

Management Decision Classification: A system for zoning land managed by Forestry Tasmania

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Abstract

The Management Decision Classification (MDC) is a land classification system used by Forestry Tasmania in the management of 1.5 million hectares of State forest. Under the system, land is divided into three Primary Zones (Production, Conditional and Protection) according to its availability for wood production. Where appropriate, one or more of 18 Special Management Zones (SMZs) can be defined to reflect additional management requirements for special values and uses. These SMZs can include, for example, areas of high flora or fauna values such as threatened species habitat. The MDC system was developed to protect special values where they are known to occur, and to modify operations where necessary to minimise the impact on non-wood values while still producing forest products. The system offers significant opportunities for the successful management of conservation values. The MDC zones are stored on a geographic information system which enables integration with other planning systems.

Tasmania's forest areas and tenure

The Tasmanian Regional Forest Agreement (RFA) was signed between the Federal and State Governments in November 1997 (Commonwealth of Australia and State of Tasmania 1997). One of the many outcomes of

this Agreement was the proposed reservation of an additional 268 700 ha of forests (396 000 ha of land). The reservation of these areas arose out of a Comprehensive Regional Assessment of Tasmania's forests. This was a large set of studies into many aspects of forests, including biodiversity, wilderness and oldgrowth values. The area figures used here reflect the anticipated situation following the formal implementation of these proposed new reserves.

Almost half of Tasmania (3.3 million hectares) is covered by forest. Forestry Tasmania manages about 40% of these forests as State forests or Forest Reserves. The Department of Primary Industry, Water and Environment manages about 30%, primarily in conservation reserves. Private forests make up almost one-third of Tasmania's forests (see Table 1). A total of 39% of Tasmania's forests will be contained within formal or informal reserves following the implementation of the RFA.

Of the land managed by Forestry Tasmania, 12% is protected in Forest Reserves and 11% (10% of forests) is not available for wood production due to informal RFA reserves and the application of the zoning system described in this paper.

Approximately another 11% of this land area is excluded from harvesting by the Forest Practices Code (Forestry Commission 1993) and a further 22% is currently excluded from coupes because of other constraints such as accessibility and the availability of merchantable timber.

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Optimising the management of State forest

The *Forestry Act 1920* and subsequent amendments set out the objectives of Forestry Tasmania:

As a manager of forest land with a commitment to multiple use, the objectives of the corporation are to optimise –

- (a) the economic returns from its wood production activities; and*
- (b) the benefits to the public and the State of the non-wood values of forests.*

The Act lists the functions of the Corporation, including the conservation of flora, fauna, landforms and cultural heritage, the care of the environment including scenery, and the provision of recreational opportunities. While there is a strong emphasis on wood production and economic returns, other benefits of forests to the public are recognised, and Forestry Tasmania is given the challenging task of 'optimising' these often conflicting objectives.

Many of the non-economic values of forests, such as many conservation values, are very difficult, or arguably impossible, to express fully in dollar terms. Land managers cannot simply use an economic model to optimise all the outputs, benefits and inherent values of forests.

Another approach to optimising the management of forests is to zone them on the basis of relative values. Just as Tasmanian forests vary from tall wet eucalypt forests to sparse dry woodlands, so do economic, conservation, landscape and recreation values vary greatly across the landscape. A particular rare species, for example, may only be found in a narrow range of suitable habitats. If its habitat can be identified, then the areas where it occurs can be zoned so that they can be managed in a way consistent with the conservation of that species.

Forests undergo an ongoing process of growth and change. Associated with this are often changes in the values of that area. For

example, many species are associated with, or dependent on, particular successional stages of forests.

Not only do the values of the forests change, but society's attitude to those values is constantly evolving. Historically, forestry in Tasmania has emphasised wood production. Public perceptions about the values of forests are changing, and forest management is changing in response to this.

The Management Decision Classification (MDC) system described in this paper is the way in which Forestry Tasmania zones the land it manages in order to optimise its management and balance the competing demands on the forest estate. It is a system to record *decisions*, made by managers, based on the best available information. It is not a database for that information.

Forest management zoning in context

MDC zoning needs to be viewed in the context of a suite of legislation, policies, standards and datasets that each influence aspects of forest management. The *National Parks and Wildlife Act 1970*, *National Parks and Reserves Regulations*, *Wildlife Regulations*, *Aboriginal Relics Act 1975*, *Historic Cultural Heritage Act 1995*, *Forest Practices Act 1985* and the *Threatened Species Protection Act 1995* are Tasmanian Acts and regulations relevant to the protection of flora, fauna, features of scenic or scientific interest and historical and Aboriginal sites. Related Federal legislation includes the *Endangered Species Protection Act 1992* and the *Australian Heritage Commission Act 1975*.

