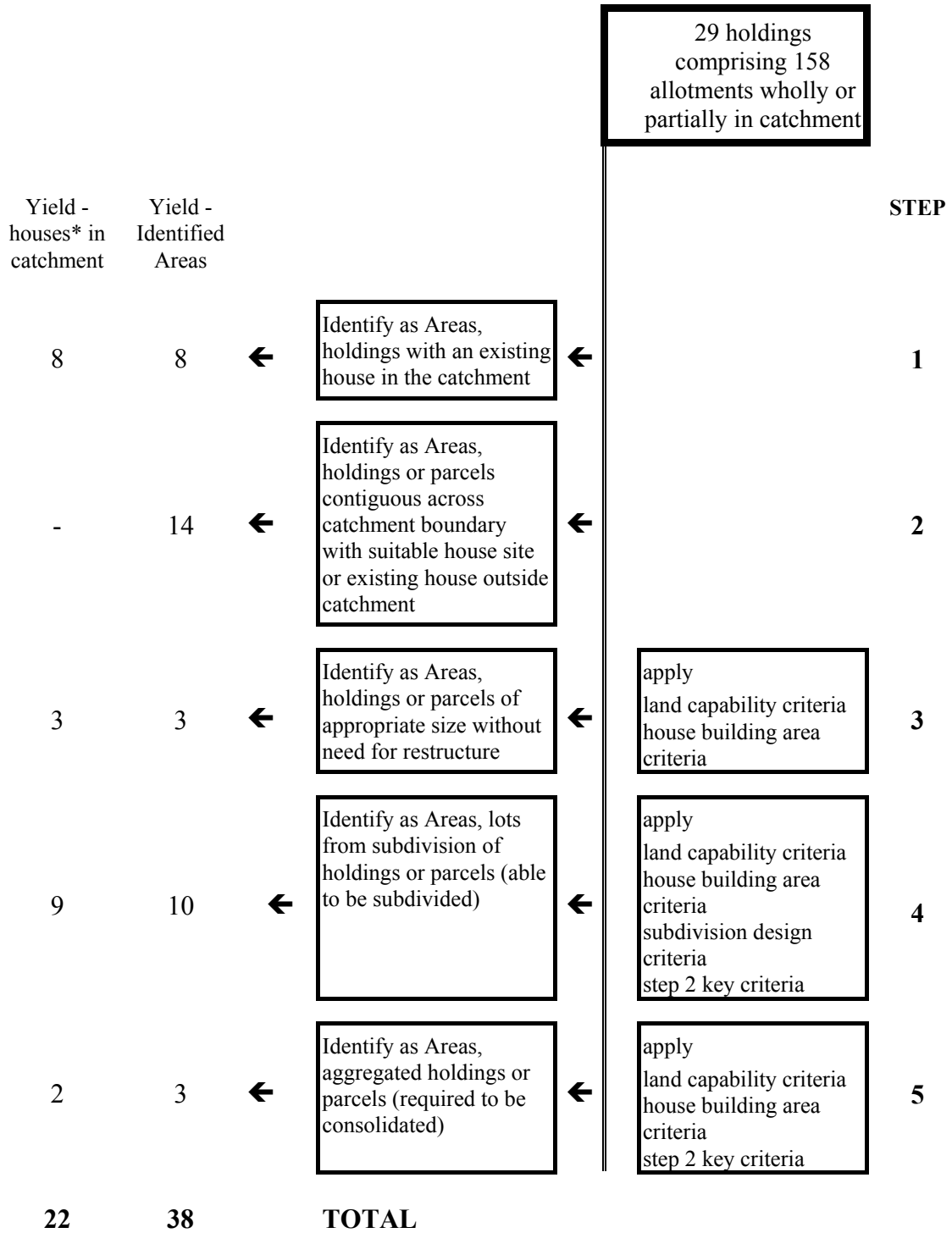
2.2 Erosion and Salinity

In addition to the potential problem of unregulated residential development, the report of the Determination identified other land management related problems present in the catchment that impact on the water supply. These are gully, tunnel and sheet erosion, and salinity. These problems arise principally from diffuse sources and indicate a continuing problem with the broadacre management of land in the catchment and, in the case of salting, possibly of land outside the catchment. The Determination proposes a management plan upon which improved management of catchment land can be based; but having these measures adopted may be a lengthy and complex procedure.

The Determination as a regulatory control mechanism is, in the first instance, an advisory document — co-operation being the principal means of implementation of the Determination measures. Only when the Determination is followed by compliance procedures known as "Conditions of Use", can the measures or conditions be made mandatory, and this has not been the case in Malakoff Creek catchment. In sharp contrast to this approach is planning control where conditions and requirements issued with a permit are mandatory although subject to appeal.

In its present form the Determination, other than for residential use, is not readily amenable to implementation with planning controls, but new legislation, discussed in a later section, includes such provisions.

Figure 3 AREA IDENTIFICATION KEY



* existing and potential houses

the term *holding* is used to describe catchment land in one ownership, whether contiguous or dispersed

the term *parcel* describes discrete blocks that make up a dispersed holding.

2.2.1 Determination Method

The approach taken in developing the Determination (essentially a catchment management plan) was to assign broad land use categories to all land, using explicit land capability criteria and assuming average levels of management. Areas of the catchment to which uses are assigned are later modified (following consideration of erosion, salting or other land deterioration effects, existing uses, and the requirement for stream and water protection), to become the land use category or the "most suitable use" shown on the Determination plan and table.

In the Malakoff Creek catchment, land with the greatest limitation to development or use is the steep land in the south. The most suitable use, compatible with the limitations imposed by soil and site characteristics, is low intensity hardwood production. This land, is excluded from residential use and preferably from grazing. Much of the area was thinned or cleared in earlier years and the management recommended in the Determination is for reafforestation or regeneration of the bushland. The hilly to rolling component of the landscape occupies the greater percentage of the catchment, with the undulating component a minor section. These two sections have significant limitations, under present management, to annual cropping but may be cultivated intermittently in association with pasture renovation. The most suitable use is grazing.

In respect of public land, suitable land use categories are assigned with reference to the uses specified in the Land Conservation Council's Recommendations for catchment land. In addition to the main land uses typified in the catchment, there is a need on the grounds of land and water protection to provide management guidelines for dispersed uses such as roads, residential use, etc., and to provide an avenue for assessment of activities associated with land disturbances. These provisions are made under Part C (other uses) and Part A (general provisions) (see Appendix B for relevant details).

Because land management is a key factor influencing the degree to which use or activity will impact on water supply, particular measures, or levels of management, need to be observed to minimise these impacts. Measures or prescriptions therefore are included in the "provisions of use" that provide the basis for formulating management conditions when and if compliance measures should be required.

This approach is not dissimilar in principle to that used to develop residential use and described previously. In the residential example, the relevant "provisions of use" were applied as the need arose, making it a more detailed task. The outcome was the same in the sense that the process identified areas of suitable use throughout the catchment.

2.2.2 Implementation

As stated previously, management conditions can be implemented co-operatively through the Department's advisory network. In the majority of cases however, it is more effective to have conditions relating to development or use whether residential, clearing, exploration, mining, extractive industry or other activity implemented through the organisation administering or planning the relevant activity. In this way, the measures can be included as a condition of the permit, licence, lease, etc., having mandatory or obligatory status, but usually subject to appeal. The effectiveness of this approach relies on:

- referral procedures being in place to enable Departmental[1] assessment of the application to be made on catchment protection grounds; and
- the willingness or co-operativeness of the administering body to include conditions it considers not to be its primary concern.

Generally advice or recommendations given by the Department are accorded a higher status when related to activities that take place within a catchment where a Determination applies.

3. PRESENT CONDITIONS

Some fifteen years have passed since the Development Policy became the primary instrument regulating activity within the catchment. Over this period, changes in the catchment and catchment related interests have occurred to varying degrees. How the respective changes have influenced or have been influenced by the presence of Planning Controls or catchment controls is assessed below.

