060483

VISUAL RESOURCE MANAGEMENT SYSTEM

EXPLANATORY NOTES

1. BACKGROUND PERSPECTIVE

Over recent years Australians have developed an increasing awareness and perception of the quality of their visual environment.

Subsequently, these expressed landscape values have placed greater demand upon the multiple resources of public land and those responsible for its management.

In response to inter-state and international research efforts, various environmental agencies in Australia now recognise the visual resource as an essential component in forest land use planning and management.

In specific forestry terms, CALM is committed to managing the visual resource on an equal basis with all other resources as it continues to put public and private land to productive use. This committment is spelled out in key passages of recent Strategic and Management Plans for the Southern Forest Region, as follows:

"Strategic Role and Responsibilities:

....(Ensure) activities are well planned and carried out in ways that meet social needs but are not detrimental to inherent visual qualities of the natural environment.

Regional Strategic Objectives:

... Landscape: To ensure that activities on CALM land are

planned and carried out in ways that compliment rather than detract from the inherent visual qualities of the natural environment. Outstanding scenic landscapes will be protected from impairment of visual amenity."

(1986 Southern Forest Region Strategic Plan)

Thus, set in context with other Strategic Planning responsibilities, Visual Resource Management (VRM) has dual program purposes: to manage the quality of the visual environment, and to reduce the visual impact of development activities, while maintaining effectiveness in all CALM resource programs. VRM also identifies scenic areas that warrant protection through special management attention. It is a specific process of which components can be mapped and incorporated into design planning for projects ranging from siting of recreation facilities, transmission lines, to the harvesting of timber.

2. KEY STUDY OBJECTIVES

* Formulate a system of Visual Resource Management to suit the requirements of CALM lands.
* Inventory and assess both social and physical elements of visual resources and recommend zones of relative concern for scenic values.
* Establish and define visual quality objectives for each delineated zone.

* Develop and field test management guidelines, specific to timber harvest, road construction/maintenance and placement of structures in forested landscapes, which minimise visual impacts and integrate alterations into the forest landscapes.
* Provide harvest studies with recommendations as to coupe size, sequence, configuration, roading and rehabilitation for areas of indigenous forest and plantation production based upon systematically derived objectives.

3. PRELIMINARY STUDY METHODOLOGY

The proposed Visual Management System will be developed initially for use at a Broad Scale Planning Level, for assessments mapped at say 1:50,000 scale. A flow chart illustrating the Visual Management System follows (Figure 1). This system was formulated by the Victorian Department of Conservation, Forests and Lands from models originally developed by the United States Forest Service (1974).

The System integrates a Resource Base (Figure 1: Column 1) of:

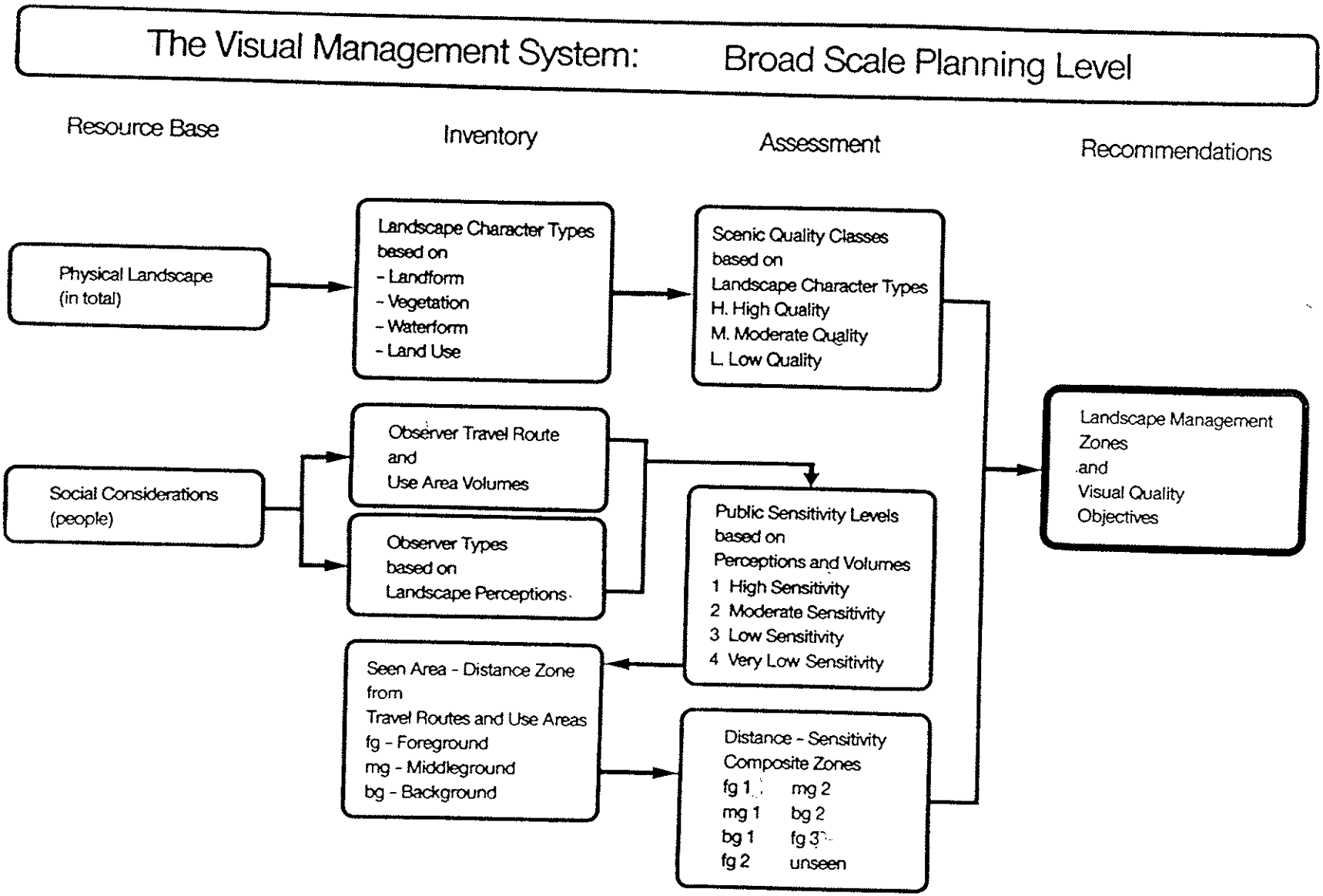
(1) Physical Landscape Elements (in total), and

(2) Social Considerations (people's visual resource values).

From an Inventory (Figure 1: Column 2) and Assessment (Column 3) procedure, Recommendations (Colunmn 4) are made with Landscape Management Zones mapped, depicting levels of concern for the visual resource. For each recommended Zone a Visual Quality

Objective (VQO) is written providing standards for operations, outlining levels of alteration and techniques for measuring results. This data will then compliment other management techniques used when managing the many resources of forest land. This objective can then be monitored and reviewed according to the operational standards.

The VRM process is thus a valuable tool for a systematic identification, evaluation and management of the scenic resource. It now equips the land manager with a means of developing rational arguments and predictive models to formulate policy for management of the scenic resource.



(Source: Victorian Department of Conservation, Forests and Lands)