The *Forest Practices Act 1985* deals specifically with setting operational standards and guidelines for best practice for forestry operations in Tasmania. This Act was passed to ensure that commercial forest operations on both Crown and private lands in Tasmania are conducted in an environmentally acceptable manner. It makes provision for the Forest Practices Code, now in its second

Table 1. Forest and land areas of Tasmania by land manager (post-RFA). (Figures are derived from Forestry Tasmania's Geographic Information System and are subject to review following the finalisation of RFA boundaries and tenures.)

Land manager	Area ('000 ha)		
	Forested	Non-forested	Total
Public land			
Forestry Tasmania	1322	197	1519
Department of Environment and Land Management	782	1229	2011
Hydro-Electric Corporation	4	55	59
Commonwealth Government	55	187	242
RFA reserves for which final tenure is as yet unresolved	160	116	276
Private property	1035	1654	2689
Total area	3358	3438	6796

(1993) edition. The Code addresses the protection of water quality, soils and forest productivity and sets out minimum standards for forest operations. It includes safeguards for the conservation of flora, fauna, cultural heritage, landscape and geomorphology values.

Under the *Forest Practices Act 1985*, Timber Harvesting Plans must be drawn up for commercial forest harvesting operations before they are allowed to proceed. These plans incorporate prescriptions from the Forest Practices Code as required and must be assessed and approved by a qualified and accredited Forest Practices Officer on behalf of the independent Forest Practices Board.

Forest Practices Officers have responsibility for ensuring adherence to the Forest Practices Code. This includes a requirement to contact the appropriate specialist (botanist, zoologist, archaeologist, geomorphologist, landscape planner, soil scientist) from the Forest Practices Unit if particular indicators of conservation values are present on a proposed coupe.

MDC zones reflect additional broader forest management objectives and hence can place additional constraints on forest operations to those operational requirements set out in the Forest Practices Code.

A major influence on Tasmanian forest management is the Regional Forest Agreement. This identifies an expanded and representative reserve system but also deals with many issues in relation to forests used for wood production. For example, it identifies vegetation communities that are to be protected as they are encountered within production forests. It sets out a range of agreed measures for protecting other forest values in production forests and for continuous improvement of ecologically sustainable forest management processes. MDC zoning is an integral part of these measures but also deals with issues beyond the scope of the RFA.

Zoning enables areas with particular values to be identified and appropriate management prescriptions put in place to ensure protection, maintenance and/or enhancement of these values. The MDC zoning system modifies or excludes forest operations where this is necessary to protect identified special values. It also aims to document the basis on which zoning decisions have been made and provide guidelines for managing each zone.

Information sources used in MDC zoning

MDC zoning is used to integrate and provide an interpretation of many sources of

information to enable effective management. Among these are extensive flora, fauna, geoconservation, Aboriginal, historical, and forest disease databases. Each of these datasets was further developed during the Comprehensive Regional Assessment process and are described within the Tasmanian RFA (Commonwealth of Australia and State of Tasmania 1997). They are maintained by and shared between data custodians, including Forestry Tasmania and the Tasmanian Parks and Wildlife Service.

Conservation datasets are overlaid with many other data sources in the formulation of MDC zones. These include land-tenure boundaries, vegetation, slope and landscape mapping, and information regarding the distribution of power lines, water intakes, apiary sites, existing plantations and other forest uses such as leases. Almost all such data sources are now available electronically and can be overlaid using Forestry Tasmania's Geographic Information System.

Forestry Tasmania's field-based planners have also accumulated a wide range of knowledge and experience covering many aspects of their Districts. This is sometimes part of District records but may not be formally recorded anywhere. Information may also be held by specialist scientists (e.g. in the Forest Practices Unit, Parks and Wildlife Service, or University of Tasmania) that may not be known to the District planners. In addition, there is a large pool of local knowledge from groups or individuals in the community that can be overlooked in the absence of a systematic means for its documentation.

Central to the task of zoning is the judgment of what represents a sufficiently significant natural feature to warrant protection, and what represents adequate protection. Numerous publications and specialist manuals dealing with non-wood inventory and other aspects of forest management are available from Forestry Tasmania, Tasmania's Forest Practices Unit and other sources (e.g. Duncan and Johnson 1995; Taylor 1991; Kiernan 1990; McConnell 1991, 1995; Forest Practices Board,

Tasmania 1998; Public Land Use Commission 1996-7; Commonwealth of Australia and State of Tasmania 1997). These provide a basis upon which such judgments can be based.

In relation to flora and fauna values, for example, studies including those contributing to the RFA allow the conservation status of many species to be assessed with reasonable confidence. Schedules listing species considered threatened or endangered form part of the above-mentioned State and Federal legislation. Special values need to be evaluated and prioritised, not simply on their importance but also on their sensitivity to various forms of disturbance. For example, a threatened plant species that responds positively to disturbance may not attract the protection afforded a similarly listed but less robust species.

From this complex and continually increasing store of information, it is necessary to derive management decisions that are consistent, transparent and accountable. Consistency is required between forest planners and across the State. Transparency and accountability require a zoning system that is systematic and is accessible for independent review.