3.1 Planning and Responsibility for Water Supply

Comprehensive revision of planning control within the (then) Shire of Avoca took place in 1988 and again in 1993. Planning within the catchment zone is now more comprehensive but the emphasis on limiting residential development, large farm dams and the clearing of native vegetation has been retained as the policy for the catchment. However they are included as "matters for

1 The Secretary of the (now) Department of Natural Resources and Environment is responsible for the implementation of Determinations of Land Use, and Determinations frequently made reference to Departmental assessment of development proposals.

consideration", and the policy is one of a long list of matters and may have lost some of the strength it held prior to the above revisions. The Central Highlands Water Authority (CHWA) is the referral authority for planning applications relevant to the catchment area. The involvement of the Department in planning matters appears to have diminished over the intervening years.

With the restructure of local government areas in 1994, the former Shire of Avoca was amalgamated into the Pyrenees Shire, which is now the responsible planning authority for the area.

In 1980, a local Trust administered the water supply. Three of its members were Councillors representing the area of the Shire covering Navarre, Landsborough and the catchment area. One representative, a member of the Landsborough community, farmed in the catchment. These close relationships may help to explain in part the acceptance by Council and the support of the community for the innovative approach taken to regulate development. Good support for these controls still exists.

In 1984, responsibility for water supply passed to the Shire of Avoca, enhancing its association with the catchment area. More recently (1994), the responsibility for water supply was transferred to the Central Highlands Water Authority.

In the present climate of change, there is a need for the Department to re-establish strong links with the water supply authority (CHWA) and the planning authority (Pyrenees Shire), to ensure that the development policy and the Determination strongly influence development or management decisions for catchment land.

3.2 Catchment Development

At the commencement of investigations in 1977, four houses were present in the catchment. By 1980 there were seven. Since the introduction of formal planning control in 1980, two houses only have been built within the catchment and two within Identified Areas on land outside the catchment. Applications for residential development and other activities relevant to catchment land use are referred to the Department and CHWA for comment prior to Council consideration.

3.3 Water Resource Development and Water Quality

Water supply to Landsborough and Navarre comes from the Landsborough Reservoir of 136 megalitres capacity. Catchment area to the reservoir is 73 hectares. Frequently run-off is insufficient from the catchment to meet the needs of the population and supplementary supply is obtained from pump off-takes on Franks Gully and Malakoff Creek, delivering to the reservoir.

In Autumn 1994, construction of a water race was completed, bringing additional run-off to the storage. this development more than doubles the storage's catchment. The race operated for the first time in Autumn 1995. Prior to this, low rainfall during the 1993/1994 drought produced insufficient run-off for flow in either the water race or catchment streams. Figure 4 shows the water supply developments within the catchment.

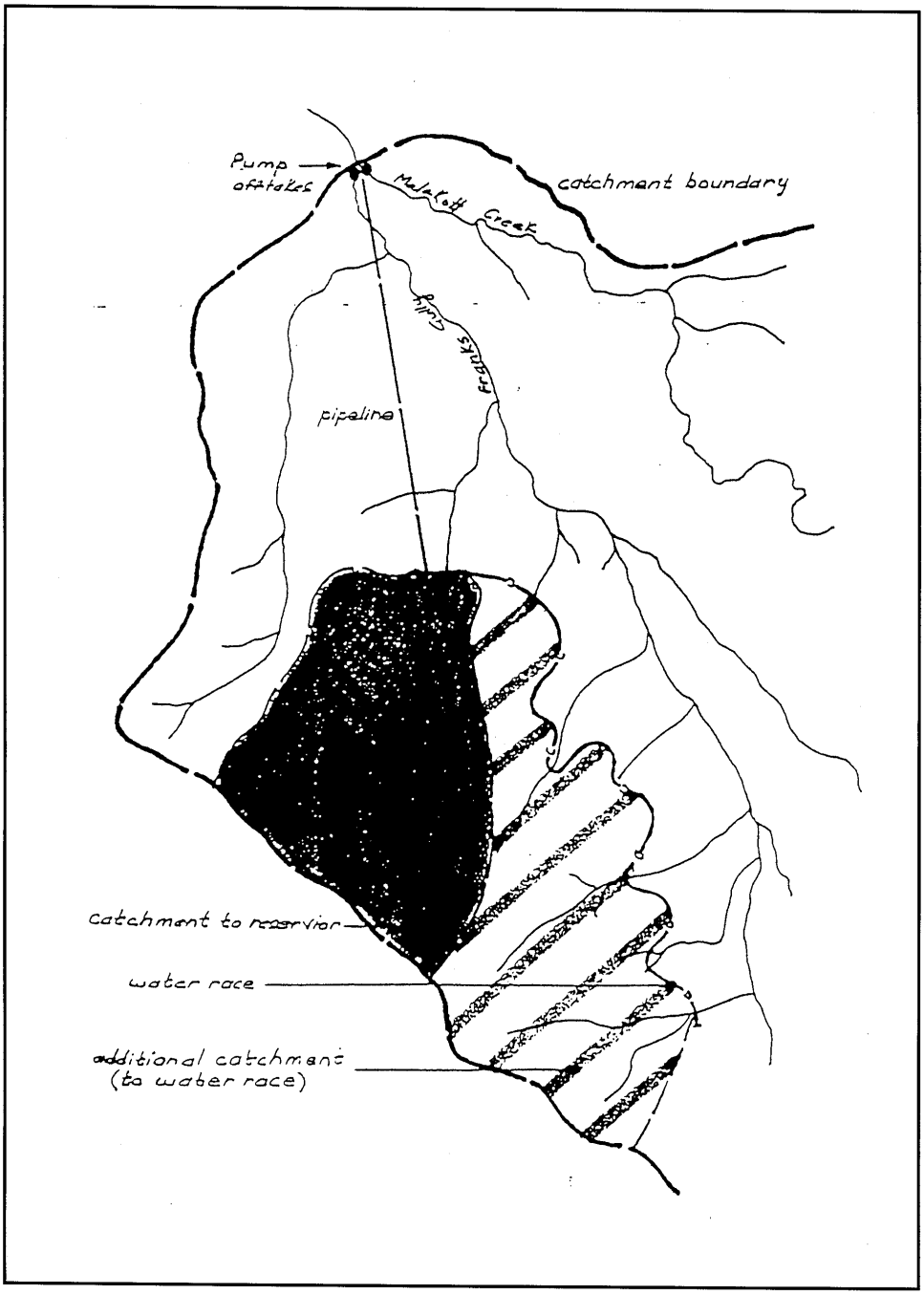
The view has been expressed within the community that water supplied by the race will obviate the need to pump from either Franks Gully or Malakoff Creek to the reservoir to supplement supply. Should this be the case, review of catchment controls may be possible to permit the construction of large dams that is presently excluded. This would allow vineyard development to be considered for the area. Removing the constraint on the size of farm dams should be considered only after an extensive proving period for the water race. Consultation with the Central Highlands Water Authority to provide a statement on this issue may be desirable to avoid speculation about possible changes.

Records of water quality are insufficient to indicate any trends or long term changes in quality of the storage. Regular testing of reservoir samples for chemical and physical quality recommenced in early 1995.

3.4 Catchment Condition

Active gully, sheet and tunnel erosion are still present within the catchment, although some properties where grazing has been intermittent are noticeably more stable. Stream bank erosion along Malakoff Creek is considered to have progressed since 1980. Although a period of extended drought has been experienced throughout the area, reasonable ground cover was observed during an inspection of the catchment in Autumn 1995. No recent occurrences of widespread land degradation are present other than old erosion sites and the effects of salting. Salting, including saline seeps, and stream bank erosion appear to be the most important land management related issues facing the catchment. The presence of gullying and stream bank erosion suggests high rainfall-runoff rates, and surface conditions may be implicated in this. Although no widespread land degradation of recent origin is present, neither is there any evidence of a marked improvement in the general condition of the catchment. Regeneration of native species on the hilly to steep land has occurred in isolated patches only, and not in adjoining grazed areas.

FIGURE 4 WATER SUPPLY DEVELOPMENTS



10 Department of Natural Resources & Environment

One section of stream, fenced out, shows excellent regeneration indicating the benefit to the stream from the exclusion of stock from stream environs.

No evidence of clearing has taken place other than a minor incident where a number of trees had been ringbarked in a small area. At the direction of Council, more than an equivalent number of plantings were made.

