

INTRODUCTION TO ENVIROMARK, A SYSTEM FOR MANAGING ROADSIDE AND CORRIDOR VEGETATION



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INTRODUCTION

Greening Australia Tasmania has developed an integrated environmental management system for mapping, marking and managing significant environments. Called Enviromark, it can help organisations to observe their responsibilities under threatened species legislation, weed management legislation and local and regional natural resource management strategies. Enviromark is designed for managing significant issues along corridors, such as road reserves, railways or under powerlines. However, it can be applied to broader areas. Enviromark has applications wherever significant natural areas are at risk of accidental damage or weeds are being spread during routine infrastructure maintenance.

Identifying locations of significant natural features, such as threatened species and problem weeds, and providing information on their management, are critical for sustainable environmental management. Communicating good information to those responsible for the management and maintenance of corridors is a challenge, especially where multiple organisations manage one area. Despite our best efforts with maps and management plans, damage to natural assets still occurs. Enviromark is a system specifically designed to address these problems.

Enviromark's power lies in an ability to translate management plans, strategies and maps into actions on the ground, so that works crews know where and how to change their operations to manage significant issues. Enviromark can communicate relevant information across multiple managers and stakeholders.

Enviromark uses field markers to mark significant areas on the ground and through easily recognised symbols and colours the markers also identify the issue being managed, for example weeds or threatened species. Each field marker code refers to a particular specification sheet, with the same symbols and code, which is designed to be carried in vehicle glove boxes. The specification sheets set out how activities such as slashing, grading and construction are to be modified to avoid damage to significant areas or prevent weeds being spread into new areas. Enviromark also includes a mapping database which holds inventory information on marked areas and their management and can be used to generate road-map reports. It can also be used for monitoring the condition of significant areas. An Enviromark user guide explains the implementation of the system and training is provided in the use of the system.

The system can be taken up to manage a priority issue and potentially expanded depending on the priorities and resources of the user. Enviromark can complement existing asset management systems or it can be used as a complete stand-alone system.

Greening Australia is delivering Enviromark as a national system standardised across administrative and organisational boundaries. Those using the system will be able to recognise it and respond consistently wherever they are working.

IDENTIFYING SIGNIFICANT ENVIRONMENTS

The land or infrastructure management organisation needs to decide what issues and which areas they wish to manage. This will depend on resources, priorities and obligations, and on the level of information existing on corridor values or the availability of specialist mapping. Different corridor areas can be significant for a variety of reasons.

Areas on roadsides and other service corridors can be significant for a variety of reasons. Sometimes they comprise the only original vegetation left in an area, or they contain threatened species, uncommon communities, regionally important vegetation or habitats, or important local genetic material. In Tasmania, threatened animal species such as the Eastern Barred Bandicoot and Swift Parrot use roadside vegetation. There also many species of rare plant found along roadsides and railways. Several plant species rely on road reserves for their continued survival. In some cases corridor areas may appear quite degraded and not likely to contain biological values. However, some rare plants *only* occur in disturbed areas.

Roads and service corridors form networks across the landscape, making them important as corridors for the movement of wildlife and the natural spread of plants. Corridors allow populations to interbreed to maintain the health of gene pools. Corridors also allow species to move away from a disaster area, such as a wildfire and to repopulate areas after such an event.

The aesthetic value of roadsides is also important, with the character of particular roads being familiar and important to local communities. Many roadsides are particularly attractive at certain times of the year with displays of wildflowers or colourful foliage.

While roadsides contain valuable environments, they are also easy places for weeds and other pest species to establish. They are subjected to unusually high numbers of pest species propagules due to passing traffic. Regular disturbance then creates many opportunities for the pests to establish. Once established on roadsides, pest species can spread either naturally or unintentionally through routine disturbance.

The infrastructure along corridors requires regular maintenance and sometimes new construction, and it is during this that important environmental areas can be either degraded or destroyed. This damage comes about from a lack of awareness that an area is important or lack of knowledge of the exact location of significant values, or through a lack of information on how to maintain infrastructure in significant areas. This is understandable as it is unrealistic to expect professional road, telecommunications or electricity managers to also be botanists or weed ecologists.

One commonly used tool for managing significant roadsides is maps, often computerised via a Geographic Information System (GIS). While accurate maps are essential for land management, they often do not work for those untrained in getting access to, or interpreting them, or when multiple organisations, including for example sub-contractors, requires much copying and updating of maps. Identifying exact locations on the ground from maps can sometimes be difficult, for example without signposted and named intersections or with new, unmapped road development.