4. SPECIFIC PROJECT LEVEL

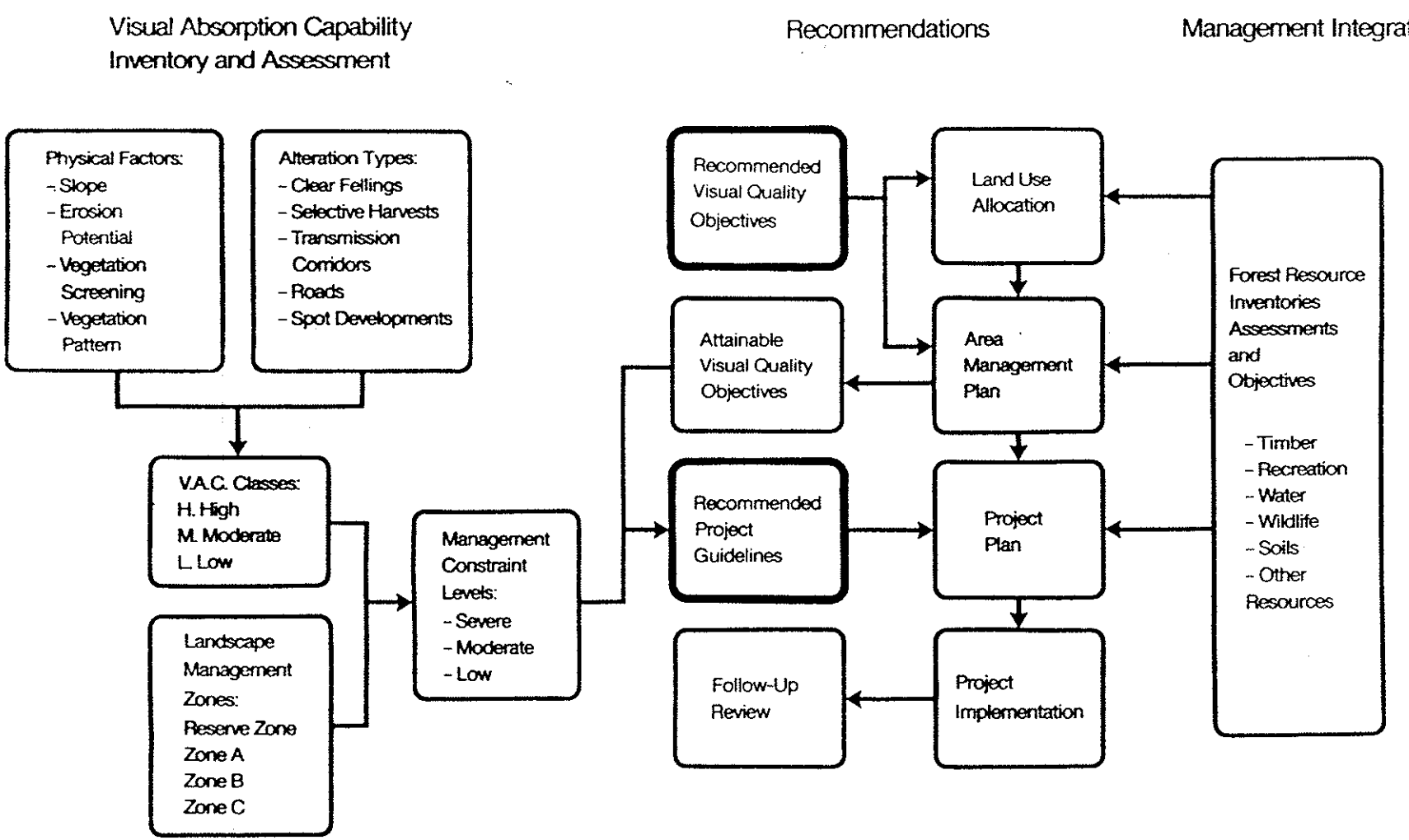
The second stage of the Visual Management System project will be devoted to applying the Visual Quality Objectives (VQO) in the field. For example, Trials will be undertaken in the Districts and detailed research carried out to maintain the integration of the Visual Quality Objectives (VQO) with Field Operations. Prescriptions will be prepared for operations to ensure the Visual Management System is workable and effective. Following this phase the Visual Quality Objective for each Landscape Management Zone will be reviewed. Hence the outcome of this Specific Project stage will be definate operation guidelines and prescriptions for various management activities. These guidelines, for example, will then be integrated into the preparation, planning, design and implementation of projects such as logging plans, coupe design, recreation developments, etc. Refer Project Application Level (Figure 2) overleaf.

5. SUMMARY

The Visual Management System will offer a detailed inventory and assessment of Visual Resources throughout the Southern Forest Region. The system will focus on both the Broad Scale Planning and Specific Project Levels. With reference to a Resource base of both Physical Landscape and Social Considerations (Refer Figure 1) the System will provide objectives for varying Landscape Management Zones. At the same time, it will recognise and compliment other vital strategies and methods of forest management. At the project level it will consider different forest types, offering specific guidelines for project planning, design and implementation.

Finally, the underlying goal of this current Study will be to adapt the above 'tried and true' system to Western Australian conditions, commencing with the unique qualities and values of the Southern Forest Region.

The Visual Management System: Project Application Level



6. GLOSSARY OF TERMS: VRM JARGONESE

LANDSCAPE - refers to the appearance or expression of the countryside. It combines the visual elements of both the natural and built environs to include such ingredients as landform, vegetation, waterform, landuse, architecture, etc. It is fundamental to consider the general public user or consumer of the landscape, and how the ingredients combine to conribute to the overall effect on such public perceptions.

VISUAL RESOURCE - that portion of a landscape falling within a person's cone of vision.

SCENIC QUALITY - is the relative nature or character of landscape features expressed as an overall impression by 'man' after perceiving an area of land.

LANDSCAPE CHARACTER TYPE - is a broadscale area of land with common distinguishing visual characteristics based on an amalgamation of landform, climate, vegetation, water form and landuse pattern.

LANDSCAPE MANAGEMENT ZONE - is a specific parcel of land within a defined Landscape Character Type which has common visual assessment classification.

VISUAL QUALITY OBJECTIVE (VQO) - is a written guideline which provides a measurable standard, acceptable degree of alteration, for the visual forest resource of the Landscape Management Zone. For example:

"Dominant Alteration Visual Quality Objective:

Management alterations may be visually dominant but should borrow from naturally established form, line, colour and texture and be in harmony with natural occurrences within the surrounding area.
The recommended alteration levels would be highly accepting of change" (Leonard and Hammond, 1984).

SENSITIVITY LEVELS - each travel route/road or use area is classified according to their level of viewer sensitivity. This relates specifically to the extent of how many and what type of public viewers are using the Region's landscapes. The classifications are known as Level 1, 2 and 3. Specific criteria is set for these levels.

SEEN AREA - that part of the landscape than can be seen from a given road or use area. Seen Area relates to the visible landform of the landscape and assumes that no Vegetation exists.

DISTANT ZONES - these zones refer to the following portions of the Visual Resource or Seen Area.

Foreground (fg): 0 - .5Km: Evident textural detail
Middleground (mg): .5 - 6.5Km: Evident textural patterns
Background (bg): 6.5 - 16Km: Mainly mass colour patterns.

7. REFERENCES AND FURTHER READINGS

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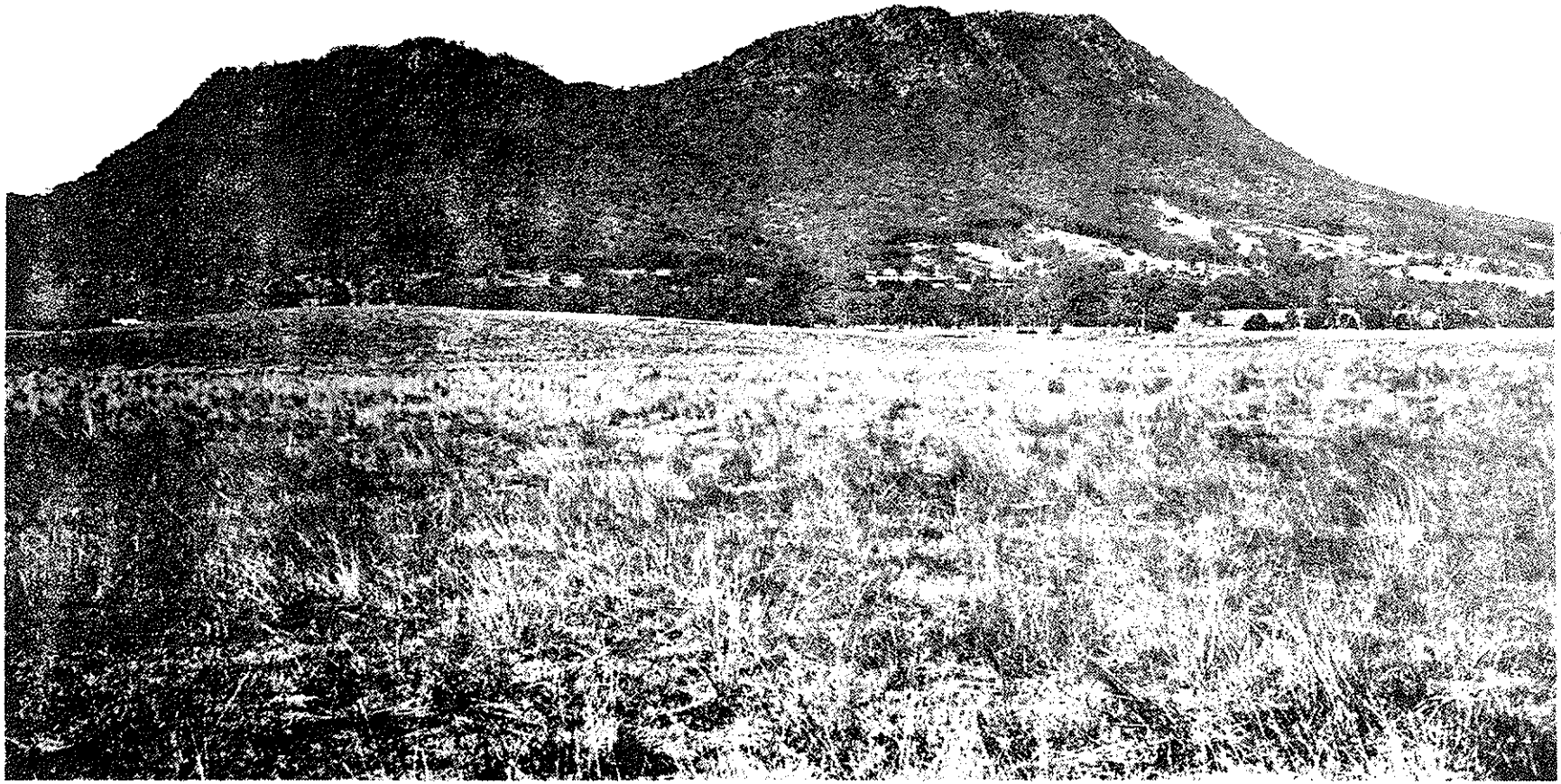