Management Decision Classification system

Forestry Tasmania's MDC system identifies two levels of zoning (Figure 1).

1. PRIMARY ZONES

The Primary Zones classify the land managed by Forestry Tasmania according to its availability for wood production. All land is placed in one of three Primary Zones that define whether the land is primarily managed for production or protection, or whether it falls into an intermediate conditional category. These Primary Zones are described below.

Protection Zone

The Protection Zone incorporates land that has been set aside from wood production for

the protection of one or more special values. It includes areas of forest and non-forest where maintenance of identified special values is incompatible with wood production, even under modified management practices (see Special Management Zones described on page 6). The inclusion of land in the Protection Zone does not preclude the removal of small quantities of timber under special circumstances such as approved research or salvage operations, provided this can be done without significantly affecting the special values being protected. Salvage may include, for example, the removal of trees felled during the construction of roads or visitor facilities but does not include harvest of trees following wildfires. Inclusion in this zone also does not, in itself, preclude mineral exploration and mining.

Land in the Protection Zone includes almost all Forest Reserves and other areas with special values such as the habitats of certain endangered species (e.g. buffers around known wedge-tailed eagle nests). Wildlife habitat strips (Taylor 1991) are also included. In most cases it does not include areas excluded from harvest solely on the basis of steepness or economics.

Areas within the Protection Zone have the appropriate Special Management Zone code(s) (see page 6) ascribed to them to assist in identifying why the area is being protected.

Conditional Zone

This zone is a temporary category comprising land for which no long-term decision on its future use has been made. At some future time, land in this category will be re-allocated to either the Protection or Production Zone. Timber harvesting is not permitted in the Conditional Zone (except for approved salvage or research reasons) pending review and re-allocation to long-term use.

Prior to the RFA, the Conditional Zone included large areas where a decision to harvest had been deferred until after 2001 to allow further scientific study (FFIC 1990).

MANAGEMENT DECISION CLASSIFICATION ZONES		
PRIMARY ZONES (current % of State forest)		
Protection (22)	Conditional (1)	Production (77)
SPECIAL MANAGEMENT ZONES (current % of State forest)		
<i>Agricultural activity</i>		< 1
<i>Apiary (bee-keeping)</i>		3
<i>Cultural heritage</i>		2
<i>Forest health</i>		< 1
<i>Fauna</i>		8
<i>Flora</i>		9
<i>Fuel management</i>		3
<i>Geomorphic hazard</i>		6
<i>Geomorphological feature</i>		7
<i>Landscape</i>		13
<i>Recreation/education</i>		3
<i>Research</i>		< 1
<i>Utility</i>		1
<i>Water supply</i>		1
<i>Plantation</i>		4
<i>Intensive silviculture</i>		< 1
<i>Long rotation wood production</i>		< 1
<i>Special timbers production areas</i>		4

Figure 1. Management Decision Classification Zones. The standard abbreviation of each Special Management Zone is in italics.

The RFA resolved the allocation of almost all deferred forests to reserves or wood production forest.

With the resolution of deferred forests, the Conditional Zone is restricted to small areas defined as 'conditional forest'. These are areas for which there is perceived to be

a potential operational problem associated with harvesting or regeneration that currently precludes such activities. Conditional forests are excluded from timber harvesting until research resolves the problem or the area is placed in the Protection Zone.

Production Zone

The Production Zone includes native forest and plantation areas available for wood production. However, not all forests in the Production Zone will be harvested.

Harvesting within the Production Zone must comply with the Forest Practices Code. One or more of the Special Management Zones described below may apply to an area within the Production Zone. Any modified harvest practices required to maintain and protect identified special values within the Production Zone are detailed in the Timber Harvesting Plan prepared for that operation.

2. SPECIAL MANAGEMENT ZONES

Special Management Zones (SMZs) form the second tier of the MDC system. These identify where particular emphasis beyond that given by the Primary Zones is to be placed on management for particular special values.

Eighteen categories of SMZs that are currently in use are described below, with their standard abbreviation in italics and their map code given in brackets:

Agricultural activity (Ag): Land on which the grazing of domestic stock or other agricultural cropping is a priority for management.

Apiary (Ap): Native forest areas identified to have high value for nectar production and selected to be managed for maintenance of the nectar supply (Forestry Tasmania 1994). These are primarily forests rich in leatherwood (*Eucryphia lucida*).

Cultural heritage (Cu): Aboriginal and historic sites that require recognition and protection

additional to normal management practices. Where protection of cultural sites is best afforded by confidentiality (or confidentiality is required by legislation), Cultural SMZs are not marked on MDC maps available to the public.

Forest health (He): Land requiring special management due to either the known presence of particular forest diseases or the presence of flora values considered particularly susceptible to, or threatened by, the introduction of a pathogen-causing disease (Barker 1994).

Fauna (Fa): Areas for which the management of fauna values is of particular importance. This zone includes selected habitat areas containing rare or threatened animal species, Wildlife Habitat Strips and Wildlife Priority Areas (Taylor 1991).