A universally recognised system of markers on roadsides can help in this situation, especially if those markers do more than just identify important locations. They should also indicate how

works should be performed in the area, either directly or in supporting information that is readily accessible.

SYSTEM OVERVIEW

To tackle the problems mentioned above, Enviromark uses an integrated set of tools, referred to as:

- Field Markers
- Specifications
- Quick Guides
- User Guide
- Training

The Field Markers identify significant locations on the ground. The field marker symbols and colours relate to issues and actions which are summarised in the Quick Guides. Standard Specifications are produced for each issue, such as a threatened species or particular weeds. These specifications detail how road management activities are to be performed in each area marked with a particular symbol. The Mapping Database holds inventory information on roadside weed infestations and their management and can be used to generate road-map reports.

THE FIELD MARKERS

Field Markers show the location on the roadside of different management areas and have links to information on the appropriate management response. Information is coded on the markers with colours, symbols and codes, as demonstrated below.

The field markers are designed to be easily recognisable by from a slow moving vehicle. Their design means that they do not distract other road users. Standard white guide posts are marked with vinyl stickers as the recommended option, although the stickers can also be attached to a semi-flexible backing which can then be attached to electricity poles, guard rails or fence posts. The diagram below (Figure 1) shows the elements of the field markers and their arrangement.

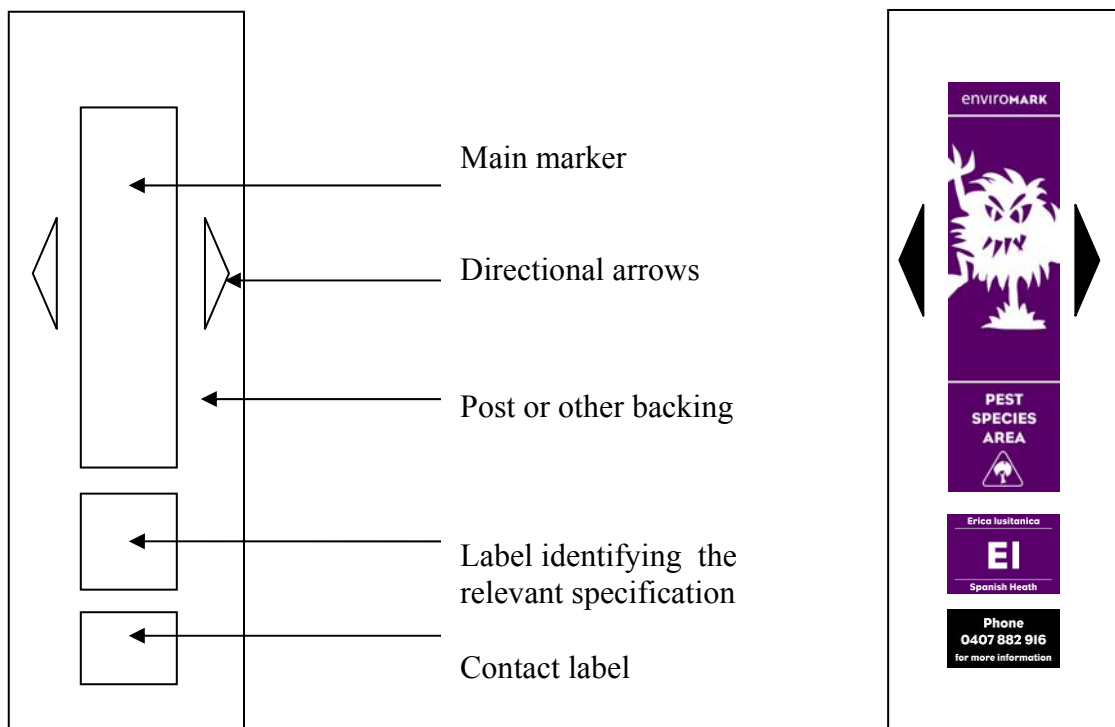


Figure 1: The elements of the field markers and their arrangement. Actual size of the main marker is 50mm X 153mm



There are a range of main markers available for different applications, described in detail in the following chapters.