SUMMARY OF THE VISUAL MANAGEMENT SYSTEM

FORESTS COMMISSION, VICTORIA

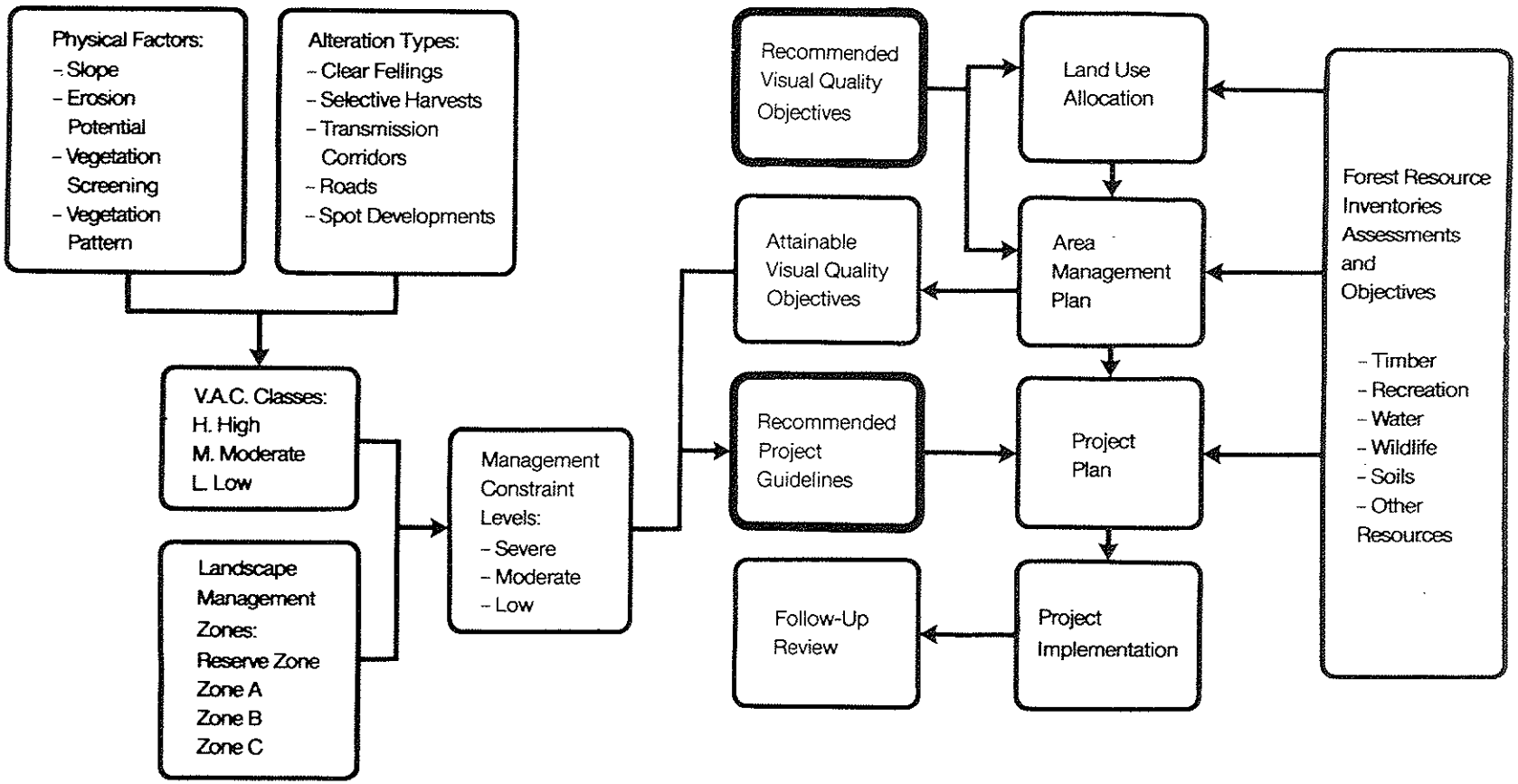
Landscape Management Series

The Visual Management System: Project Application Level

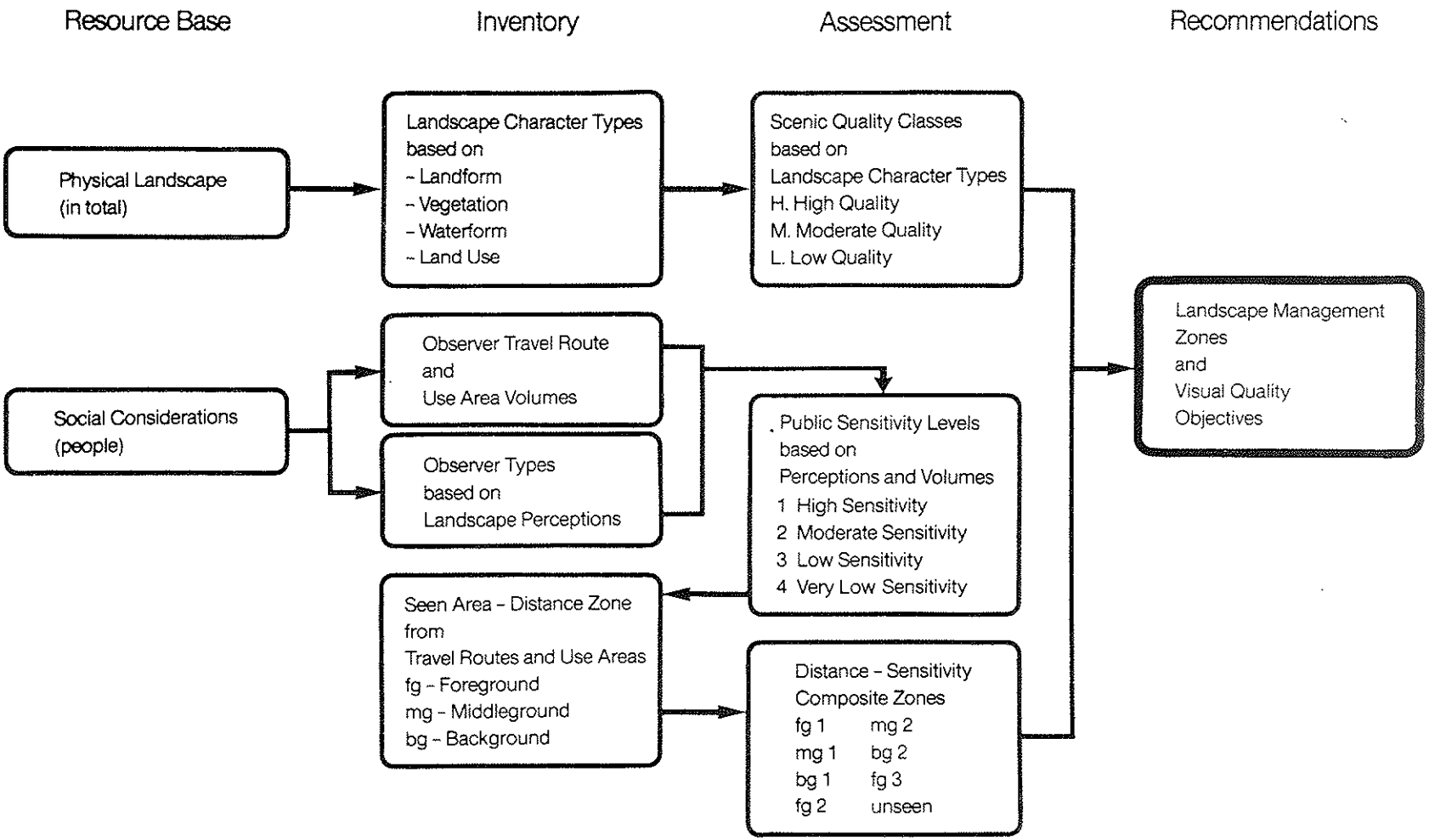
Visual Absorption Capability Inventory and Assessment

Recommendations

Management Integration

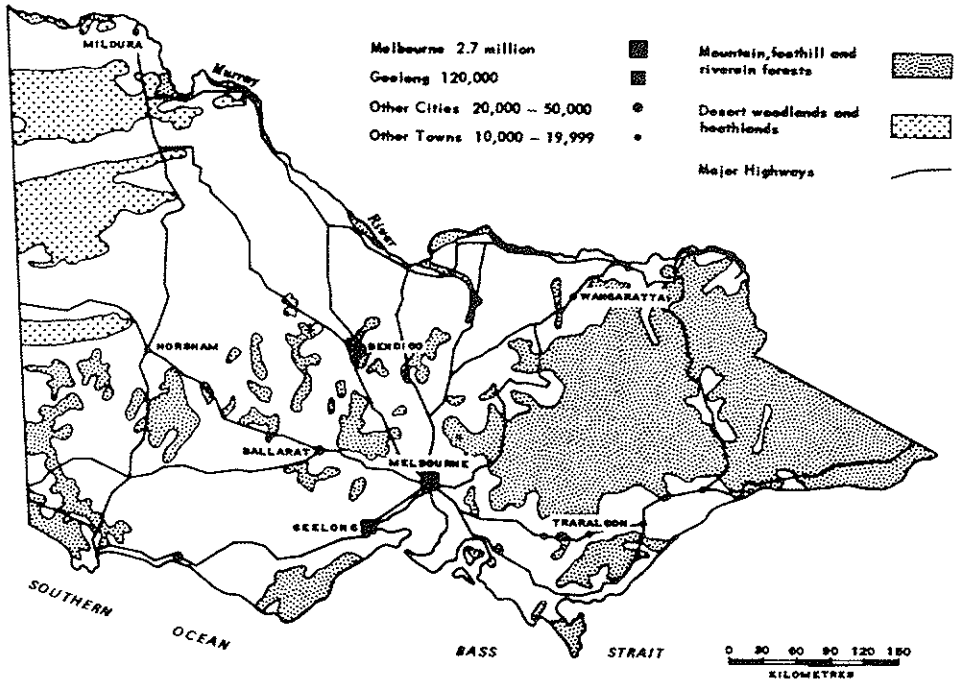


The Visual Management System: Broad Scale Planning Level



THE VISUAL MANAGEMENT SYSTEM

The establishment of a Visual Management System for the Forests Commission Victoria began in 1977. The goal was to adapt a system originally developed in the United States (U S Forest Service 1974) to Victoria's conditions. The system was to be comprehensively applied to 5.7 million hectares of forest land, nearly 25% of Victoria's total land area (see map below).