Currently erosion control works are being undertaken on one property with Departmental supervision.

Records held by the Department indicate that, since the introduction of the Determination in 1986, contact with land holders in the catchment has been infrequent. At the farm level, condition of the land is marginally better than that of the surrounding area where no Determination applies. It could be expected that a Determination would offer a means for influencing land management in a positive way, in addition to its role as a compliance measure. Clear objectives and ongoing strategies or programs aimed at improving land management initiated by the Department may be required if maximum benefit is to be derived from the Determination.

3.5 Land Ownership

Land transfers since 1980 have involved about one third of the freehold land in the catchment area. These changes are summarised in Appendix C.

Some consolidation of ownership within Identified Areas has taken place, suggesting that the planning control is influencing the consolidation process. On the other hand, several Areas with single ownership in 1980 now have multiple ownership. Four Areas are involved: two have existing houses in the catchment, one has a permit to build outside the catchment and one is unoccupied. This situation has the potential to work against maintaining the policy of one house per Identified Area. Although single ownership of all land within an Area is not a prerequisite for consideration of residential use, the policy would need to be rigorously applied should an application for a second residence be made within one of the above quoted Areas. The Department would need to support Council in this stance because of the Determination's provisions relating to residential use.

Current interest in land purchase within the catchment is unclear. Based on anecdotal evidence, one view has it that renewed interest is being shown in land transfer. The opposing view, supported by field experience, maintains that prospective purchasers are deterred from buying when constraints on single allotment development are made known.

4. EFFECTIVENESS OF CONTROLS

The intensive pattern of land ownership within the catchment became the determining factor in choosing not to pursue residential development controls along the lines of either 'maximum density' or 'uniform minimum area' planning. The approach needed to account for the existing pattern of ownership and at the same time limit in a fair way the number of houses that could ultimately be built in the catchment. Given these conditions, the development of Identified Areas was considered by all parties to offer an equitable solution.

In the intervening fifteen years since the policy was approved, changes in land ownership have, with few exceptions, conformed to the informal principle of one land owner per Identified Area. Where Areas were in multiple ownership, subsequent land transfers have tended towards consolidation of ownership.

Apart from several instances, changes in ownership overall have tended towards, have reached or have maintained, the model of the Identified Area as the basic tenement unit within the catchment. From a planning viewpoint, this is a good result that demonstrates the effectiveness of the measures and of the approach used in reaching an acceptable solution for residential development.

Development policy for the catchment is implemented through Planning Controls. The principal focus of the policy is protection of catchment land by limiting residential development, construction of larger dams, clearing and construction of new (Shire) roads, and encouraging revegetation or reafforestation with native species. Although successive revisions of Planning Controls have been undertaken, the policy has remained intact to the present time, reflecting the effectiveness of measures contained in the policy in maintaining the objectives for development of catchment land. Had the policy or indeed planning been at odds with the desires or expectations of the community, it is likely this would have found its expression in pressures for change. To a large degree, the approach used has reduced the speculative potential of catchment development, making the catchment less attractive to small scale land transfers.

The effectiveness of the controls may have been enhanced by a number of factors including:

- good general support for the Planning Controls initially. The close relationships between planning, water supply and community representation on these bodies ensured good co-operation in acceptance of the Planning Control; and

- the proximity of the township of Landsborough with basic services and the surrounding area with a greater range of residential and hobby farm development opportunities may have taken some of the pressure for development away from catchment land.

Considering the wider implications of the Determination as representing land use policy for the catchment, of which the development policy forms part, the Determination has been effective in referral and consultative matters, but on the general theme of influencing land management to improve catchment conditions, it has been less than effective. More than anything else, this reflects the lack of effective implementation procedures or strategies, or indeed priorities. Unless the Determination is translated into programs involving all catchment interests including planning, water managers, land managers, advisory bodies, etc., little may be achieved beyond the constraints of the Development Policy .

5. EVALUATION

Several factors stand out in the way they contribute to or have contributed to the overall effectiveness of the control measures (strengths) or tend to limit the effectiveness of the measures (weaknesses). These are discussed below.

5.1 Strengths

- **Using the existing ownership pattern and adapting this to develop appropriate control measures.** In principle the pattern of Identified Areas is little different to a plan of subdivision for the whole freehold area of the catchment where each lot or Identified Area was permitted one house. Each Area retained a recognisable identity as a negotiable tenement.

- **A high level of planning detail**, i.e. siting and location of houses and subdivision boundaries providing a well documented plan for information purposes.

- **An integrated approach to planning**. The development policy was central to both planning and catchment protection requirements, was simple and easy to implement through the planning mechanism.

- **A good technical base** in the sense that stream/water protection requirements and land capability related criteria were the principal factors in shaping policy.

- **A small catchment area** (freehold) less than 20 sq. km., permitting an intensive level of planning detail.

5.2 Weaknesses or Limitations

- **The emerging and potentially complex problem of multiple ownership within Identified Areas.** This is a minor consideration at present but will require rigorous application of the policy to avoid the possibility of inappropriate precedents occurring.

- **The level of detail** may not be possible or appropriate in larger catchments.

- In respect to the implementation of the Determination, **lack of Departmental objectives, strategy or priority**[2], limits its effectiveness.

6. APPLICATION OF CONTROLS TO OTHER AREAS

The Malakoff Creek Catchment Planning Model, the current legislative provisions for catchment planning and management control and the identification of areas within the Wimmera River Basin are three matters of interest, relevant to the assessment of issues of land in the Basin where the Malakoff Creek approach may be applicable, and are discussed below.

6.1 Malakoff Creek Catchment Planning Model

The Malakoff Creek Catchment approach to planning demonstrated amongst other things the effectiveness of integrated planning in applying development controls within the catchment. The essential features of this approach are:

- **Clear identification of present or potential land/water management conflicts**;

2 This is unlikely to be the case with future catchment planning because of new legislation requirements for the preparation of special area plans.

- **Development of solutions to resolve these conflicts**, acceptable to both land use (or development) and catchment protection interests, and that would represent land use or land development policy for the catchment or area of land under consideration;

- **A solution that is technically sound**;

- **Use of an existing avenue of control** for the implementation of the 'solutions' within the catchment, and

- **Consultation and referral procedures** to ensure appropriate consideration is given to site specific requirements or the finer detail of planning.

6.2 Legislation

Determinations of Land Use are effectively catchment management plans made under the powers of the former *Soil Conservation and Land Utilization Act.* In 1994, this statute was replaced by new legislation, the *Catchment and Land Protection Act*, that retains the strong focus on catchment planning particularly as it aims to ensure the quality of the State's land and water resources are maintained and enhanced.

Under the new legislation:

- The existing proclaimed catchments (such as the Wimmera Systems Water Supply Catchment) become special areas (water supply catchments).

- Special area (water supply catchment) plans will replace Determinations of Land Use, but existing Determinations (such as the Determination for Malakoff Creek), unless revoked, will continue in force as under the former legislation.

- special area plans may be implemented through municipal Planning Schemes.

This new legislation requires that a more detailed approach to catchment planning and plan implementation be undertaken than in the past. The Malakoff Creek catchment approach can be used in the context of the new legislation equally well as under the former legislation.

6.3 ASSESSMENT

Within the Wimmera River Basin, planning on the above basis may be relevant to many situations where land use/management and water/stream/catchment conflicts are present or have a potential to arise. However for the purposes of this review, the identification and assessment of areas/situations has been restricted to consideration of other town water supply sub-catchments specifically and more generally to several other broad land use issues, as examples where the Malakoff Creek Catchment approach to planning may be applicable within the Basin.

6.3.1 Town Water Supply Sub-catchments

All sub catchments are located within the Wimmera Systems Water Supply Catchment[3] as shown in Figure 5. Table 1 summarises some relevant details of these sub-catchments.

The sub-catchments under consideration share the following characteristics with Malakoff Creek Catchment (pre-1980).

- A high value natural resource (town water supply) is potentially at risk and in need of protection;

- A control mechanism for limiting development or influencing land use activity currently exists (planning control for freehold land and management plans for public land); and

- Present measures for the control of development or other activities which may not be appropriate to the needs of town water supply protection.