Threatened Species Habitat Marker

This marker may apply to one or more species, or to a threatened community. The marker identifies areas that either are known threatened species localities or are likely to provide habitat for threatened species. Threatened species will not always occur in pristine native bushland, in fact many occur in quite degraded areas. This marker is not used to identify all threatened species within an area, only those that require special roadside management practices such as a specific slashing or mowing regime, or the retention of rocks and fallen wood near drains.

The Threatened Species Marker can only be used for species or communities that are listed, for example as rare, endangered or vulnerable, under State or Commonwealth legislation. In most cases a permit will be required for work within the marked management area, although in some cases certain road maintenance activities may be allowed without a permit. Allowable activities are listed on the relevant Specification, in the Mapping Database, and can be obtained by calling the contact telephone number on the field marker. The main marker label is shown at right, and examples of some site-identifying labels are shown below.



Blue devil, *Eryngium ovinum*, is found along roadsides in Tasmania. It is listed as vulnerable under the Tasmanian *Threatened Species Protection Act 1995*. Areas where blue devil occurs could be marked with the Threatened Species Habitat marker.

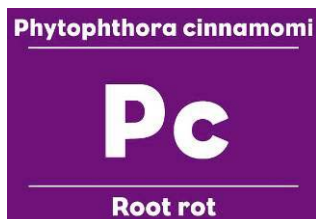
Pest Species Area Marker

Management areas marked with this symbol, at right, contain pest species of plants or animals that can be spread by common roadside management activities. It is important to note that this marker is not used to identify *all* pest plants or animals, such as all roadside weeds. This is because not all roadside pest species have a high risk of spread by roadside management activities and some species are more significant than others. These markers only identify those species and occurrences where hygiene measures are likely to reduce their spread and where the application of hygiene measures is practical.

Since Enviromark sets out a management regime for an area, it is a good idea to clump similar weeds and manage them with a single specification and site code (it is cheaper to do this also). Weeds to be clumped are those with the same management requirements, so grassy weeds could be managed together for example.

The purpose of this marker is to minimise the further spread of the pest species through routine road management activities and to direct activities to remove the pest species. To achieve this the directions for working in areas identified by this marker focus on managing the hygiene of works personnel, machinery and associated materials.

The label below the main marker refers to the specification relevant to that management area. This code on the field markers should be visible from a vehicle. The labels for the root rot fungus, grassy weeds and Chilean needle grass are shown below.



Chilean needle grass is a major pest species occurring on roadsides in Victoria, New South Wales, the ACT and found recently in South Australia, Queensland and Tasmania. Roadwork hygiene has a major influence on its spread. This species would be marked with the Pest Species Area marker.



Hygiene Area Marker

Areas marked with this symbol, at right, contain facilities or a suitable area for hygiene practices. This marker is usually used in conjunction with the Pest Species Area markers, and may be placed at the end of a series of Pest Species Area sites, to indicate where vehicles are to be cleaned before moving further. A specification sheet could specify the appropriate techniques for air blow-down, brush-down or wash-down techniques that ensure weed seeds are not transported into uninfested areas.

The consequences of the hygiene actions need to be thought through, as special equipment will need to be carried or provided, it will take longer for maintenance activities to be completed (and therefore it will be more expensive), there may be requirements for moving vehicles in a particular direction, or from clean to weedy areas, and the hygiene site must be checked regularly for weed growth.

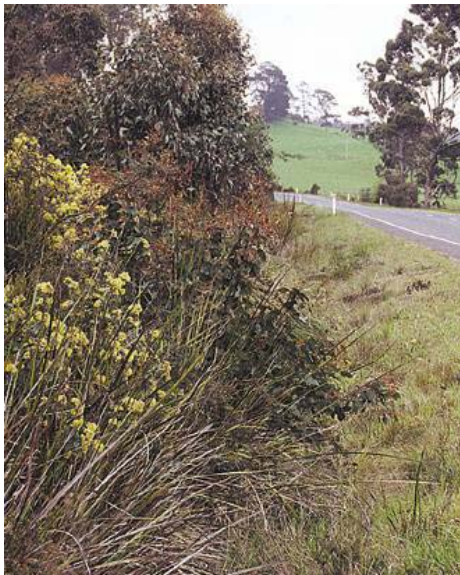
Some research has been conducted into hygiene methods and equipment, and many shires and councils have undertaken hygiene training. This marker should be used as part of the hygiene strategy for the area.