BROAD SCALE PLANNING LEVEL

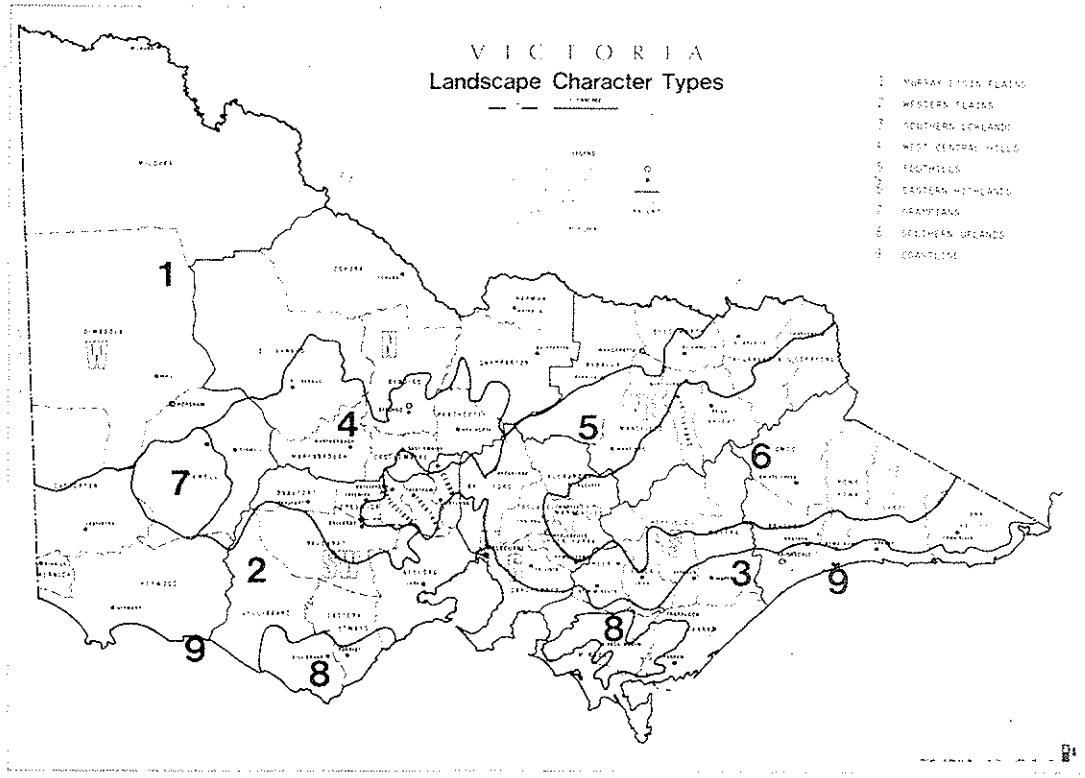
The Visual Management System was first developed for use at a Broad Scale Planning Level for assessments mapped at approximately 1:50 000 scale. A flow chart of the system at this broadscale is shown on the following page.

The System utilizes a resource base with two major components:

(1) Physical Landscape (in total) and
(2) Social Considerations (people's concern for scenic quality).

A brief step by step summary of the Visual Management System process follows:

Step 1: LANDSCAPE CHARACTER TYPING requires identification and description of Landscape Character Types, which are areas of common distinguishing visual characteristics based upon landform and landcover patterns in vegetation, water and landuse. The 9 Landscape Character Types of Victoria are shown on the map to the right.



Step 2: SCENIC QUALITY CLASSIFICATION requires delineation of the total landscape into Scenic Quality Classes (High, Moderate and Low) using aerial photographs and descriptive Frames of Reference which are based upon diversity, uniqueness, prominence and naturalism of landform, vegetation and waterform within each Landscape Character Type.

SCENIC QUALITY CLASS FRAMES OF REFERENCE - THE EASTERN HIGHLANDS LANDSCAPE CHARACTER TYPE

	A HIGH SCENIC QUALITY	B MODERATE SCENIC QUALITY	C LOW SCENIC QUALITY
LANDFORMS	1. Peaks or plateaux (e.g. Mt Buffalo) with distinctive form and colour that become focal points. 2. Distinctive sharp crested ridges or razorbacks. 3. Sharply defined V-shaped valleys unusual in gorge depth, elevation, drop, or number and configuration of lateral tributary valleys. 4. Massive rocks outcrops, cliffs, boulders or groups of boulders.	1. Rounded broad peaks and/or long extended ridge systems which are visually evident but surrounded by more landforms of similar types. 2. Dissections varying from V-shaped valleys to broader U-shaped valleys lacking in unusual configuration, colour, elevation drop, or focus. Lateral tributary valleys lack distinction. 3. Rock outcrops. 4. Steep slopes, often in excess of 30^{o}, gradually rounding to valley floors.	1. Slightly undulating or rolling terrain, relatively lacking in visual interest in comparison to the normal landform in the character type.
VEGETATION	1. Strongly defined patterns of such combinations as eucalypt forest, alpine meadows, waterbody associated vegetation, bare soil and/or rockforms. 2. Dramatic displays of seasonal colour. 3. Distinctive vegetation unusual in density, growth habit or texture, in comparison to the surrounding vegetation.	1. Forest canopy varying slightly in texture, age and spacing and with or without some natural openings, and offering some visual diversity. 2. Vegetative pattern evident but not dominant relative to the surrounding landscape character.	1. Extensive areas of similar vegetation with few evident patterns.
WATERFORMS	1. Major streams, or portions of other streams with flow character such as waterfalls, rapids, etc. 2. Bogs and lakes.	1. Moderate to small sized streams, resulting in moderately down-cut drainages and landforms.	1. Minor streams resulting in subdued drainage patterns in landforms.

Step 3: OBSERVER ANALYSIS requires identification and classification of Observer Volumes and Observer Types for all travel routes and use areas.

Step 4: SENSITIVITY LEVELLING requires classification of all travel routes and use areas into Levels of Public Sensitivity (Level 1-High, Level 2-Moderate, Level 3-Low, Level 4-Very Low) based upon public perceptions of landscape and the criteria listed below.

PUBLIC SENSITIVITY LEVEL: INITIAL TRAVEL ROUTE AND USE AREA CLASSIFICATIONS*

Level 1 - High Sensitivity

1. Freeways and State Highways with more than 500 vehicles/day.
2. Classified Tourist Roads.
3. Main Sealed Roads with more than 75 vehicles/day.
4. Recreation, Cultural or Scenic Sites and Viewpoints of National or Interstate Significance.
5. Walking Tracks of National Significance.
6. Residential Areas with High Degrees of Scenic Concern.
7. Interstate Passenger Rail Lines with Daily Daylight Service.
8. Rail Lines of Cultural, Historic or Scenic Significance.
9. Navigable Rivers, Lakes, and Reservoirs of National Recreation Significance.

Level 2 - Moderate Sensitivity

1. Main Sealed Roads with more than 50 vehicles/day.
2. Forest Access and Other Roads with more than 35 vehicles/day.
3. Roads with less than 35 vehicles/day, but Planned for Recreation Promotion within 5 years.
4. Recreation, Cultural or Scenic Sites of State Significance.
5. Walking Tracks of State or High Local Significance.
6. Residential Areas with Moderate Degrees of Scenic Concern.
7. State Passenger Rail Lines with Daily Rural Town Service.
8. Navigable Rivers, Lakes and Reservoirs of State Recreation Significance.

Level 3 - Low Sensitivity

1. Timber Management Roads with Occasional Recreation Traffic up to 10 vehicles/day.
2. Walking Tracks of Low Local Significance.
3. State Passenger Rail Lines with Less than Daily Rural Town Service.

Level 4 - Very Low Sensitivity

1. Timber Management Roads with Infrequent Recreation Traffic less than 3 vehicles/day.
2. Forest Tracks with Infrequent Recreation Usage.

* Traffic volume estimates made for weekends of peak recreation seasons, 1978-1983.

Step 5: SEEN AREA MAPPING requires identification and delineation of Seen Areas and Distance Zones - Foreground (0-.5 km), Middleground (.5-6.5 km) and Background (6.5-16 km) from all Level 1, 2 and 3 travel routes and use areas either manually or by using the computer program, VIEWIT (Elsner et al 1975).

Step 6: COMPOSITING requires integration of the Physical Landscape and Social Considerations data by an overlay process resulting in Landscape Management Zones and associated Visual Quality Objectives.

The matrix used to determine Landscape Management Zones and correlative Visual Quality Objectives follows.