Flora (Fl): Areas for which the management of flora values is of particular importance. This zone includes locations of rare or threatened plant species or communities and areas set aside for the regional conservation of flora (Duncan and Johnson 1995) or to protect oldgrowth forests.

Fuel management (Fu): Land managed primarily for strategic fire protection purposes. Generally this includes strips of land adjacent to towns, plantations and other high-value assets or large areas of button-grass moorland adjacent to native forest on which fuel management is the primary objective. Timber harvesting and other forest operations may be modified in this zone to achieve the fire protection objective.

Geomorphic hazard (Hz): Land that poses a specific geomorphic hazard such as a high level of susceptibility to landslip, soil erosion, cave-ins, flood or accentuated drought stress and on which the priority for management is to protect against such events. More details of these processes and the soils or landforms to which they apply can be found in Kiernan (1990), Brown and Laffan (1993) and Grant *et al.* (1995).

Geomorphological feature (Ge): Landform features of significance that require recognition and protection above that afforded by normal management practices. It also includes Geomorphic Priority Areas (Kiernan 1990).

Landscape (Ls): Land on which a priority for management is the protection of landscape values. This generally includes areas assigned an Inevitable Landscape Management Objective using Forestry Tasmania's Visual Management System (Chetwynd and Horning 1990).

Recreation/education (Rc): Land for which recreation or education is identified (or earmarked) as a priority use.

Research (Rs): Areas where research trials or projects (but not routine forest inventory plots) are located and in which the Primary Zone or another SMZ do not already provide the management they require.

Utility (Ut): Land set aside as easements for power, water, telecommunications, railways and for major public roads. Areas set aside for gravel pits greater than 0.1 ha, mines, quarries, rubbish tips and other similar impact activities are also included.

Water supply (Wa): Areas for which measures additional to those of the Forest Practices Code are required to protect a stream, water storage or water intake or supply facilities.

In addition to the above SMZs, there are several others that are specific to the Production Zone:

Plantation (Pl): Land currently managed as an indigenous or introduced species plantation.

Intensive silviculture (In): Native forest managed intensively to accelerate timber production. The nominal rotation length may be less than 85 years and silvicultural operations such as thinning, pruning or fertilising may be carried out.

Long rotation wood production (Lo): Native forest set aside for wood production on a nominal rotation length greater than 110 years. This includes the Tall Tree Management Zones.

Special timbers production areas (St): Areas having high proportions of special species timbers (non-eucalypt native species) where a decision has been made to manage for high quality timber production from these species. This zone includes areas designated as Special Timber Management Units and other special species timber supply areas (apart from blackwood and silver wattle).

Additional categories of SMZ will be implemented and categories removed from use as needed in the future.

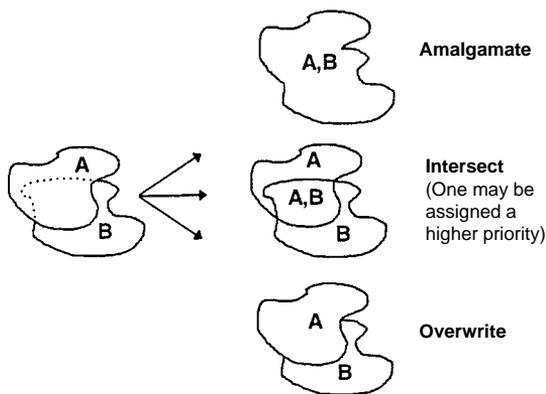
Due to the diversity and independence of the special values covered by SMZs, they often overlap. In many cases, it is possible to integrate the conservation requirements for some or all of these special values where they have similar implications for management. This allows mapping either as a single zone or as one zone overwriting another (Figure 2). The greatest level of information is retained by creating a new zone representing the overlap or intersection of the individual values. The MDC system accommodates this by allowing for multiple, prioritised SMZs. In this way it is possible to indicate for a specific area which special values are of greater management importance.

Implementation of MDC mapping

Given the great diversity of situations encountered when undertaking zoning, it is not possible to be totally prescriptive with a methodology. Subjective value judgments will inevitably be involved. However, there is a need for a systematic, consistent and transparent approach to zoning. A revised MDC manual planned for release in 1999 will formally document this zoning methodology. Key aspects of this methodology are discussed here.

Special values

Zoning solutions



derive from regional analyses conducted by specialists from the Forest Practices Unit (Taylor 1991). The boundaries of these areas may be amended where this will improve operational boundaries or reduce impacts on wood production while maintaining the value being protected. Landscape SMZs are derived from a separate zoning process as documented in Chetwynd and Horning (1990). These can be one of the hardest forms of SMZ to delineate as they often represent subjective individual preferences and because, for society as a whole, these preferences change over time.

Figure 2. Zoning of coincident special values.