Native Habitat Marker

These markers identify areas of significant habitat for native plants and animals, or significant remnant bush or areas of value to the local community. The purpose of this marker is to protect these areas from being damaged or degraded by ongoing road management activities, by minimising the disturbances associated with roadwork. The management regime on the relevant specification would be worked out to cover the relevant threats, in consultation with the land manager(s) and adjacent land managers and local community where appropriate. The directions for management of these areas, as specified in the relevant Specification sheet, could include:

- Do not park vehicles, stockpile or dump materials within these areas.
- Do not “clean up” or remove materials such as dead vegetation, rocks and soil.
- Cut up limbs and leave on-site away from slashing areas and the roadside.
- Always revegetate after works with local species.



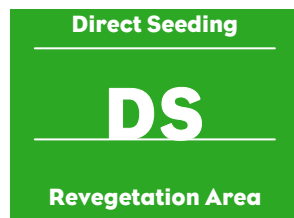
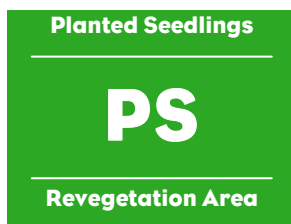
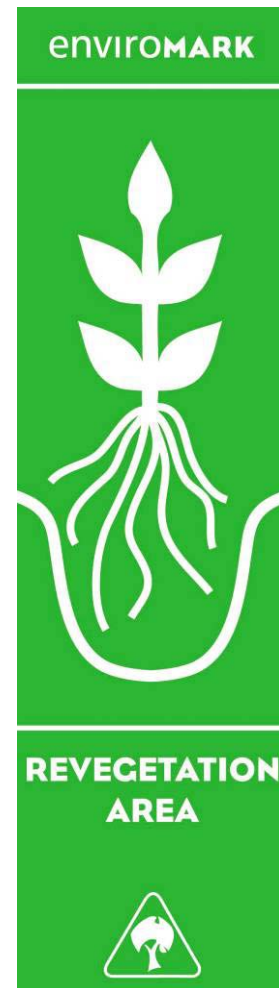
Native bush in good condition can be protected using the Native Habitat Marker.

Revegetation Area Marker

This marker identifies areas where actions have or are being taken to revegetate or rehabilitate an area. The purpose of this marker is to protect revegetation areas from accidental damage from roadworks.

Do not work in these areas unless you know the appropriate management for the area, which will be specified in the appropriate Specification.

This marker can be used by organisations such as community environmental groups to identify and protect their work. The organisation responsible for managing the area can be identified with a site identifying label with a contact number. If the managing organisation is a community group, it should draft a site guide and distribute it to, and liaise with, relevant road management organisations.



The picture left shows the revegetation marker on a roadside planting site. While obvious now, in summer the new plantings will disappear in long grass, making them vulnerable to accidental damage by slashers, herbicide or fire.

Markers for Specific Actions

Stockpile and Parking Area Marker

These markers are used to direct vehicles to appropriate parking and stockpiling areas. The markers should be used in areas that do not have pest species, threatened species or significant habitat that could be damaged by parking or stockpiling.

Actions:

- Keep to the area identified by the markers.
- Inspect the area regularly for weeds and pest species and treat them immediately.

This marker can also be used for temporary construction areas. A set zone for the movement of construction vehicle can be defined or designated using this marker. This should minimise any unnecessary damage or disturbance.



No Herbicide Marker



The purpose of this marker is to prevent damage to non-target significant species or areas. These may be in the actual marked area or in adjacent areas where translocation of the pesticide is likely due to wind or water movement.

Do not spray herbicides or pesticides in the area identified by the marker.

As well as being used to protect important herbicide sensitive species, the marker can also be used around human areas where herbicide spraying is not desirable. This may be near organic farming enterprises or adjacent to schools for example.

The capability exists with this marker to add a label that specifies the actual type of chemical that is prohibited, thereby allowing the use of other herbicides or pesticides that do not pose a risk.