MATRIX		(2) DISTANCE ZONE - SENSITIVITY LEVEL							
		fg-1	mg-1	bg-1	fg-2	mg-2	bg-2	fg-3	U
(1) SCENIC QUALITY CLASS	H	A	A	A	A	B	B	B	B
	M	A	B	B	B	B	C	C	C
	L	B	B	B	B	C	C	C	C
		(3) LANDSCAPE MANAGEMENT ZONE							

Matrix Formula:

(1) Scenic Quality Class
\+ (2) Distance Zone - Sensitivity Level

= (3) Landscape Management Zone

Examples:

fg1 + H = Zone A
bg2 + L = Zone C

Matrix key:

(1) Scenic Quality Classes
- H - High
- M - Moderate
- L - Low

(2) Distance Zones
- fg - foreground
- mg - middleground
- bg - background
- u - uninventoried levels 3 or 4, and unseen in levels 1, 2 or 3

(2) Sensitivity Levels
- 1 - High
- 2 - Moderate
- 3 - Low
- 4 - Very Low

(3) Landscape Management Zone = Visual Quality Objectives

A	= IA - Inevident Alterations
B	= AA - Apparent Alterations
C	= DA - Dominant Alterations

The Visual Quality Objectives provide measurable standards or objectives for the visual management of public lands. The objectives for the Landscape Management Zones generated by the previous matrix are defined below.

Zone A - Inevident Alteration VQO

Management alterations should range from being visually inevident to temporarily apparent. When evident, the period of impact (contrast) should not exceed one year. The recommended alteration level would be low, least receptive to change.

Zone B - Apparent Alteration VQO

Management alterations should range from visually apparent and yet subordinate to established landscape characteristics to visually dominant. The period of visual dominance should not exceed two years. The recommended alteration level would be moderately accommodating to change.

Zone C - Dominant Alteration VQO

Management alterations may be visually dominant but should borrow from naturally established form, line, colour and texture to be in harmony with natural occurrences within the surrounding area. The recommended alteration level would be highly accepting of change.

The above objectives are applied to the general forest areas of Victoria. However, to respond to forest areas of special importance and concern, two special category Visual Quality Objectives were developed: Reserve and Rehabilitation. They are defined below:

Reserve VQO

The recommended alteration level for these special management zones would allow for little more than natural change or low visual impact changes which are carefully planned to accommodate and/or enhance the special qualities of the Reserve.

Reserves include: forest parks, scenic reserves, alpine reserves, roadside reserves, National parks, State parks and local parks.

Rehabilitation VQO

Landscape modifications which have resulted from past management practices, and don't meet the desired Visual Quality Objective, fall into this category.

Short-term management activities should attempt to upgrade visual quality to the desired level. Long-term visual management may require development and/or rehabilitation plans. Where priorities for rehabilitation must be established the higher Quality Objective Zones should receive priority.

Note: The Rehabilitation VQO is a special category not applied in Visual Absorption Capability (VAC) assessments.

The Visual Management System: Project Application Level

Visual Absorption Capability Inventory and Assessment

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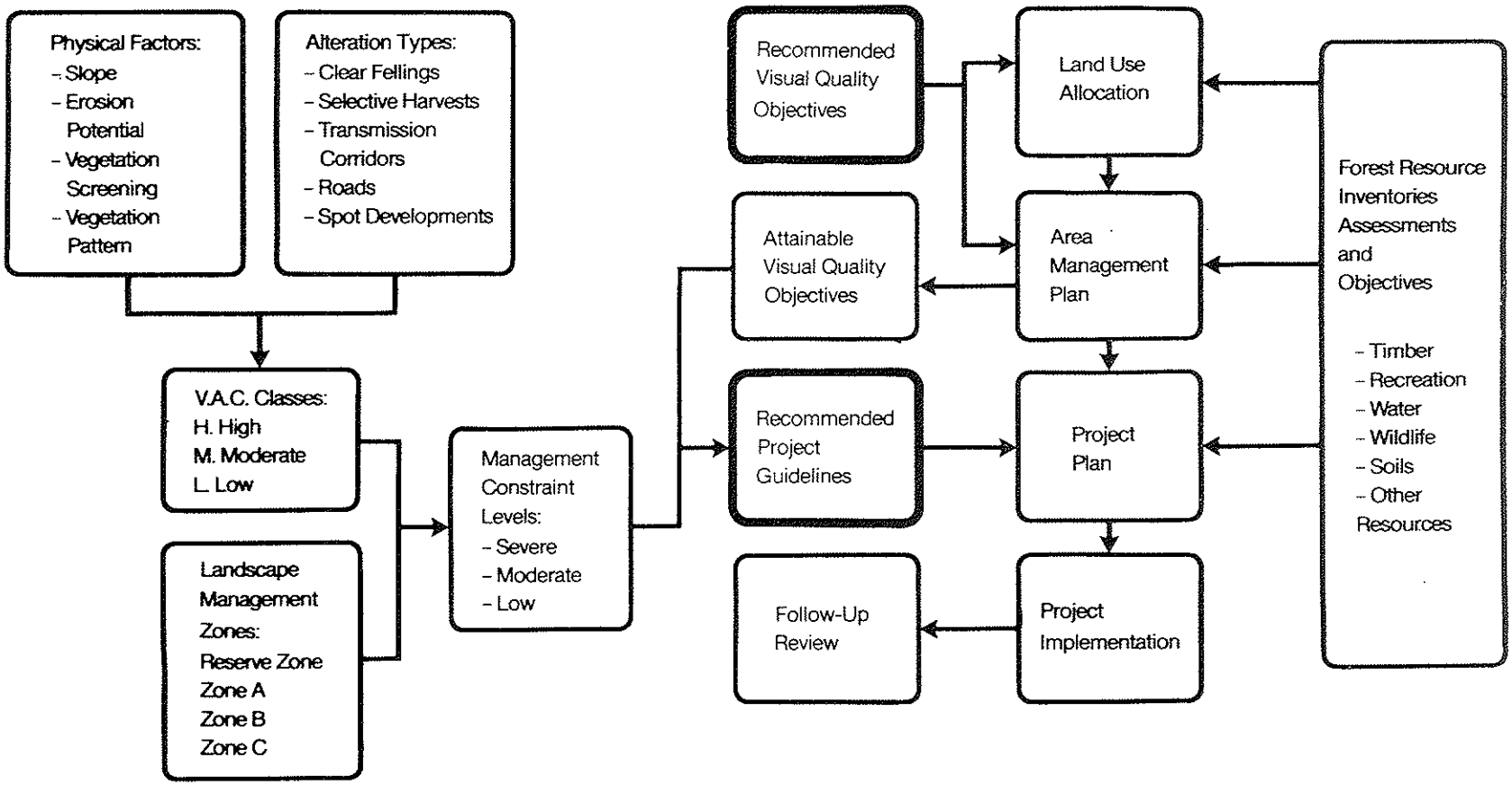


At this time, the Visual Management System has been completed at the Broad Scale Planning Level for almost every Forest District in Victoria. Each office has comprehensive assessment maps of Scenic Quality Classes, Seen Area Sensitivity Levels and Landscape Management Zones. Approximately 1.2 million hectares of land have been recorded and processed under the VIEWIT program (Keefe 1979). Extensive research on people's perceptions of forest scenic quality has been completed (Williamson and Chalmers 1981), adding to knowledge for future Scenic Quality Class and Public Sensitivity Level assessments. The system is being effectively implemented on various alteration projects throughout Victoria. It is planned that the basic assessments made by the system will be updated every five years, responding to changes in land use patterns over time.

PROJECT APPLICATION LEVEL

The second stage of the Visual Management System is developed for the Project Application Level. This stage allows for the integration of Visual Quality Objectives (recommended in the Broad Scale Planning Level) with other forest resources in the process of land use allocation and management planning. Once the attainable Visual Quality Objectives are determined and other resource development plans are made, the Visual Absorption Capability assessment can be used to estimate Management Constraint Levels and recommend Project Guidelines for the development plans. The system applied at the Project Application Level is illustrated on the following flow chart.

In conclusion, the Visual Management System offers a comprehensive inventory and assessment of visual resources in Victoria's forests. The system is designed for Broad Scale Planning Levels as well as Project Application Levels. It considers the scenic quality of the physical landscape and public sensitivity to visible landscapes. It recommends a range of objectives for different Landscape Management Zones and recognises the importance of other resources in forest management. Finally the system considers different forest alteration projects in terms of the landscape's Visual Absorption Capability, offering guidelines for project planning and implementation.

* For a more detailed discussion of the Visual Management System, see Williamson and Calder, 1979, 'Visual Resource Management of Victoria's Forests: A New Concept for Australia'; Landscape Planning 6:313-341, Elsievier Scientific Publishing Co., Amsterdam, The Netherlands.

For a full explanation of the Visual Absorption Capability assessment procedure, see Williamson, Murray, Moss and Hammond, 1981, Visual Absorption Capability in the Blue Range Study Area: An Assessment Procedure for Victoria's Landscapes, Landscape Management Series, Forests Commission Victoria, Melbourne, Australia.

VISUAL RESOURCE MANAGEMENT (VRM)

LANDSCAPE ALTERATION STRATEGY:

1.0 Preamble

Attaining desired Visual Quality Objectives (VQO) requires following some general principles:

LANDSCAPE MANAGEMENT ZONE A: VQO:
Inevident Alteration. Visual Impact inevident within one year.

LANDSCAPE MANAGEMENT ZONE B: VQO:
Apparent Alteration. Visual impacts apparent but not dominant. The period of visual dominance should not exceed two years.

LANDSCAPE MANAGEMENT ZONE C: VQO:
Dominant Alteration. Few visual constraints. Management Alterations may be visually dominant but should borrow from naturally established form, line, colour and texture from the surrounding landscape (see later).