Criteria used in delineation of zones

A broad hierarchy of steps used when zoning includes the following:

- Where legislative requirements can be translated into specific zoning decisions, then these must be met. For example, with two exceptions, Forest Reserves are in the Protection Zone (the exceptions relate to an area of remnant plantation and a public 'demonstration forest').
- The RFA identifies a range of Formal and Informal Reserves that must be protected as prescribed. There are a range of other RFA commitments that also need to be incorporated into MDC. The boundaries of some of these RFA values are not precisely specified and require interpretation.
- Accepted standards prescribed by the Forest Practices Code or by agreed reference documents guide the management of a range of conservation values. For example, a wedge-tailed eagle's nest entails a reserve of particular shape and minimum size of 10 ha, with a further buffer zone in which forest operations may not occur during the breeding season. Wildlife habitat strips are features within the Protection Zone that
- A strong principle in MDC zoning is to preferentially protect areas that meet multiple conservation objectives. For example, if there were a requirement to exclude 20% of a vegetation type from wood production, then areas that have other values requiring protection will preferentially be used to meet this requirement.
- A further issue facing the forest planner is how to zone values that may be discontinuous or have indeterminate boundaries. For example, the endangered swift parrot relies on blue gum (*Eucalyptus globulus*) as a food source. Typically, scattered patches of forest with high densities of this eucalypt species can be surrounded by forest with increasing proportions of other eucalypts. The width of buffers required to protect various special values also needs to be considered. For example, a difficult aspect of heritage management is deciding the extent of an area that needs to be specially managed to protect the significant values of a place. In instances such as these, recommendations of the Forest Practices Unit are given substantial weight. The ultimate decision lies with the District Forester as the manager of that area and is based on the balance of all values: environmental, social and economic.
- Geomorphic hazard and water supply SMZs are among the more difficult SMZs

to delineate. A review currently underway into the soil and water provisions of the Forest Practices Code should assist in further refining guidelines for these SMZs.

- Agricultural, Fuel, Research, Utility and Special Timbers SMZs are relatively straightforward to identify. The boundaries of Apiary SMZs can also be identified in that they normally follow the boundaries of leatherwood (*Eucryphia lucida*) stands. Not all leatherwood stands are included in Apiary SMZs so ranking of the relative importance of these areas for honey production has been required, in consultation with the Tasmanian Beekeepers Association.
- Plantation SMZs indicate the location of existing plantations but do not show areas proposed for plantation development. This is because of the rapid changes and uncertainties that currently apply to the identification of plantation sites and the potential for any zoning of these areas to date rapidly. Forestry Tasmania's annually updated and publicly available Three Year Wood Production Plan identifies those areas proposed for plantation establishment in the coming three years. District offices can provide the most up-to-date information regarding proposed plantations.
- As an additional constraint, zone boundaries chosen to protect special values should also take account of operational requirements. For example, cable harvesting and regeneration burning place constraints on coupe shapes and boundary locations. With forward planning, MDC Primary Zones and optimal coupe boundaries can be aligned to the benefit of both. By optimising MDC boundaries in relation to roading requirements, it is also possible to reduce the need to road through the Protection Zone.

Consultation and approval process

MDC maps are available for public inspection and comment in Forestry Tasmania's District

offices. Opportunities for the public to review these maps form part of the public consultation and comment process during the preparation and annual review of District Forest Management Plans. Simplified versions of this mapping are also published within the Forest Management Plans.

Scientists from the Forest Practices Unit are consulted during the preparation of MDC mapping. Other external specialists may also be consulted if the relevant area of expertise is not held within Forestry Tasmania or the Forest Practices Unit. Following an internal review process, the Manager of the Planning Branch at Forestry Tasmania is ultimately responsible for approval of the maps.

MDC maps are working documents under continuous review and improvement as new information becomes available. They are reviewed annually by Forestry Tasmania's District Foresters and field planners. Any changes to MDC zoning that further constrains timber harvesting activities require the approval of the District Forester. Changes to the maps that ease restrictions on timber harvesting activities also require approval of the Manager of the Planning Branch at Forestry Tasmania. A publicly available record is kept in Forestry Tasmania's Head Office of all changes that ease restrictions on timber harvesting and the reasons for them. Following the signing of the RFA, an additional review process is required to ensure that MDC changes do not compromise agreed protection levels of RFA values. Any changes will be reviewed externally as part of the five-yearly review of the RFA.

Strategic and across-tenure planning

The MDC system's greatest strength has been the bottom-up planning based on the local knowledge and experience of District planners. The initial strategic focus of the system has become increasingly site-based and operational. With the completion of the RFA, there is a need for MDC zoning to better address issues such as biodiversity conservation across regions and landscapes. For example, the RFA sets regional limits on

conversion of native forest to plantation. Forestry Tasmania's use of MDC is evolving to better address these regional conservation issues. The need for improved continuity of management zoning across tenures, including those managed by the Parks and Wildlife Service, Forestry Tasmania and local government, is also being recognised.