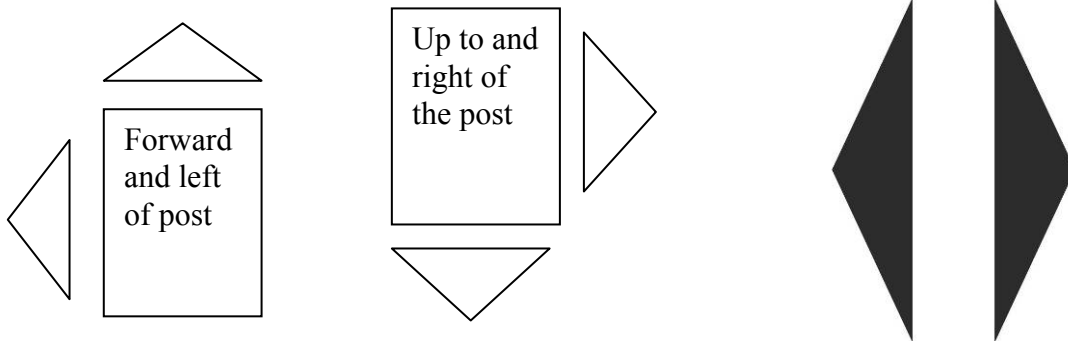
The Contact Label

The contact label (right) contains the phone number of the organisation implementing Enviromark. This provides a source of further information on the markers. The number must be one that is monitored during most working hours.



Directional Arrows

Directional arrows should be stuck on the marker posts to indicate the location, with respect to the marker post, of the management area to which the marker refers.



Safety Considerations

The placement of markers and the associated management regimes are not to compromise safety or the reasonable functioning of the road corridor at any time. The determination of management practices and placement of markers is to be done in consultation with road managers and their input is sought in making guidelines practical and safe.

THE QUICK GUIDES AND STANDARD SPECIFICATIONS

EnviroMark provides two guides to be used by workers in the field. Where many issues are to be managed Quick Guides describe how to interpret the markers and summarise the generic management response for all of the main markers. There are also Standard Specifications for each main marker which gives more detail on specific management actions for particular issues.

A standard specification is needed for each main marker issue, for example for each weed or threatened species to which a main marker refers. Standard specifications and Quick Guides are A4 so as to be easily carried or faxed on demand. Figures 2 and 3 below give examples of a threatened species and a pest species specification.

The standard specification links to the label below the main marker on the field markers. It sets out the critical hygiene requirements for a particular species or infestation. For example, when mowing in areas of Chilean needle grass, parts of the grass, including seeds, will end up on top of the mower. Hence it is essential that the machine is cleaned of plant material before leaving the site.

Figure 2: A Serrated Tussock Pest Species Area Specification

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SPECIFICATION

PEST SPECIES AREA

NASSELLA TRICHOTOMA (SERRATED TUSSOCK)

Description Serrated Tussock is a tussock forming (clumping) grass. It is easily confused with some native grasses such as silver tussock (*Poa labillardieri*). See the sheet "Identifying Serrated Tussock" for key differences. Originally from South America, Serrated Tussock is one of Australia's worst weeds, and a serious threat to agriculture.

Management Hygiene is critical. Serrated Tussock is easily spread along roadsides by moving bits of plants or soil that may contain seeds. If possible, do not enter Serrated Tussock pest species marked areas and do not move material, particularly soil, out of these areas. If you must work in these areas, follow the guidelines below:

Transport Cover loads. Deposit material at the closest suitable point. Do not move material into uninfected areas.

Disposal of Spoil Do not take spoil into weed free (unmarked) areas unless you can bury the infected soil at least 200 mm deep underneath uninfected soil. Inspect disposal sites regularly and treat any tussocks that come up.

Machinery and Equipment Always clean machinery and equipment when leaving a pest species marked area.

SPECIFIC MANAGEMENT ACTIVITIES

Slashing No slashing from late spring to autumn. Best time to slash is usually in mid-spring (four weeks prior to the period of maximum grass growth).

Weeding Treat with flupropanate or glyphosate herbicide. Follow the herbicide label directions. Flupropanate may only be applied between November and February. Manually remove small infestations and safely transport, in a covered vehicle. Dispose of plant material by burying at least 200mm under uninfected soil. Clean machinery and equipment when leaving a marked pest species work area.

Drain cleaning Drains are the most likely place for seeds to occur. Spoil from marked areas must be safely transported (under cover) and disposed of by burying under 200mm of uninfected soil. Clean machinery and equipment when leaving a marked pest species work area.


Scraping /Grading Avoid scraping and grading whenever possible. If it has to be done, the spoil from marked areas must be safely transported (under cover) and disposed of by burying under 200mm of soil from uninfected areas. Clean machinery and equipment when leaving a marked pest species work area.