2.0 Harvesting

If the visual impact of harvesting operations attains or exceeds these general objectives (detailed above), no conflict with scenic resources are expected. If the impact does not attain the desired quality objective, either the proposed alteration is modified of the scenic resource degradation is recognised and accepted.

For high sensitivity areas, eg Landscape Management Zone A individual coupes are to be selected and designed within the context of the total landscape area. Coupe harvest sequences will be designed to ensure an even distribution across the available area in order to reduce localised impacts.

2.1 Specific Concerns

In order to achieve the desired level of visual impact particular attention should be given to the following. (Refer attached Planning and Design Guidelines in order to prepare appropriate prescriptions).

- Roading : consider alignment, minimum widths, cut and fill, vegetation screening, etc.

- Coupe Harvest Sequencing : for a given sensitive view shed (eg: Landscapes with one or more "A" Landscape Management Zones) - No more than two active harvest operations should be evident within the view shed at any one time.

  - No more than one active harvest operation may be evident in the foreground or middle ground zone at any one time.

- Any number of active harvest operations evident in the seldom seen (unseen zones).

- Coupe Size : The acceptable size of individual coupes should relate to Landscape Management Zones and the distance zones from each of the major viewing points. For example, where y is a very small area of cut (ha)?

DISTANCE ZONES	LANDSCAPE MANAGEMENT ZONE A	B	C
FOREGROUND	y	y x 2	-
MIDDLEGROUND	y x 2	y x 4	-
BACKGROUND	-	y x 8	y x 16
SELDOM SEEN	-	-	y x 16

In an "A" L.M.Z. coupes should be gradationally smaller as they move up slope towards ridgelines or skylines. Where openings already occur in the forest cover larger clearfelled areas may be successfully employed. Selection harvesting should be employed in critical locations in foregrounds and near middle ground distance zones in the major view sheds.

- Coupe Shape :
  - The shape of individual coupes is largely determined by topography and by the nature of the stand of commercial timber. The boundaries of harvest areas should follow natural ridges and stream corridors.

  - In "A" L.M.Z's the transition between harvest areas and natural forest, cover should be gradual and subtle. Gradational cutting levels of the forest edges can greatly influence the transition from harvested to unharvested areas and should be employed in critical locations particularly along the top edge of coupes in an "A" L.M.Z.

  - Clusters of trees within harvested areas should be retained midslope in larger coupes, to visually break up the harvested areas. These may effectively coincide with streamside reserves, (particularly at the junction of streams).

  - Wherever possible coupes should be designed to be seen obliquely. This can be achieved by running coupes across the face of visible slopes and meandering the boundary to exploit vegetation screening (rather than running coupes vertically up

slopes).

- Snig Tracks and Landings :
  - The number of vertical snig tracks should be reduced to a minimum and substituted with diagonal tracks which run at oblique angles to the slope contour and feed onto a single vertical spine.

  - Wherever possible landings and log collection points should be located where topography or vegetation will screen them from view. If located in areas of potential visibility, adjacent trees should be retained to screen operations from view.

  - Once operations are completed snig tracks and landings should be carefully and fully rehabilitated to ensure maximum regeneration.

3.0 Other Alteration Types

The VRM pilot study has prepared trial prescriptions for the following -

- Selection/Salvage Harvest
- Prescribed Edge Burning
- Scrub Rolling
- Landings
- Advance Mop Up of Prescribed Burn

Those prescriptions will, in due course, become policy inclusions to the Regional Operations Manual and Hardwood Specifications Manual. They are currently on Regional File (13.9.1) and with Kevin Vear.

The broadscale mapping information
- seen area/distance zones
- scenic quality
- landscape management zones

are currently held with Paul Davies, Mapping Officer, Manjimup, Inventory and Planning Office.

In due course copies will be issued to each District in a workable format, eg - overlay?
- computer print out?
- etc?

Planning and Design Guidelines, and VRM Background Explanatory Notes are attached.

For further information, and in times of "visual resource concern", request support from:

Alan Sands
Regional Office
(097) 711 988
and
Richard Hammond
Murdoch House, Perth
(09) 3649666

Grant Revell
Manjimup

30 August 1988

LANDSCAPE MANAGEMENT INFORMATION SERIES

- LANDSCAPE AWARENESS

DEFINITION OF LANDSCAPE:

The term landscape has often been used in a limited sense to refer to scenery alone. More recently "landscape" has come to refer to the total landscape, that is all the visible physical components of the land, both natural and cultural. This is the way landscape is referred to today.

The landscape is an important land resource, just as the soil, vegetation, mineral sand and water are other important land resources.

Across Western Australia we have a wide variety of landscapes.

Both natural and human induced change occurs in these landscapes. Frequently human induced change is destructive to the landscape.

The value society places on a landscape is frequently reflected in the sensitivity with which change is accommodated in the landscape.

For the public a direct impact of land management is visual. So the landscape becomes the shop window of the public land managers regard for the natural environment.

Therefore changes to the landscape caused by human actions need to be carefully managed to maintain and improve the quality of Western Australia's landscapes.

To manage any resource we need to know the terms with which to describe and identify it, and the means of assessing the resources. Below are some common landscape terms, and concepts.

DOMINANCE ELEMENTS

All landscapes are composed of Form, Line, Colour and Texture. These four elements compete for visual dominance in every landscape.

a) Form - Form is the mass of an object, or the space it occupies in three dimensions. If seen in only two dimensions, it is called "shape". Most landscape objects are perceived in three-dimensions however, and are viewed as forms.

b) Line - Lines in the landscape can make up the silhouette of a form. Lines are also defined by the intersection of two planes. In the landscape lines are created by ridgelines, timberlines, shorelines, drainage lines, powerlines, etc. They are also found in tree trunks, roads, and vegetative boundaries.

c) Colour - Colour enables the differentiation of objects even though they may have similar form, line, and texture. Distant colours are often muted by a bluish haze caused by dust and moisture in the air. Foreground colours are stronger and more dominant.

d) Texture - Texture is the structure and minute moulding at the landscape surface. Textures range from fine and smooth to coarse and rough. When viewing the same surface cover the texture will usually appear to be more coarse and rough in the foreground and progressively finer and smoother as distances increase to the background.

These elements are apparent at a broadscale or site specific level of detail.

VARIABLE FACTORS

Eight Variable Factors affect landscapes and how the dominance elements are seen, they are: Motion, Light, Atmospheric conditions, Season, Seen Area, Distance, Observer position, Scale and Time. These factors help identify the most critical location, time or situation to judge the impact of a proposed alteration.

LANDSCAPE CONTEXTS

Landscape can be viewed in many contexts depending upon the observers location, the surrounding environment and the particular subject of interest. Landscape contexts include: Panorama, Feature, Enclosed, Focal, Canopied, Detailed, Ephemeral, etc.

LANDSCAPE CHARACTER TYPES

All landscapes have different characters. These result from various natural geologic, hydrologic and climatic processes and associated soils and vegetation.

In Western Australia Landscape Character Types have been identified in the Kimberley and South-west land divisions but a statewide classification is as yet incomplete.

SCENIC OR NATURAL BEAUTY

The scenic or natural beauty of any landscape varies from place to place. Scenic beauty generally increases with naturalness, ruggedness and variety in landform, vegetation and waterform features. Scenic beauty can be defined in specific terms for each Landscape Character types.

ALTERATIONS AND CHANGE IN THE LANDSCAPE

Man's activities frequently have a direct visual impact on the landscape at a local and also regional scale. Alterations can have a dominant, overpowering impact or they can blend sensitively with the surrounding landscape's forms, lines, colours and textures.

LANDSCAPE MANAGEMENT

Landscape planners can provide Regional staff with landscape assessment and visual guidelines to assist with the satisfactory integration of change into the landscape. The Visual management System establishes a method to describe, inventory and assess the landscape. Visual guidelines suggest operation techniques that meet operational and landscape requirements specific to each alteration.

Landscape designers can provide field staff with site specific analysis and layout plans to integrate local alterations into the landscape.

LANDSCAPE MANAGEMENT INFORMATION SERIES

- BASIC TERMINOLOGY

BASIC CONCEPTS:

1. Every landscape being viewed has an identifiable and describable character.

2. Variety uniqueness and naturalness in the landscape are desirable.

3. Man imposed changes in the landscape can usually be manipulated to achieve desirable variety.

The foundation for the development of these basic concepts is the principles of design. These principles are centuries old and account for a broad agreement as to objects of beauty.

The four component elements with which we can describe the character of any landscape are called:

DOMINANCE FACTORS

1. FORM

Form is defined as the shape or structure of something as distinguished from the material of which it is composed. Form is the strongest of the dominance factors and is found in topographic land form in distant views and individual rocks, trees, etc, in foreground views.

2. LINE

Line can be described as the result of a point which has been extended.

Line is the second dominance factor in visual weight. It is found in such things as tree trunks, roads, twigs and branches.

Management Application: an activity strong in horizontal emphasis imposed upon a land form of strong vertical dominance would likely contrast strongly and appear out of place.

3. COLOUR

Colour is defined as that visual sensation or perception that enables one to differentiate objects even though the objects may appear otherwise identical.