None of the sub-catchments has a high density or large number of allotments that pose a major risk to the water supply from residential development, similar to the Malakoff Creek catchment. However a potential risk from residential use is always present with freehold land in a catchment, and planning to limit residential activity, and if acceptable, to appropriately locate it on catchment protection grounds is desirable.

Integrated planning as a management tool is equally applicable to other land uses found in these catchments whether freehold or public land is involved, so that timber harvesting, clearing of native vegetation or establishment of tourist facilities (tracks, toilets, etc.) can be planned accordingly.

[3] Under the new legislation, the Wimmera Systems Special Water Supply Catchment Area equates with the former Wimmera Systems Water Supply Catchment.

Sub-Catchments within Parks:

Five sub-catchments are located within the Grampians National Park and two sub-catchments in the Mt. Buangor State Park. The parks' Management Plans are an appropriate vehicle for the recognition of catchment management requirements.

Ideally the plan identifies the location of catchments on working plans, specifies what activities are likely to impact on water catchment values and how mitigation of these potential impacts is to be approached (such as consultation, referral, guidelines or reconsideration of proposals).

Currently Park Management Plans identify water catchment values in a general way and, because park management is regarded as sympathetic to water catchment values, few conflicts appear to arise. An exception is the area at Zumsteins in the Mackenzie River reaches of Horsham supply.

When revision of management plans is being undertaken, greater emphasis on catchment protection measures is warranted. Detailed catchment planning will need to provide appropriate protection measures to give adequate status to water catchment values for incorporation into the plan.

Similar considerations apply in relation to the fire management plan currently being prepared for the Grampians National Park.

Sub-catchment within State Forest:

Three sub-catchments are located wholly or partly within State Forest. These areas fall within the Midlands Forest Management Area for which a management plan is currently being prepared (Department of Natural Resources and Environment, in prep.). The plan is an appropriate vehicle for the recognition of catchment protection and management requirements.

The content of the draft plan dealing with stream and catchment values is comprehensive within the limits of the report and all sub-catchments are identified in the text. This identification of stream and catchment values, and protection needs, should be extended to working plans.

The need for protection of town water supply catchments is accorded a high status, however there is a need to identify in a more detailed way the limiting effects land features, such as steep slopes, various soil types or other site characteristics, have on proposed activities. This information would make a valuable contribution to the management plan but is unavailable at a resolution suitable for the preparation of catchment specific timber harvesting prescriptions. Accordingly, detailed catchment planning is required and specific catchment prescriptions should be developed.

Referral procedures are well documented and are an opportunity to present the above detailed information for the preparation of coupe plans at the harvesting stage if this information is not already available.

Sub-catchments within Freehold Land:

One sub-catchment, Panrock, a small area of another, Shepherds Creek and the Mt. Zero channel are located on freehold land. Within freehold land, the planning scheme can contribute to the implementation of catchment protection measures under a provision of the new legislation. Grazing is the predominant land use. Planning control is exercised within these sub-catchments but it lacks effective water or land protection focus.

The incorporation of special water supply catchment area plans into planning schemes would provide greater levels of protection and may be warranted in the following sub-catchments.

- Panrock Creek sub-catchment is small, the water is high in iron, and this source may be phased out over the next few years; if not, detailed planning would be appropriate.

- Mt. Zero channel, although in need of greater protection such as fencing, is unlikely to be given this level of protection because of high costs. No relaxation of present measures should be considered in lieu of water treatment this supply now receives at Mt. Zero. The catchment to the channel could benefit from the application of integrated catchment management measures similar to those applied to the Malakoff Creek catchment.

- Shepherds Creek sub-catchment has 25 small freehold allotments in immediate proximity to the main stream near the off-take. Improved control over residential development may be warranted.

At the sub-catchment level, priority for undertaking detailed catchment planning should consider the relevance of other planning activity in the area. Because planning within the Midlands Forest Management Area is currently being undertaken, it is appropriate that the highest priority be given to developing detailed catchment plans for Shepherds Creek, Collier Gap, Spring Creek and

Hickmans Creek sub-catchments to complement the Midlands FMA plan. Within local government areas planning activity is likely to increase following recent amalgamations. This is an appropriate time to carry out catchment planning within Panrock Creek (if relevant) and Shepherds Creek sub-catchments and Mt. Zero channel environs. With the exception of the Mackenzie River sub-catchment, that contains the Zumsteins tourist area, catchments within the Grampians National Park and McLeods Creek sub-catchment in the Mt. Buangor State Park are possibly the least in need of detailed catchment planning at this stage.

6.3.2 General Land Use Issues

The Wimmera River Integrated Catchment Management Strategy (Wimmera Catchment Co-ordinating Group, 1992) contains many references to the adverse impacts land use and management is continuing to have on the condition of land and water quality within the catchment. Two examples follow.

1. Two particular areas identified as priority areas for vegetation management are: the upper reaches of the Wimmera River; and the Mt. William Creek catchments. Erosion and salinity are noted as significant land degradation problems within the steep hills and skeletal soils.

   Policy for the management of steep hill country is long overdue, and relevant not only to the Wimmera River catchment but more generally to the Northern Slopes areas of the State.

   Consideration of a pilot area within the Wimmera River Basin for intensive planning that would lead to the development of an effective land use policy is well within the scope of the actions proposed by the 1992 Strategy. Using the Malakoff Creek Catchment approach would require an objective analysis of catchment land using all available information including, land capability assessment, recharge area locations, guidelines, codes of practice, etc., to enable areas of land to be identified on a sound and rational basis for suitability of use.

   A greater role for local government in the administration of land use policy through planning schemes would be an integral part of the model. This would require that planning be fully integrated to meet the needs of statutory planning and the management of pest plants and animals, conservation and production.

   The final result should be a land management plan representing land use policy that can be used to develop farm plans, Special Area Plans, or be incorporated into Planning Schemes for implementation. If the target for implementation is the planning scheme, the need for competent oversight may require that local government develop an expertise in environmental planning and related issues, or maintain comprehensive referral or consultation procedures for expert advice.

2. Stream frontage areas are other situations where effective land use policy could provide a focus for setting goals for the improved management of land and water quality in streams. Where public land is involved, the opportunity now for 35 year leases probably signals a greater need for development of an effective and consistent policy.

   An integrated approach to planning would include consideration of conservation values and aquatic habitat as well as erosion control, erosion prevention, adjacent land use and the provision of tourist/recreation facilities.

   In a similar way to steep hill country, planning could be undertaken for a pilot area or section of stream, preferably one within which management requirements are similar.

   Once again, the final result should be a management plan that, ideally, reflects an acceptable balance between the needs of the land, the land manager and water manager. Policy developed along these lines (*cf.* the Malakoff Creek Catchment Development Policy, Appendix A) is more likely to be accepted than if imposed "from above".

Similar avenues for implementation, to that described in the steep hill country section are applicable where private land is the case. Management of public land may be the subject of a separate but similar policy for implementation through leasing provisions farm plans or special area plans.