A dynamic system

The MDC system can only include information on known values. The absence of a recorded special value is not necessarily evidence it is not present in a particular location. Pre-harvest coupe surveys regularly identify additional special values that lead to amendments to MDC zones.

At a more strategic level, Forestry Tasmania actively supports broader surveys and research into improved forest management. Predictive modelling can also assist in the identification of special values such as threatened species and cultural sites (e.g. McConnell 1995).

MDC is also dynamic in that it records variations in management practice arising from changes in public values in relation to forest management and changes that occur to forests over time.

Annotation and prescriptions

The presence of a SMZ often does not identify the specific value present (e.g. the particular threatened species) and how it should be managed. This has been dealt with, in part, by attaching descriptive paper notes to copies of individual MDC mapsheets. Corporate knowledge is at risk of being lost or overlooked, however, as the planner responsible for particular zoning decisions moves on or simply forgets the basis for decisions made in years past. The lack of systematic explanations for zoning decisions also detracts from the transparency of the system. For example, it is more difficult for the public to comment on MDC mapping when the basis of that mapping is not accessible.

Since the inception of the MDC system, it has been the intention that annotations and prescriptions eventually be electronically available for each SMZ. This is in the process of being implemented. It will allow forest planners to more fully describe special values and to select default prescriptions or tailor prescriptions to that specific site.

For many threatened species, a comprehensive set of management prescriptions to suit various situations and assessments of sensitivity to various forms of disturbance are not yet available. Specialists from the Forest Practices Unit and the Parks and Wildlife Service are developing a decision support tool that will incrementally provide this. The MDC database will include, or will provide pointers to, the prescriptions in this system.

In accordance with an RFA commitment, Forestry Tasmania will publish a revised manual for the MDC system in 1999. This will include prescription guidelines for SMZs.

Use of the MDC system

The MDC system dates back to 1990, with map production beginning in 1991. By mid 1993, all the land for which Forestry Tasmania had a management responsibility (some 1 860 000 ha) had been mapped. This comprised all State forest but also included some other areas. Within this area, over 14 000 MDC zones have been designated, with an average zone size of around 130 ha. The proportion of this area encompassed within each category of SMZ is shown in Figure 1.

Data capture has occurred at a scale of 1:25 000. These data are stored using Forestry Tasmania's ARC/INFO Geographic Information System (GIS). The GIS storage of MDC data enables integration with other spatial data for querying and other planning purposes.

While the purpose of MDC mapping is ultimately to ensure consideration and protection of special values, there are also some specific long-term strategic and short-

term operational uses of this system as outlined below.

RFA informal reserves

The RFA recognises that areas requiring reservation under the Agreement that are too small or dispersed to be effectively managed in formal gazetted reserves are appropriately recognised and protected under the MDC system.

Management plans

Forestry Tasmania prepares Forest Management Plans for each of its seven Districts at a nominal 10-year interval. Maps within these Plans delineate MDC Primary Zones. Poster-scale maps produced in conjunction with these Plans also broadly identify SMZs within the Production Zone.

The MDC system provides opportunities for meaningful public participation during the development of Management Plans. MDC zoning assists the public understanding of what values occur where and, thus, why forests are managed in certain ways. The public can then comment as part of the management planning process.

Sustainable yield calculation

MDC mapping is an important component in many strategic planning tasks. Primary Zones provide a framework for planning the provisional boundaries of coupes. Forest-type mapping, inventory information and forest growth models are then used to optimise harvest schedules and predict wood yields from these indicative coupes. In this way, MDC is a necessary component in sustainable yield calculation for State forest.

Strategic land-use analysis

Forestry Tasmania conducts a range of routine and once-off analyses to derive statistical and other information regarding land use. These are essential for strategic planning and public reporting and contribute

to studies such as those conducted as part of the Comprehensive Regional Assessment and the RFA. MDC zoning is frequently a component of such analyses.

Timber Harvesting Plans

District staff routinely use MDC mapping to assist in forest management. An example of MDC mapping is provided in Figure 3. This mapping is used both as 1:25 000 mapsheets and via interactive GIS mapping tools. District staff can generate on-screen and paper maps at a range of scales that show, for example, MDC mapping overlain by all available conservation records. One of the most important uses of this information is as source maps for the production of Timber Harvesting Plans (THPs). For example, the THP map shown in Figure 4 for coupe WT011C delineates areas protected from harvesting. These areas include a wildlife habitat strip and SMZs that were previously planned and recorded on the MDC map shown in Figure 3. The relationship between the two maps is shown diagrammatically in Figures 3 and 4.

Conclusion

The Management Decision Classification system has been developed as a tool to assist in meeting the challenges of managing a diverse, dynamic forest estate for multiple-uses and a variety of values. It is one of a range of systems used by Forestry Tasmania in the sustainable management of State forest.

The MDC system provides a mechanism for the community to gain an overview of the purpose for which State forests are being managed and to have input into the decision-making process. It is also important as a synthesis of land management decisions for use in strategic and operational planning.