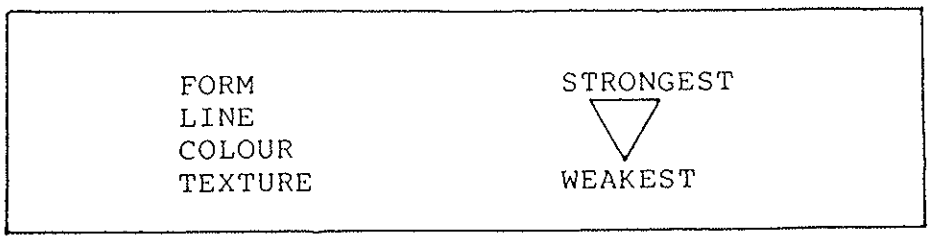
Distant views have their colours muted into a bluish haze.

4. TEXTURE

texture is defined as the visual or tactile surface characteristics of something.

Texture varies with distance and helps establish distance zone designations.

It is not necessarily the actual size of a feature that establishes dominance, it is the relative visual weight of each dominance factor.

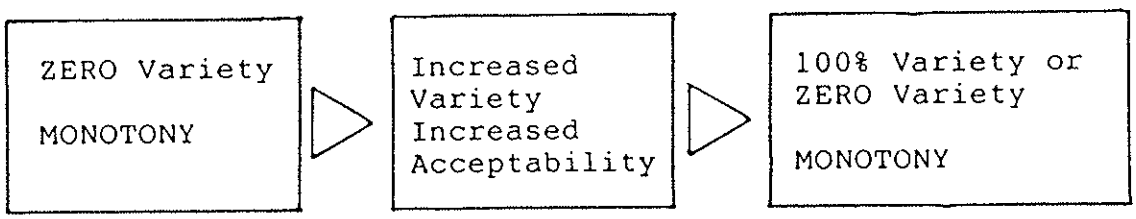


Management Application Example

With a natural landscape dominant in texture, it is extremely difficult to impose an activity strong in form and line (as a clearcut) and yet retain the texture dominance.

VARIETY - Variety in the landscape is desirable.

Given any area viewed ... small, large or moving, there is a point at which variety increases from zero (monotony) until it becomes visually pleasant. As it continues to increase, it approaches the point where it is no longer pleasant; then finally, it is infinite and no longer recognisable or zero again.



ACHIEVING VARIETY

Changes in a landscape which borrow their form, line, colour and texture from nature can be a useful tool to achieve variety.

DISTANCE ZONES

Change in vegetative texture is the yardstick which is used to define distance zones.

1. FOREGROUND

   Maximum detail-veination on leaves through leaf patterns and individual boughs can be distinguished.

2. MIDDLEGROUND

   Land forms and vegetative patterns link together into a whole unit.

   Middleground is critical to visual resource management as it is generally dominant in texture and imposition of forms sharply contrast.

   Middleground usually includes the largest area visually.

3. BACKGROUND

   In the background the expansive view reduces form to simple shapes and removes any sense of texture.

   Application: Alterations are generally easier to work with in the background landscape as distance reduces the strength of form or line.

   Texture is generally a reliable yardstick in determining distance zones.

   Mileage designations are a supplementary tool to delineate these zones.

ZONES	KILOMETRES	
	Near Boundary	Far Boundary
Foreground	0	0.5
Middleground	0.5	6.5
Background	6.5	16

ELEMENTS EFFECTING DOMINANCE FACTORS

1. MOTION - Motion when applied to dominance factors will either draw attention away from or directly to a management activity.

2. DISTANCE - Dominance factors weaken as distance increases. As distance increases potential dominance shifts up the scale of weight from texture and colour to line and form.

3. OBSERVER POSITION - The closer the observer-management activity angle gets to 90% the more the management activity can be seen and the more critical the observer position.

a) Observer below - generally least critical
b) Observer normal (same level)
c) Observer above - generally most critical

4. LIGHTING

a) Backlighting tends to obscure the object being viewed into a dark silhouette as the sun is in the observer's eyes. (Poor time to evaluate a landscape).
b) Frontlighting is critical as sunlight is from the observer's back. Most of an activity is in full sunlight and is flattened into two dimensions. (Satisfactory time to evaluate landscape).
c) Sidelighting is most critical and most satisfactory for evaluating dominance factors as shadows give an activity apparent three dimensions and added strength. (Excellent time to evaluate a landscape).

5. SCALE

Scale is defined as the relative size of parts or part as compared with the whole.

(Example) Using a human figure as a reference, pea gravel appears as texture while a large boulder becomes overpowering form.

6. TIME SPAN

Time span refers to the length of time that an observer views a particular landscape.

Seen areas at the focal end of long tangent are more critical than the areas immediately adjacent to the moving viewer.

7. WEATHER

Clouds, fog, smog, and precipitation generally reduce the strength of dominance factors. This will lessen the contrast between a management activity and the characteristic landscape.

8. SEASON

Spring colour, fall colour and winter snow can draw the eye towards or away from management activities.

Except where the activity itself is strengthened by spring or fall colour, evaluation of dominance should NOT be done during the height of these colour seasons.

In areas of winter traffic snow periods may create the most critical evaluation period.

NOTE: Ideally landscape evaluations should be done when all elements are at their most critical.

LANDSCAPE MANAGEMENT INFORMATION SERIES

- MANAGING LANDSCAPES - CALM

"Quality can be seen. Visual effects are the first clue in assessing the differences between appropriate and inappropriate land management practices".

U.S. Forest Service, 1972
Forest Landscape Management

Landscape management is concerned with the conservation and management of land, vegetation and water resources in ways that either maintain or upgrade the visual quality of the environment. Landscape management is a positive integral element in the land use planning and management process. It should not be thought of as a cosmetic exercise in which the results of careless land use planning and development are hidden from view or 'tarted up' to make them more palatable to the viewing public.

Many land uses and management practices can and often do significantly change the character of the landscape. Such uses and practices, while they may be scientifically or technically correct, do not always result in visually attractive landscapes. The goal of landscape management is to ensure that all uses and activities are planned and carried out in ways that recognise and complement rather than detract from the inherent visual qualities of the environments in which they occur.

Land management authorities world wide recognise the need to conserve and specifically manage public lands for their scenic values. This recognition has occurred as a result of several factors; including:

1. The alteration and loss of many of our 'natural' landscapes.

2. The increasing level of public awareness and vocal dissatisfaction with public land management.

3. The nature of many land management activities/operations, which often result in long term, negative visual impacts.

Our effectiveness as land managers is often judged on the basis of how our management activities and projects look on the ground. This is an important point, as most management operations have the potential to alter the appearance of the landscape. Where operations are not carefully planned

and executed, the result can be long term degradation of the visual resource. In many instances, it is this very loss of scenic quality associated with environmental change that is most apparent to the public and which results in criticism of our land use activities. This can usually be avoided through effective management of the visual resource.

THE BASIS FOR LANDSCAPE MANAGEMENT

Landscape management is based on the premise that the visual quality of the landscape is a resource in its own right which can be assessed and managed in much the same way as other resource values such as timber, water, fauna and recreation. The art and science of visual resource management is dependent on a knowledge and assessment of the landscape itself as well as a thorough understanding of proposed land use(s). After resource factors are identified and assessed, it is possible to evaluate how particular management alternatives will effect the appearance of any landscape and to subsequently develop appropriate landscape prescriptions in terms compatible with other resource management guidelines and recommendations.

Landscape architects, working at a regional scale in the National forests and other public lands of the U.S., and more recently in Australian forests, have devised a systematic approach to the inventory and assessment of landscape values as they relate to various land management activities. Using these existing systems as a model, the Recreation and Landscape Branch is working on the development of a 'Visual Management System' for CALM lands. The objectives are:

- increased awareness of visual resource values, and concerns;
- inventory of the diverse quality of the visual environment based upon landscape character types;
- assessment of management activities in terms of visual impact;
- delineation of landscapes with varying degrees of public concern;
- establishment of visual quality objectives which recommend relative levels of acceptable alterations to the landscape and;
- production of data on the visual resources of land compatible with resource inventory and assessment data required for land use planning at both broad scale and project levels.

In addition, a Landscape Operations Manual is being prepared. The Manual will provide planning and design guidelines covering a wide range of Departmental activities including road location and construction, timber harvesting, plantation establishment, mining, and dieback rehabilitation, corridor planning for utilities and design and placement of structures in the landscape.

Direct assistance to field managers in the assessment, planning and design of specific project will be provided by the Recreation and Landscape Branch.

PLANNING AND DESIGN GUIDELINES

Roading and Associated Facilities

- Road location should be selected and designed to complement and borrow from naturally established landscape elements as scale, form, line, colour and texture.

- Road design should strive to focus road alignment on positive landscape features, screen negative intrusions and to provide a diversity of scenic opportunities within design and safety standards appropriate to the project.

- Road location and design should ensure that scenic quality of the project is maintained or enhanced and that negative impacts resulting from construction are short term only.

- Visual impact reduction/rehabilitation operations should be an integral part of the road design and construction plan - not a post project addition.

- Vertical and horizontal road alignment should be designed to minimise cut and fill earthworks and to provide a curvilinear flow of the road over the landscape.

- Earthwork grooming of road excavations and fills should fine tune landform details for enhanced visual effects on roadsides. Slope rounding, warping, filling and moulding techniques should be employed.

- Rock outcrops and stable boulders should be left within road cuts where possible. Loose boulders, if removed, should be stockpiled and re-positioned in key locations to enhance cut and fill slopes.

- Road cuts through solid bedrock should be left with irregular rough textured faces.

- Rock materials removed from solid rock cuts can be utilised in construction of retaining walls, bridges and visitor facilities.