7. SUMMARY

7.1 Conclusions

A review of the determination of land use for the Malakoff Creek (Landsborough) Water Supply Catchment has been made and the following conclusions reached:

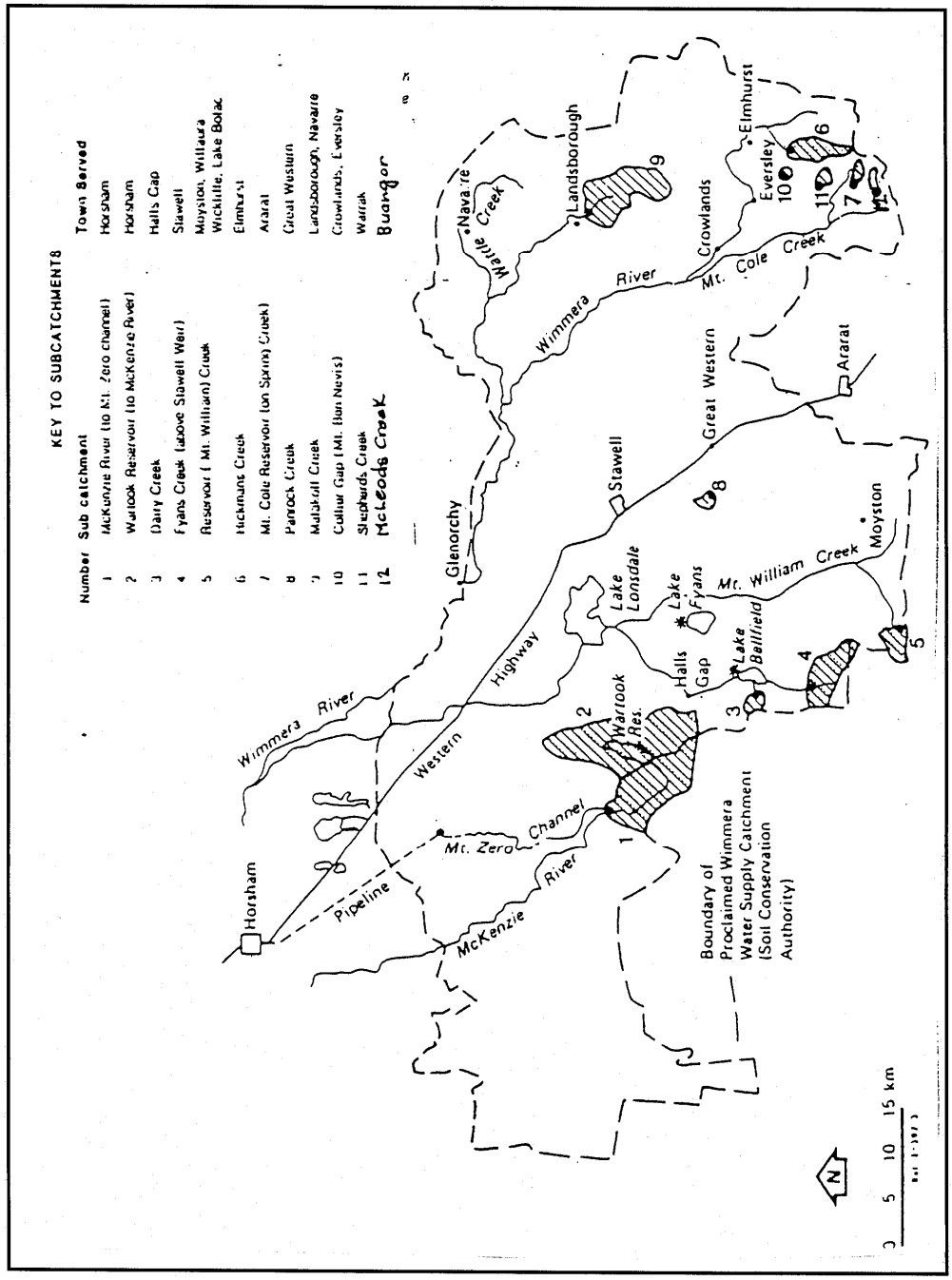
- In the late 1970s, there was a need to regulate speculative residential development of the many small to medium sized catchments within the Malakoff Creek (Landsborough) Water Supply Catchment. Unregulated development posed a major potential risk to the water supply for Landsborough and Navarre.

- Within the catchment, active erosion initiated in earlier years, and catchment salting was adversely affecting the water supply.

- The approach taken to limit and locate residential development was innovative in planning terms because it needed to recognise the then existing pattern of land ownership. Traditional planning approaches were unsuitable on equity grounds. The method required the identification of areas in the catchment within which only one house could be built. The final result was a pattern of Identified Areas that resembled a plan of subdivision for the freehold land in the catchment. The process effectively reduced the number of potential houses in the catchment from 158 (the number of crown allotments involved) to 22.

- Identified Areas represent the preferred tenement plan for the catchment and were therefore included in Residential Development Policy for the Malakoff Creek Catchment implemented by the (then) Shire of Avoca through planning control.

FIGURE 5 TOWN WATER SUPPLY SUB-CATCHMENTS



Department of Natural Resources & Environment 17

Table 1 Town water supply catchments, Wimmera River Water Supply catchment

SUB-CATCHMENT	TOWNS SUPPLIED	LAND TENURE & USE	PLANNING/LAND USE CONTROLS & COMMENTS
Wartook Reservoir	**Horsham**	**Public Land (National Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Mackenzie River	**Horsham**	**Public Land (National Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Mt. Zero Channel	**Horsham**	**Private land (grazing)**	**20 metre easement**
Dairy Creek	**Halls Gap**	**Public Land (National Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Fyans Creek	**Stawell**	**Public Land (National Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Reservoir and Mt William Creeks	**Moyston, Willaura, Wickliffe, Lake Bolac**	**Public Land (National Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Hickmans Creek	**Elmhurst**	**Public land (State Forest)**	**Forest Management Area Plan in preparation**
Spring Creek (Mt. Cole)	**Ararat**	**Public land (State Park)**	**Water catchment values have been accommodated in the Park Management Plan**
Panrock Creek	**Great Western**	**Private land (grazing)**	**Special control area in Planning Scheme**
Malakoff Creek	**Landsborough, Navarre**	**75% Private land (grazing)** **25% Public land**	**Water catchment zone in Planning Scheme, Development Policy, Determination of Land Use**
Collier Gap	**Crowlands, Eversly**	**Public land (State Forest)**	**Forest Management Area Plan in preparation**
Shepherds Creek	**Warrak**	**90% Public land (State Forest)** **10% Private land (grazing)**	**Forest Management Area Plan in preparation** **Private agreement, some prohibition on building**
McLeods Creek	**Buangor**	**Public land (State Park)**	**Water catchment values have been accommodated in the Park Management Plan**

- The approach taken for planning broadacre land use and management such as cropping, grazing, general land disturbance activities, stream and water protection and use of public land was through the determination of land use. The method relies heavily on land capability related criteria to identify the most suitable uses for catchment land. The Determination

represents land use policy for catchment land and complements development policy.

- Since the introduction of development policy for the catchment in 1980, minimal development has taken place in comparison to the surrounding area where planning control is less detailed and less rigid. This has been attributed to the development and application of a very effective policy for the control of development throughout the catchment.

- The effectiveness of the Planning Control is attributed to the application of Identified Areas as the basic tenement unit in the catchment, and to the long standing nature of the policy that has remained intact over 15 years without amendment. Good general support over the years for the Control and the opportunity to take up a greater range of planning options within the nearby township and surrounding area may also have contributed to effectiveness.

- The effectiveness of the Determination in improving the management of land for other uses has been limited. No significant change in the general condition of the catchment since 1986 (when the Determination was approved) has been evident.

- The effectiveness of planning has been influenced in a positive way by integrated planning, degree of planning detail undertaken, a sound technical base for decisions, a fair and equitable solution and a small catchment area.

- The future effectiveness of the Planning Control may be limited by the emergence of multiple holdings within one Identified Area. This has implications for potential conflicts with policy to arise unless policy of one house per Identified Area is rigorously applied.

- The effectiveness of the Determination of Land Use in influencing land management has been limited and possibly reflects lack of implementation objectives, detailed policy, strategies or priorities.

- Within the Wimmera River Basin, the Malakoff Creek approach to planning is applicable to other town water supply catchments and may find application to other situations, such as management of steep hill country and stream frontage areas.

7.2 Recommendations

What has emerged from the review is the success of the development policy in maintaining an acceptable balance between residential use and catchment protection, so far. In addition the review noted several areas where uncertainties exist or where additional input may be warranted. These are given below as recommended actions:

1. In view of the number of Identified Areas with multiple ownership in the catchment and the potential this may have to influence Pyrenees Shire Council to consider the possibility of more than one house on an Area, **it is recommended that:**

   The Pyrenees Shire Council and the Central Highlands Water Authority be informed about the success of Planning Controls in managing development in the catchment, and of the need for continued rigorous application of the Malakoff Creek Catchment Development Policy in general and the residential provisions in particular.