Removal of material Do not unless it is essential. Practice safe transport ie cover the vehicle. Dispose of material from marked pest species areas by burying under 200mm of soil from uninfected areas. Clean machinery and equipment when leaving a marked pest species work area.

Stockpile & Parking Do not stockpile materials or park on marked pest species areas.

Pruning If pruning other plants in this area, practice hygiene i.e. clean all clothing, tools and equipment before leaving the area.

Clearing, Digging and Construction Practice safe transport and disposal of material i.e. transport material under cover and dispose of by burying under 200mm of soil from uninfected areas. Clean all clothing, tools and equipment when leaving the area.



Nassella trichotoma

Nt

Serrated tussock




Figure 3: A Threatened Grassland Threatened Species Habitat Specification

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SPECIFICATION

THREATENED SPECIES HABITAT

NATIVE GRASSLAND AND NATIVE WOODLAND
THREATENED PLANTS AND THREATENED PLANT COMMUNITIES

Description There are nine species of rare and endangered plants that have most of their distribution within road reserves. A number of these are grassland plants. They are often difficult to identify when not flowering. There are also several highly significant grassland areas that occur on roadsides. These are a threatened plant community. The key sites may have active management but also require some modification of routine maintenance activities to protect and encourage native species and hinder the spread of weeds.

Management A permit is required for work within areas of rare and threatened plant species and communities. Placement of Enviromark field markers will assist in identification of these areas. All routine maintenance works in these areas are covered by a Public Authority Management Agreement. Damage to native plants must be avoided or minimised. If you must work in these areas, follow the guidelines below:

Machinery and Equipment Avoid bringing machinery into road reserves in Threatened Species Habitat areas. If machinery has to be brought in it must be cleaned of any soil contamination before entering to avoid weed transport.

SPECIFIC MANAGEMENT ACTIVITIES

Mowing Mow Native Grassland Threatened Species Areas between April and early September only. DO NOT MOW IN LATE SPRING OR SUMMER.

Slashing DO NOT SLASH MORE THAN 2M from the pavement edge. Avoid damage to any trees or shrubs outside sight-lines. Do not disturb the soil surface.

Weeding Hand-pull weeds or treat with selective herbicide once the weeds have been positively identified. Do not damage any native vegetation. Follow the herbicide label directions for safe use.

Drain cleaning Clean drains once yearly or less frequently, as required. Minimise the disturbed area. Remove spoil from site and dispose of in a designated area (not on native vegetation).

Scraping /Grading Do not scrape or grade beyond the table drain inside Threatened Species Habitat areas.

Removal of material Do not remove any material from Threatened Species Habitat areas, unless it is essential. This material is likely to contain threatened plants, bulbs or seeds.

Stockpile & Parking DO NOT STOCKPILE materials or park within Threatened Species Habitat areas.

Pruning Do not prune any plants within native grassland and native woodland Threatened Species Habitat areas unless it is essential for safety.

Clearing, Digging & Construction NO clearing, digging or construction is to occur within native grassland and native woodland Threatened Species Habitat areas.




Photo: H & A Wapstra

Native Grassland

NG

& Native Woodland

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MONITORING AND REASSESSMENT

Monitoring Vegetation

To conduct monitoring of on-ground changes to the vegetation, an initial start condition needs to be described when the markers are installed. This is mostly done by the description of the vegetation during the initial inventory. The amount of detail will depend on the significance of the site – threatened species sites will require more details on plant numbers, age etc compared to common vegetation for which a simple community description and condition will suffice.

The timeframe for revisiting monitoring sites will largely depend on the significance of the vegetation and the speed at which it changes. Generally a time frame of 5 years for most sites is realistic. However, during the early stages of implementation and for highly significant sites, a shorter timeframe is advised.

The vegetation will have to be assessed after five years to determine whether the original mapping is still accurate. The management issue may have to be re-mapped.

Monitoring System Use

After five years the use of the Enviromark system needs to be reassessed, to check that it is being used properly and that the problem(s) for which it was implemented are still being adequately addressed and still require the prescribed management, within the marked areas.

Monitoring of how well the system is used by the relevant road workers is important, but difficult. There may be a reluctance by road workers to report problems. The best way is to conduct informal site visits with individuals or small groups of road workers. This should be done at least every five years but preferably also within the first year of operation.

Through this reassessment, the system can be progressively fine-tuned to provide the optimum outcomes.

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