Implementation of the MDC system has required a major commitment from Forestry Tasmania's field planners. Undoubtedly, it will continue to evolve to meet the changing needs of forest management.

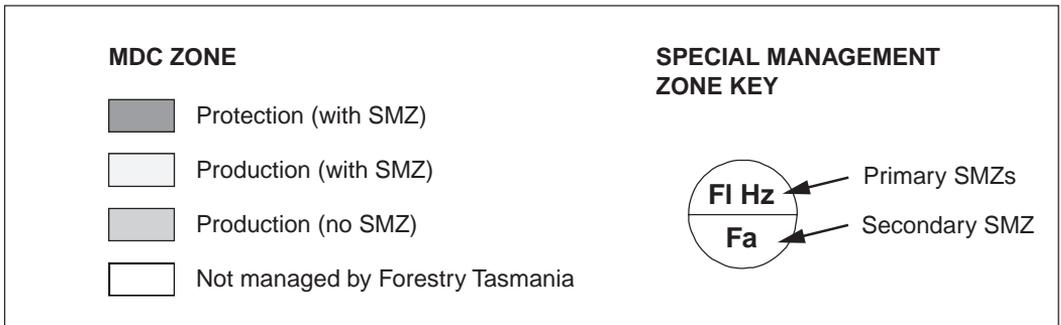
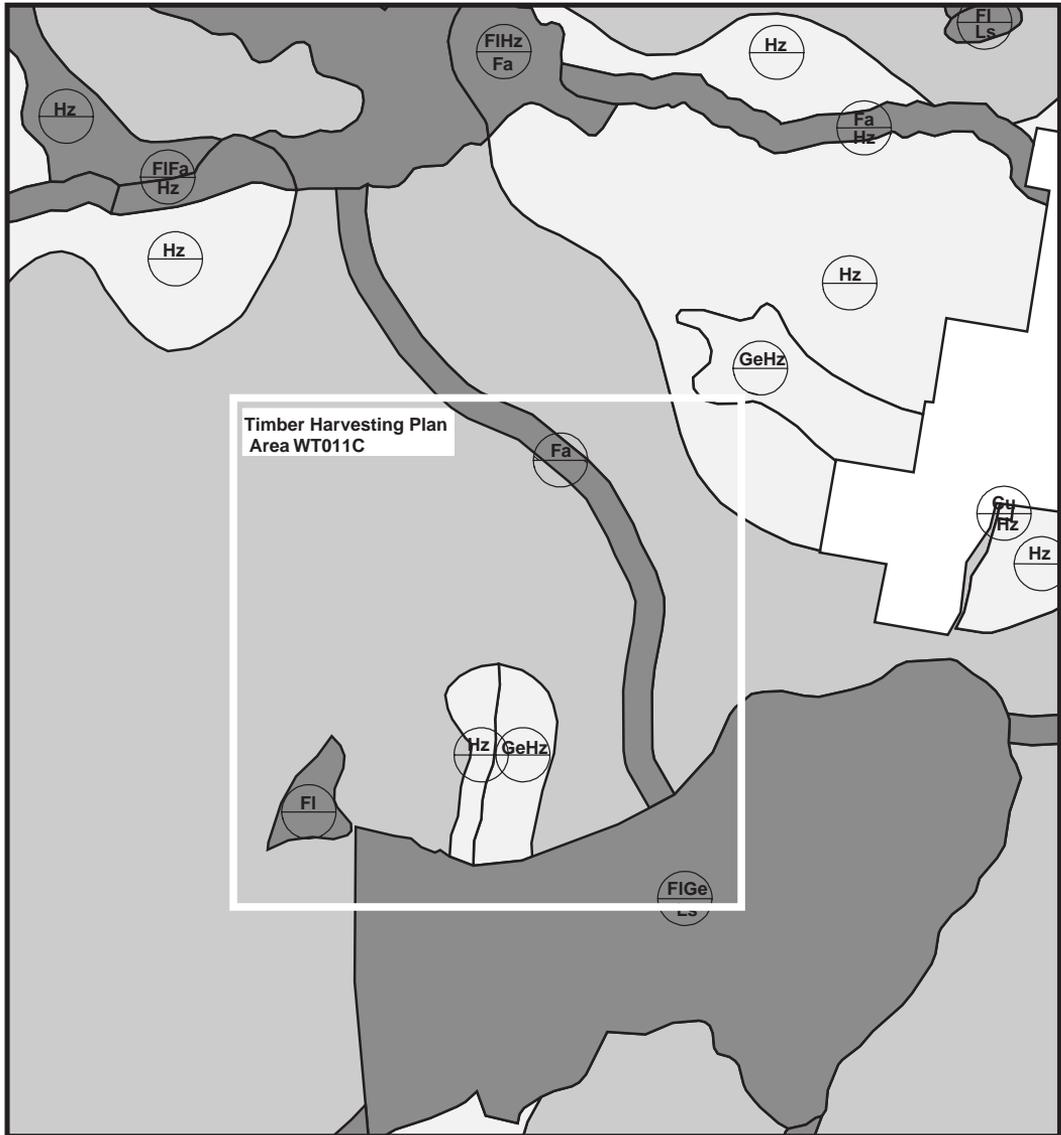