2. The question has been raised from within the catchment farming community about the future role of the supplementary supply from the pump off-takes on Franks Gully and Malakoff Creek, now that the water race is operative. If the pumped supply becomes redundant this has implications for catchment controls as they are currently administered. To avoid speculation about the possible relaxation of some controls, **it is recommended that: -**

   The Department of Natural Resources and Environment liaise with the Central Highlands Water Authority and the Pyrenees Shire Council with a view to making a public statement about water supply developments within the catchment and how these will be evaluated to provide essential information relating to water race performance and the probability of using the pump off-takes in the long term.

3. Active community programs such as Landcare operate in the surrounding area but to date have not involved land in the catchment. Some erosion control works are in progress. Given that a management plan framework exists in the form of the Determination, and that the Catchment Development Policy supports the reafforestation of steeply sloping land, the planting of trees or the regeneration of bushland, there is a need to actively implement these policies. **It is recommended that:**

   The Department of Natural Resources and Environment, in consultation with all interested

bodies including catchment and water managers, Local Government and the local community, give consideration to the preparation of a strategy for the implementation of the highest priority catchment protection or management works or actions to improve the management and condition of land within Malakoff Creek catchment.

4. Within the town water supply sub-catchments of the Wimmera River Basin, the potential for development or use of land that may impact on the water supply is always present. On the basis of the information and priorities given in the review, **it is recommended that:**

   The Department of Natural Resources and Environment further investigate the need to undertake detailed planning for individual sub-catchments and to have appropriate catchment protection measures recognised in planning schemes or public land management plans to assist in the implementation of these measures.

5. The 1992 Strategy for integrated catchment management within the Wimmera River Basin provides many examples where the impacts of land use and management are adversely affecting catchment condition and water quality. Two of these problem management areas, steep hill country and stream frontage areas have been given a brief assessment for the applicability of the Malakoff Creek approach to planning and **it is recommended that:**

   The Department of Natural Resources and Environment consider the value of such an approach to pilot areas of steep hill country management and stream frontage management.

REFERENCES

Catchment and Land Protection Act 1994. Act No. 52/1994. Printing and Publishing Services Victoria.

Department of Natural Resources and Environment. (*in prep.*) *Draft Midlands Forest Management Area Plan.*

Department of Water Resources (1987) Water Victoria: A Resource Handbook. VGPO

Environment Protection Authority. (1985). *State Environment Protection Policy No. W-15A*. (The Waters of the Wimmera River Catchment).

Ransome, S.W. (1985) *Report of the Investigation for a Proposed Land Use Determination for Malakoff Creek (Landsborough) Water Supply Catchment.* Department of Conservation, Forests and Lands. Land Protection Service.

Soil Conservation and Land Utilization Act 1958 (as amended). Victorian Government Printer.

Wimmera Catchment Co-ordinating Group (1992) *Wimmera River Integrated Catchment Management Strategy Final Report.*

APPENDIX A

MALAKOFF CREEK CATCHMENT DEVELOPMENT POLICY

1. Objectives

The objectives of this policy are:

(a) to limit, in a fair way, the number of houses to be constructed in the Malakoff Creek Catchment, which provides domestic water supply for Landsborough and Navarre;

(b) to retain the present land uses of extensive grazing and broad rotation cropping on suitable land;

(c) to encourage planting of trees, particularly on steep land.

2. Houses

2.1 Only one house (including a house existing or under construction on 9 July 1980) will be permitted on each of the areas marked on Plan No. S-970 (Figure 6) with a heavy outline, and identified with the large numbers, 1-38 inclusive.

2.2 The only exception to point 2.1 is where two or more of the areas identified on the plan are owned by the same person. In this case more than one house may be permitted in one Identified Area, but the number of houses permitted on all land owned by that person will not be allowed to exceed the number of Areas, as shown on the plan. (For example: if one person owns the land made up of Areas 18, 19, 20, 24 and 25, a maximum of five houses may be built on that land, although two of these may be constructed on, say, area 25).

2.3 If an application is made for construction of a house on an Area which is partly outside the catchment, a permit will not be granted for construction of the house on that part of the Area within the catchment, unless the part of the Area outside the catchment is not suitable for construction of a house.

2.4 A house must be serviced by an 'all wastes' liquid waste septic tank and disposal system to the satisfaction of the Shire Engineer.

2.5 A house and the associated waste disposal system must be located in a House Building Area shown shaded on the plan. When considering an application for construction of a house, the Council will consider whether or not the house is in accordance with the Design and Siting Guidelines published by the Ministry for Planning and Environment. Copies of these may be obtained from the Shire Office or from the offices of the Town and Country Planning Board in Bendigo or Melbourne.

2.6 A permit will be granted for the replacement of an existing house if;

(a) the applicant agrees to demolish the existing house when the new house is ready for occupation, by an agreement with the council,

and

(b) the new house is located and constructed in accordance with this policy.

3. Subdivision

3.1 The Council will not grant a planning permit for any subdivision, unless;

(a) a house could be constructed on each allotment in the subdivision, in accordance with Part 2 of this policy, and

(b) each allotment is easily accessible from roads which are already sealed or already regularly maintained by the Council.

3.2 In considering any application for subdivision, the Council will consider whether or not the design and layout of the subdivision is in accordance with the guidelines of the Soil Conservation Authority (SCA). Copies of these guidelines may be obtained from the Shire Office or from the Ararat or Melbourne Offices of the SCA.

4. Trees and bushland

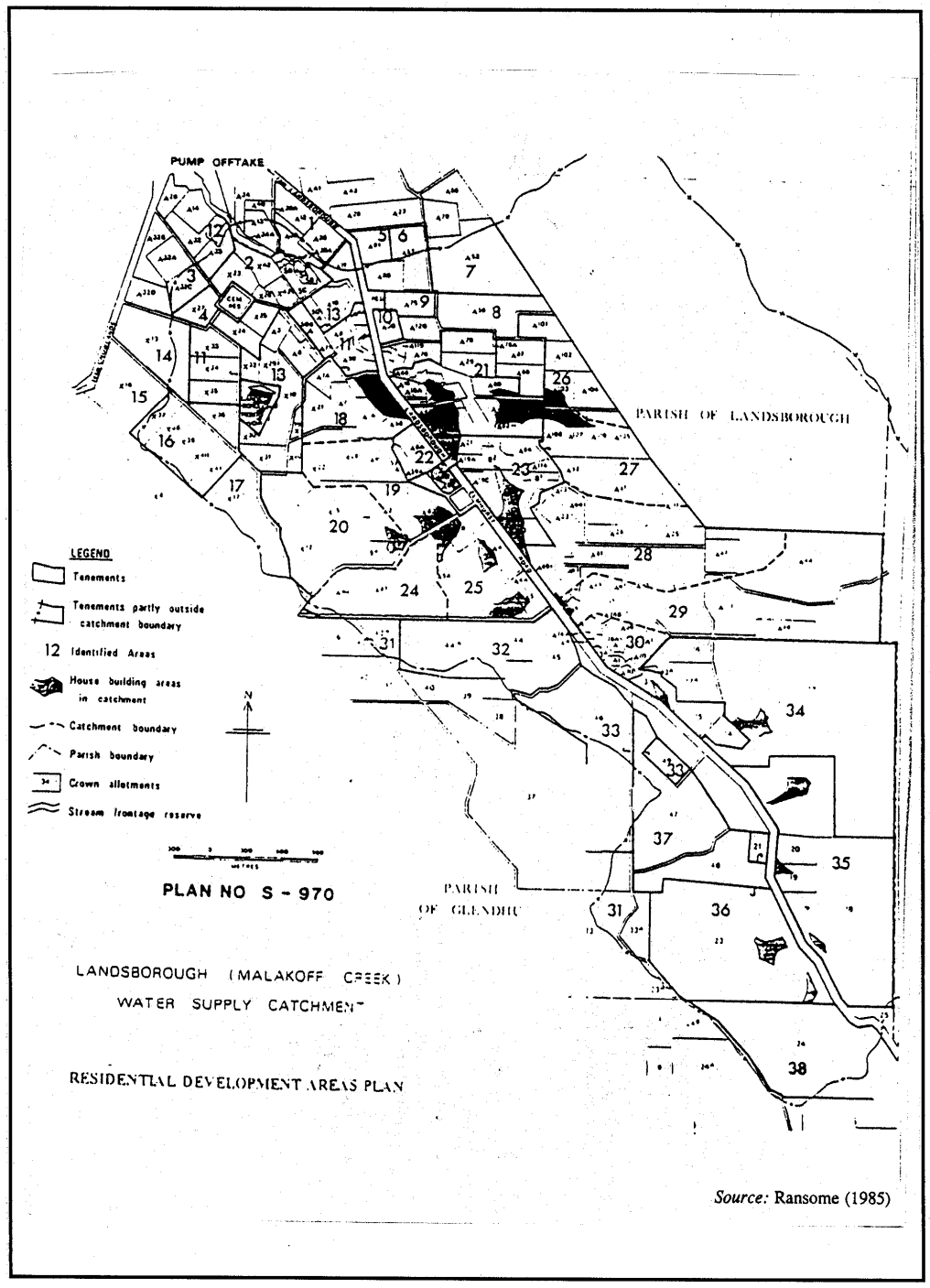
4.1 Applications for or including clearing of trees or bushland will not be favourably considered by the Council, except in special circumstances.