- Vegetation clearing limits should be minimised to retain existing tree and shrub cover as close to the roadway as possible. Clearing limits can be reduced by minimising cuts and fills, by using split carriageways, and by using tree walls and retaining walls.

- Vegetation to be retained should be protected from damage by construction equipment and blasting.

- Road construction should disperse downslope water drainage at frequent and even intervals to help avoid interruptions and concentrations of water flows due to earth works which could damage or kill downslope vegetation.

- Modification of roadside vegetation through clearing should incorporate undulating clearing limits and edge feathering techniques. Felled vegetation should be removed, burned or buried to avoid negative visual impacts.

- Roadside areas disturbed by earthworks should be revegetated with appropriate plantings before or soon after construction operations are completed.

- Topsoil removed during construction should be stockpiled and replaced on cut and fill batters to aid revegetation.

- Fertilization, mulching, hydromulching, serration of slopes and temporary watering techniques should all be considered for improved revegetation.

- Plants selected for revegetation should represent hardy species well adapted to survival in the soil and climatic conditions of the site.

- Special revegetation efforts should be concentrated on strategic locations that will afford quick visual screening of larger background areas that may be slower in revegetation.

- Planting should be positioned both within and outside the clearing limit and species selected to enhance transitional blending and feathering of roadside vegetation. Native species should be used where possible. Non-native species used should be compatible in growth requirements and appearance with existing native plants.

- Culverts and drainpipes should be buried as far as possible. Exposed end sections should be formed, coloured or screened with plantings to blend into the landscape.

- Retaining walls and planter bin walls should be designed with colours and materials that will blend with the landscape. Shrubs, creepers and vines should be used to screen and enhance their visual appearance.

- Bridges should be located and designed to appear as natural extensions of the landscape, utilising colours and materials that visually blend with the surroundings. If bridges must contrast they should appear as a graceful and positive visual addition to the landscape.

- Fences should be built of materials and colours that either blend into the landscape or provide an historically or culturally compatible transition between the roadside and other land uses. Vegetation can be used to assist the blending and transitional effects of fences.

° Guardrails should be designed with colours and materials that will be visually compatible and subordinant in their surroundings. Staining, colouring or dulling solutions should be used to reduce colour contrasts. Plantings located behind guardrails can be encouraged to further camouflage these roadside structures.

° Signs should provide clearly legible information, but be designed to otherwise enhance the scenic quality of the roadside. Appropriate scale, colours and materials should be used. Excessive signage and widely divergent sign construction standards should be avoided.

° Major interpretation signs should be located at appropriate roadside rest areas.

PLANNING AND DESIGN GUIDELINES

Public Utilities - linear

° Design of utility corridors such as pipelines and powerlines should borrow from naturally established landscape elements - especially landform ~~and line~~ and vegetation patterns.

° Utility corridors are least obtrusive ~~and should be~~ when located:

- on flat terrain;
- in areas of partial or scattered tree vegetation;
- at junction points between flat and uplifted topography;
- at transition points between vegetation types; or
- in locations unseen from travel routes or special use areas.

° Utility corridors are most obtrusive ~~and should avoid~~ when locations:

- on uplifted terrain;
- crossing ridgelines;
- passing through uniformly dense vegetation types; or
- in close proximity to travel routes, towns or special use areas.

° Different utilities should share the same corridor where ever possible to reduce the number of corridor clearings.

° Corridor clearing limits should be kept to a minimum of width and designed with natural appearing edge undulations.

° Corridor clearing edges should be carefully feathered, especially within areas of uniformly dense vegetation.

° Utility corridors should avoid critical focal points, prominent features, visible ridgelines and steep slopes and foreground seen areas.

° Utility corridor location should utilize natural landform lines, vegetation and land cover transition zones and areas screened from prominent viewpoints.

° Utility corridors should cross roads at right angles and be screened by vegetation or buried under the road to reduce foreground visual impacts.

° Utility structures, pylons, poles and pipes, should be designed to visually harmonise in form, line, colour, texture and scale with the surrounding landscape. Painting of structures should be considered in sensitive landscape zones.

° Utility powerlines, cables and pipelines should be located underground or in below ground recessions where possible to eliminate the visual impacts of above ground structures and minimise corridor clearings.

PLANNING AND DESIGN GUIDELINES

Timber Harvest and Plantation Establishment

- All harvest proposals should be evaluated in terms of expected impacts upon the visual resources of the project area. This should include a visual resource description and site analysis as well as an estimation of expected impacts.

- Harvest or plantation establishment proposals within extremely sensitive landscapes, such as scenic drive foregrounds, focal ridge lines, recreation areas or areas of distinctive scenic quality, may require special assessment studies with assistance from Recreation and Landscape Branch staff.

- Harvest or plantation establishment plans which require sequential entries over one or more years should carefully evaluate expected cumulative visual impacts over the life and total area of the project.

- The percentage of canopy cover removed from harvest coupes should be evaluated in terms of expected visual impact.

- The harvest or plantation coupe should be in scale with forms, lines, colours and textures found commonly in the surrounding landscape.

- The shape of a harvest or plantation coupe should be natural and free flowing to reflect the natural lines and forms of the surrounding landscape.

- Edge effects (contrast to adjacent landcover) should be carefully evaluated; with edge feathering techniques being employed within very sensitive viewsheds.

- Stream corridor vegetation should be retained to maintain the visual integrity of natural landscape systems in keeping with soil, water and wildlife prescriptions.

- Islands and clusters of vegetation should be retained within harvest coupes and plantations where possible, coinciding with soil and wildlife requirements.

- Harvest and plantation operations should be planned to minimise road and track construction. The visual impacts of essential construction should be reduced by using alignment, grade and excavation designs appropriate to the level of visual resource sensitivity. Rehabilitation techniques should be applied to minimise soil erosion and colour contrasts of roads and tracks.

- Log landings and dumps should be located and designed to minimise visual impact and associated disturbance to soils and water. ~~Log collection sites~~ should be fully rehabilitated following completion of harvest operations.

landings

° Residual logs and slash resulting from harvest operations should be removed, scattered or piled and burned.

° ~~Minimum~~ Stump heights of logged trees should be utilized within foreground zones seen from roads, tracks or special use sites.

° Past harvest and plantation areas that currently do not meet desired levels of visual quality should have rehabilitation plans and designs prepared and applied at the earliest possible time.

° Harvest coupes should be regenerated as soon as possible following harvest.

° Harvest coupes and plantations proposed in areas of exceedingly high visual sensitivity may be most effectively planned and designed with the aid of computer simulation programs such as PREVIEW or PERSPECTIVE PLOT.

° Photographic records of harvest and plantation areas, especially those with high levels of visual resource concern, should be kept to monitor the effectiveness of planning and design techniques in achieving appropriate visual standards. Permanent photo stations and a systematic photo schedule and filing system should be established.

° Interpretive and explanatory signing should be considered before, during and following harvest and plantation operations.

PLANNING AND DESIGN GUIDELINES

Spot Developments

- Planning, design, and construction of spot developments such as towers, reservoirs, buildings, extraction sites, carparks and recreation facilities should be evaluated in terms of expected impacts upon the visual resources of the project area. Development proposals should effectively borrow from and complement elements in the naturally established landscape such as form, line, colour, texture and scale.

- Spot developments should be sited away from critical features or focal points.

- Spot developments should reflect the historic and cultural characteristics of the local area.

- Buildings should be sited and designed to minimise cuts and fills.

- Construction should minimise vegetation removal. On sparse or barren sites, vegetation should be planted to complement and reduce impacts of buildings, towers or recreation facilities.

- Reservoirs should be located in natural drainages and minimise the amount of cuts and fills required.

- Earthworks created in reservoir construction should be appropriately rounded and groomed into a gradient found commonly in the surrounding landscape.

- The colour and texture of dam walls should blend with and complement those of the surrounding landscape.

- Trees should be removed from within the reservoir highwater line to avoid dead trunks. The vegetative clearing line should undulate and reflect natural forms and lines in the landscape. Edge feathering techniques should be employed.

- Topsoil removed during construction of spot developments should be stockpiled and replaced in selected areas to allow more effective revegetation.

- Reservoir spillways and water outlets should incorporate natural rocks and vegetation to improve the visual transition from the dam wall to the natural streamline.

- Observation towers should be built at the lowest possible height necessary without removing adjacent vegetation.

- Towers should borrow from natural forms in the design of support structures and utilise harmonious natural colours and non-reflective glass and metal.

- Developed recreation areas should incorporate appropriate forms, lines, colours, textures and scales in the construction of buildings, roads, signs and car parks.

- Car parks should be designed to minimise earthworks, colour contrast in the graded or paved parking area, and the expanse of cleared and graded areas.

- Car parks should integrate existing or introduced vegetation, waterforms, rockforms or moundings into the parking areas to break up the unnatural expanse.

- Sand and gravel extraction proposals should have comprehensive development plans prepared prior to initial entry. Plans should evaluate potential visual impacts following each removal period and include complete rehabitation procedures.

- Quarry sites should be kept as small as possible while allowing efficient movement of equipment.

- Storm water runoff should be confined within the mined area.

- Movement of heavy machinery should be subject to dieback hygiene procudures.

- Rehabilitation of extraction project sites should be ongoing as each stage of development is completed. Embankments should be battered, stockpiled topsoil spread over disturbed areas, compacted areas scarified and appropriate vegetation completed.