Figure 3. Extract of MDC mapping from Wielangta State forest on the east coast of Tasmania, showing some Primary and Special Management Zones (for illustrative purposes only). This extract of MDC mapping includes areas requiring management for wildlife habitat strips (Fa), areas prone to landslides (Hz), an historical site (Cu), rainforest areas of particular conservation importance (FI), areas with high landscape values (Ls) and sandstone outcrops important for geoconservation (Ge).

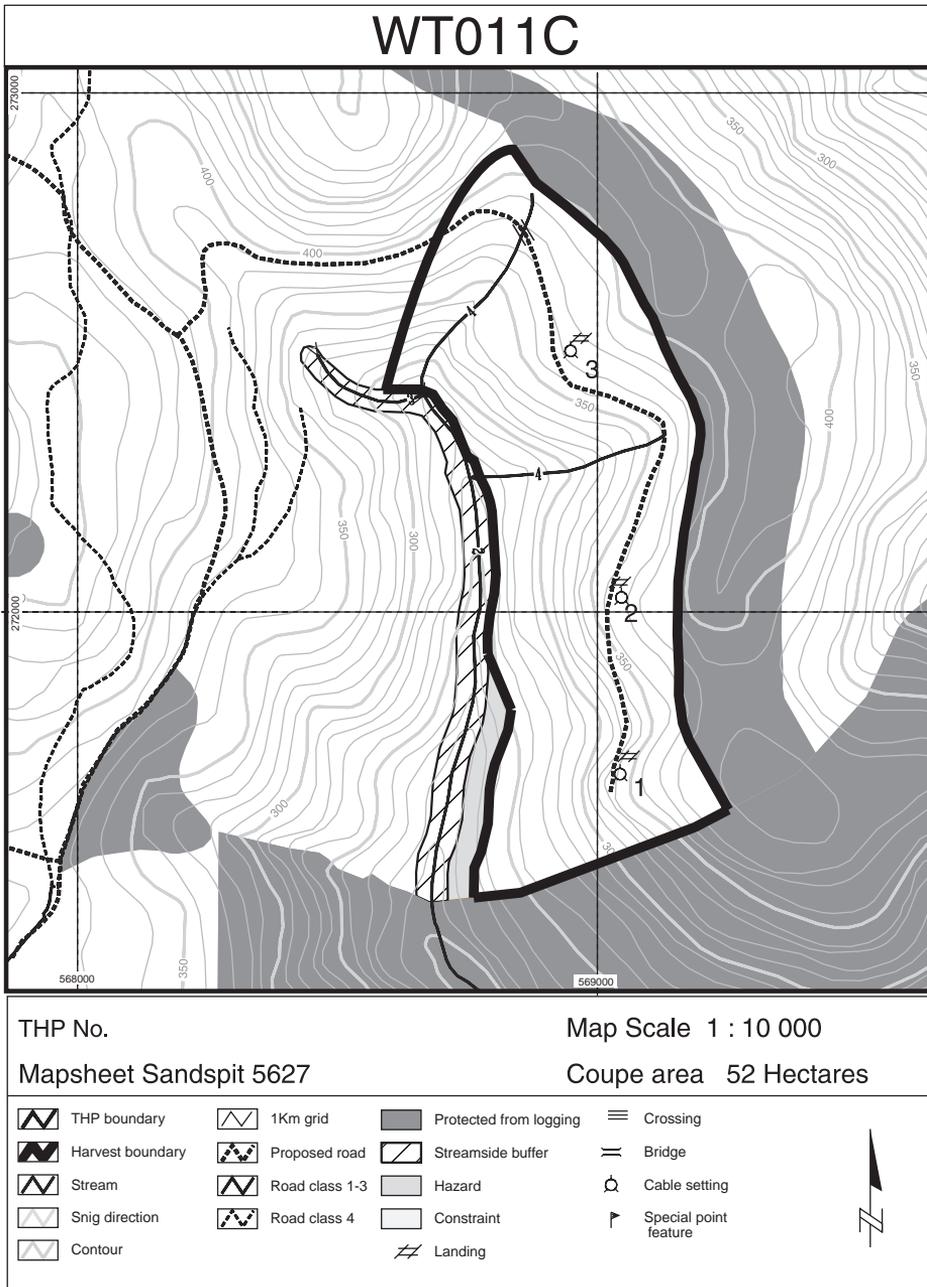


Figure 4. An example of a map from the Timber Harvesting Plan for coupe WT011C within the Wielangta State forest, that draws on the MDC mapping in Figure 3 (for illustrative purposes only).

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