4.2 Applications for use, development or subdivision of land or for any other activity will be more favourably considered by the Council if the proposal includes an undertaking to plant trees or regenerate bushland in the catchment. In particular, proposals including the reafforestation of land identified as 'Steeply sloping' (category 3) on the Land Use Determination (LUD) plan, will be viewed most favourably.

5. Roads

5.1 Generally, the Council will not construct any roads which were not constructed on 9 July 1980.

FIGURE 6 RESIDENTIAL DEVELOPMENT AREAS PLAN



Source: Ransome (1985)

APPENDIX B
DETERMINATION OF LAND USE FOR THE MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT: TABLE OF LAND USE CATEGORIES

WIMMERA CATCHMENT

DETERMINATION OF LAND USE FOR MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT

PART A: GENERAL PROVISIONS APPLYING TO ALL CATEGORIES

1. Proposals for the following activities require assessment by the Authority before activities commence:
   (a) siting and construction of houses and access tracks;
   (b) subdivision of land titles;
   (c) road or track construction;
   (d) recreation development;
   (e) extraction industries;
   (f) siting and construction of dams.

2. The Soil Conservation Authority may determine and impose any conditions pursuant to Section 23 (1) (c) and 23 (4) (a) of the *Soil Conservation and Land Utilisation Act* 1958 with respect to the use or management of all or any land in any Category specifying any action for the purpose of:
   (a) preventing or limiting soil erosion or reclaiming eroded sites;
   (b) preserving or improving the quality or yield of water supply.

PART B: LAND USE CATEGORIES

LAND USE CATEGORY	LAND AFFECTED	MOST SUITABLE USE	PROVISIONS OF USE
1.	(a) within 100 metres radius upstream of the Malakoff Creek and Franks Gully pump offtakes; (b) within 100 metres of fully supply level of the Landsborough Reservoir; (c) on the upslope side of and within 100 metres of the water race (future proposal) to Landsborough Reservoir; (d) within 20 metres of the banks of all creeks and drainage lines shown on Plan No. 5 - 969A	Protection of the water supply offtakes, Landsborough Reservoir, creeks and drainage lines from the effects of soil erosion and pollution.	1. No disturbance of soil or vegetation should take place other than the minimum necessary for creation of access or works relating to fire prevention and fire protection. 2. Any proposals which may cause disturbance of soil or vegetation must be referred to the Authority for assessment before activities commence. 3. In accordance with the Malakoff Creek Catchment Development Policy no houses or effluent disposal systems may be sited on this land. 4. The Authority may specify conditions which relate to: (a) the exclusion of stock; (b) the location and design of crossings; (c) measures required for the control or prevention of erosion.

Source: Ransome (1985)

DETERMINATION OF LAND USE FOR THE MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT: TABLE OF LAND USE CATEGORIES (continued)

LAND USE CATEGORY	LAND AFFECTED	MOST SUITABLE USE	PROVISIONS OF USE
2	(a) The Landsborough Flor and Fauna Reserve; (b) the Landsborough Historic Reserve; (c) public land stream frontage; (d) road reserves; (e) all other public land not included in the above (a) to (d) or in Categories 1 or 3.	Water catchment protection, by the retention of forest cover.	1. Provisions of Land Use 1, 2 and 3 in Category 1 apply. 2. Use of public land is to be in accordance with the appropriate Land Conservation Council Recommendation as approved.
3.	(a) public land in Pyrenee Range hardwood Production Area; (b) steep freehold land as shown on plan no. 5 - 969A.	Low intensity production of hardwood and farm timber.	1. All forest operations are to be in accordance with management guidelines approved by the Authority. 2. No clear felling of timber or cropping may be carried out on this land. 3. In accordance with the Malakoff Creek Catchment Development Policy, no houses or effluent disposal systems may be sited on this land. 4. The Authority may specify conditions which relate to: (a) measures required for the control or prevention of erosion; (b) number, type or timing of stock grazing on existing cleared freehold land.
4.	Freehold land, with the exception of that freehold land in Categories 3 and 5.	Grazing.	The Authority may specify conditions which relate to: (a) number, type or timing of stock grazing; (b) clearing of trees; (c) cultivation rotations for the purposes of pasture establishment or pasture renovation; (d) measures required for the control or prevention of erosion.

DETERMINATION OF LAND USE FOR THE MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT: TABLE OF LAND USE CATEGORIES (continued)

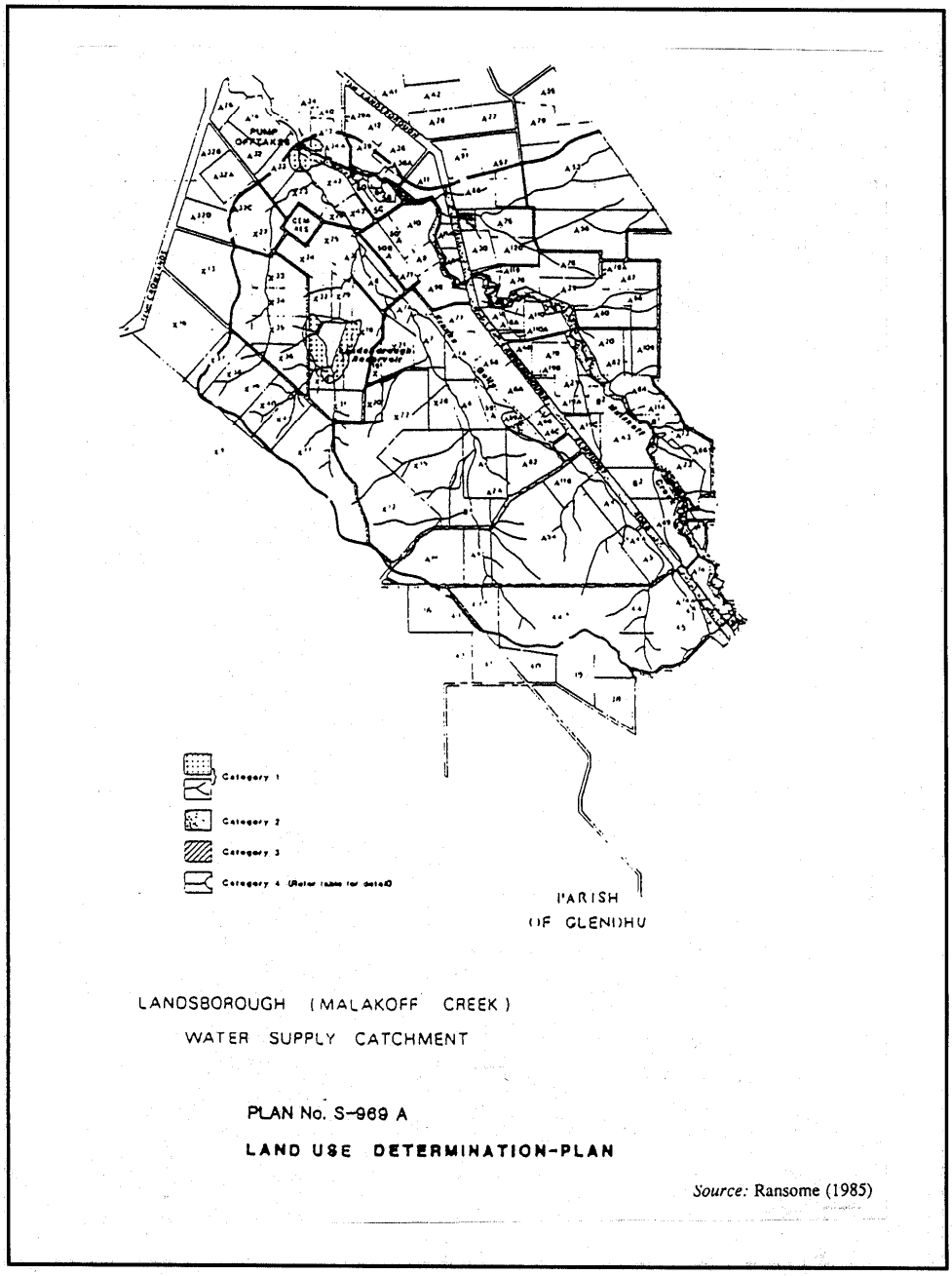
LAND USE CATEGORY	LAND AFFECTED	MOST SUITABLE USE	PROVISIONS OF USE
5	Freehold land within 100 metres of creeks and drainage lines shown on Plan No. 5 - 969A, but including Category 1 land.	Grazing (non residential area.	The Authority may specify conditions which relate to: (a) number, type and timing of stock grazing; (b) clearing of trees; (c) areas suitable for intensive agricultural uses; (d) cultivation rotations for the purposes of pasture establishment or pasture renovation; (e) measures required for the control or prevention of erosion; (f) improvements to existing domestic effluent disposal systems.

PART C: OTHER USES

OTHER USES	LAND USES CATEGORIES	PROVISIONS OF USE
Residential use	4	1. Residential use is to be in accordance with the Malakoff Creek Catchment Development Policy 2. Treatment and disposal of domestic effluent must comply with the relevant requirements of the Health Act 1958, the Environment Protection Act 1970, and the Shire of Avoca.
Roads, tracks, dams	1,2,3,4,5.	The Authority may specify conditions which require improvements to: (a) roads and tracks; (b) drainage; (c) embankment stability.
Recreation	2,3	The Landsborough Flora and Fauna Reserve, the Pyrenee Range Hardwood Production Area and the Landsborough Historic Reserve may be used for passive recreation.
Extraction Industries Mineral production	3,4,5 3	The Authority may specify conditions which relate to: (a) access; (b) the conduct of operations; (c) soil conservation measures required; (d) reclamation.

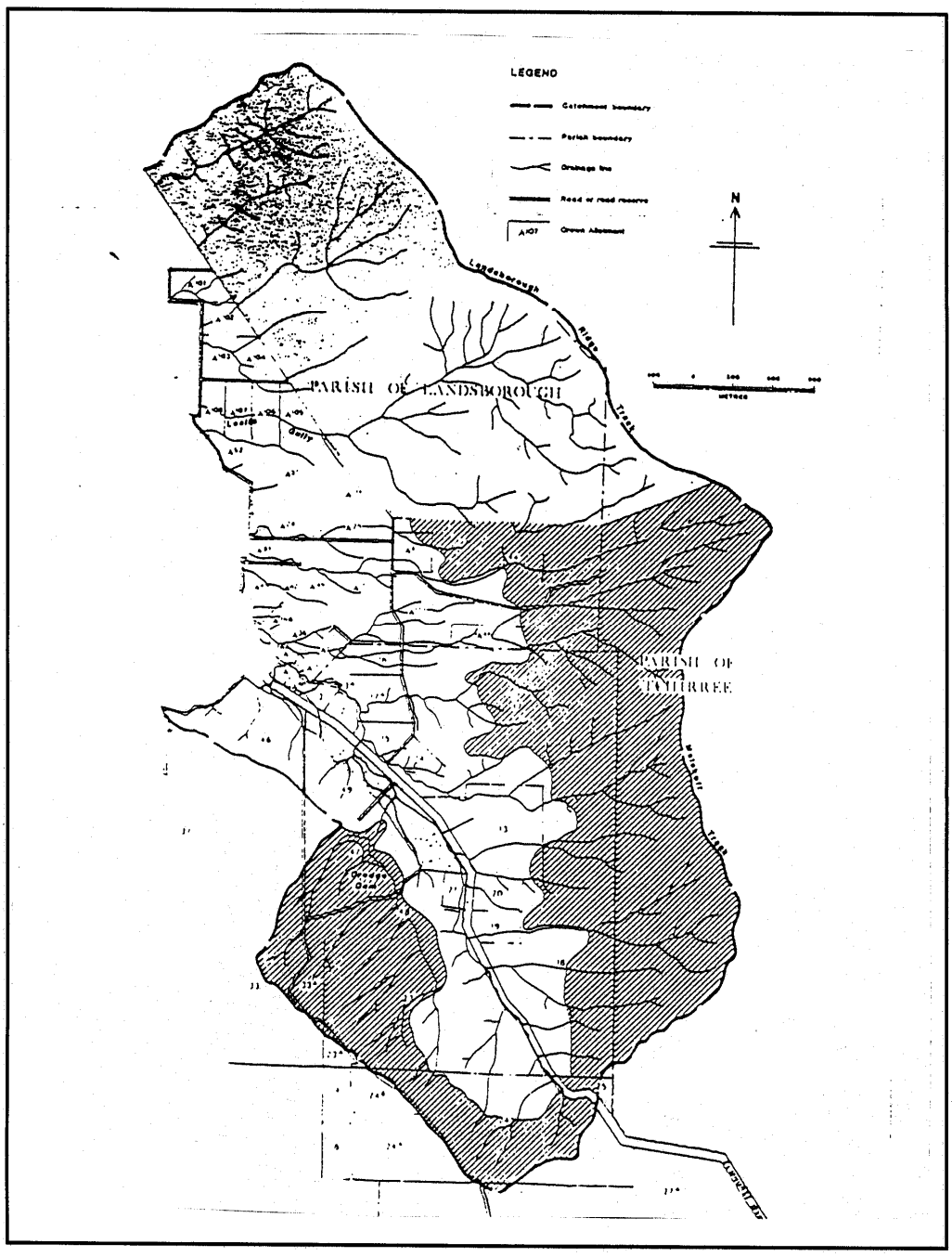
Note: The Land conservation Council's recommendations referred to in the above determination are contained in the Final Recommendations for the North Central Area published in 1981.

DETERMINATION OF LAND USE FOR THE MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT: DETERMINATION PLAN



Source: Ransome (1985)

DETERMINATION OF LAND USE FOR THE MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT: DETERMINATION PLAN
(continued)



APPENDIX C

MALAKOFF CREEK (LANDSBOROUGH) WATER SUPPLY CATCHMENT

SUMMARY OF LAND TRANSFERS 1980 *vs* 1995

Identified Area No.	Changes/Comments
1	Ownership change - common ownership retained
2	Part ownership change - house block retained in former ownership, two holdings
3	No change
4	Ownership change Single allotment
5	No changes
6	Part ownership change - consolidation of ownership complete
7	No change
8	Ownership change - effectively common ownership retained
9	No change
10	Ownership change - single allotment
11	No change
12	No change
13	No change
14	No change
15	Ownership change - single allotment
16	Part ownership change - some consolidation of ownership into three holdings. One house in catchment, by default. Potentially difficult to resolve
17	No change
18	Ownership change - accords with spirit of Identified Areas
19	Ownership boundaries differ from preferred location
20	Ownership boundaries differ from preferred location
21	Part ownership change - some consolidation of ownership into two holdings
22	Ownership change - common ownership retained
23	Ownership change - four holdings, one house - potentially difficult to resolve
24	Ownership change - accords with spirit of Identified Areas
25	Ownership boundaries differ from preferred location
26	No change
27	No change
28	No change
29	No change
30	No change
31	No change
32	No change
33	No change
34	Ownership change - common ownership retained
35	No change
36	Part ownership change - two holdings
37	Ownership change -two holdings. One house outside catchment Potentially difficult to resolve
38	Ownership change - large single allotment.