THE INTEGRATED FIRE MANAGEMENT PLAN FOR BRIBIE ISLAND

UPDATED DRAFT

(FOR CIRCULATION)

Author: David Marlow (Principal Research Adviser)

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ACRONYMS

ACRONYM	DESCRIPTION
CSR	CSR Softwoods
CSC	Caboolture Shire council
DEH	Department of Environment and Heritage
DoL	Department of Lands
DPI	Department of Primary Industries
EP	Environmental Park
GIS	Geographic Information System (a computer-based spatial database and query system)
QFS	Queensland Fire Service
UQ	University of Queensland
VCL	Vacant Crown Land

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1. David Marlow and Shaun Kolomeitz, of the Applied Research Unit of DoL;
2. John Fletcher and Scott Rogers, of DEH;
3. Ian Knobel and Maurie Carfoot, of CSR;
4. Bruce Hattersley, of CSC;
5. Jim Sorensen, of QFS.

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EXECUTIVE SUMMARY

SCOPE OF THE INTEGRATED FIRE MANAGEMENT PLAN

1. Identifies the vegetation patterns on the island.
2. Details how the accumulation of fuels is managed (controlled burning).
3. Discusses the location, creation and maintenance of firebreaks.
4. Describes the available fire-fighting capabilities.
6. Examines fire hazard/risk mapping.

FIRE MANAGEMENT PLANS VERSUS FIRE RESPONSE PLANS

Fire response plans already exist in the organisations that are involved in fire-fighting on Bribie Island. These bodies decided that the present informal co-operation in fire-fighting worked well and so the integrated fire management plan should not address this issue.

Consequently, this fire management plan is NOT a detailed fire response plan, or fire training plan, or a fire modelling/simulation system. Fire response has been included in this management plan, but the discussion does NOT include details, such as:

a. the fuel loads of the different bushland areas;
b. the fire history of the different bushland areas;
c. contact names and telephone numbers;
d. the organisation of a co-operative response to wildfire.

PRINCIPAL RECOMMENDATIONS

1. <u>Firebreaks on the rural/urban fringe</u>
   a. CSC and DoL will maintain the present firebreaks annually.
   b. DoL will upgrade the Ford Street, Webster Street and Industrial Estate firebreaks to the 1994 standard, in late 1994.
   c. DoL will create new firebreaks at Eighth Avenue and North Street, Woorim, in late 1994.
   d. CSC will include fire management as a component of subdivision design in future urban development on the urban/rural fringe.

2. <u>Fuel reduction buffers</u>
   a. DEH will construct east-west fuel reduction buffer strips in the:
      (i) eastern EP at Mermaid Lagoon;
      (ii) eastern EP at Top Swamp Crossing (The 'G' line);
      (iii) eastern EP at the southern boundary;
      (iv) southern boundary of the western park at White Patch.
   b. DEH will burn these strips every two to three years.

3. VCL firebreaks

DoL will widen the Bracken Street track and the Woorim end of the Eighth Avenue track, to allow these tracks to be used as backburning lines.
This work will be carried out in 1995 and maintained every two-to-three years.

4. Pine plantation firebreaks

CSR will continue to slash and grade their firebreak network annually.

5. Controlled burning

a. DoL will examine the costs, benefits, rationale and knowledge needs of a controlled burning regime in the VCL.
b. DEH will exclude fire totally from some areas (such as Thooloora Island and Long Island) and to conduct controlled burns on a minimum eight to ten year cycle in all other areas (such as the eastern EP and Buckleys Hole EP).
c. CSR will continue to conduct hazard reduction burns in the pine plantations on a two to three year cycle.

6. Fire modelling and fire hazard/risk/danger mapping

a. DoL will retain its GIS of Bribie Island for land use allocation and fire management applications - the GIS can produce customised mapping products, such as updated fire hazard/risk/danger maps, combined vegetation and track network maps, fire history maps, etc.
b. The organisations involved will discuss the usefulness and potential future applicability fire modelling and fire mapping as fire management tools.

7. Future co-operation

a. DoL will create a five-page A3-size colour-photo location map of Bribie Island, displaying the track network and naming major tracks and features, for use by other organisations in emergency work on the island. This map will be released in November 1994.
b. DEH will seek DoL approval to manage a fuel reduction buffer strip on VCL at White Patch.
c. DEH will co-ordinate prescribed burns in the national and environmental parks bordering the pine plantations with CSR.
d. QFS, CSR, DEH, DoL and CSC will review the fire management plan in late 1994 to provide further detail such as contact numbers (business and after-hours) for all participating organisations, in emergencies.
e. QFS, CSR, DEH, DoL and CSC will review the fire management plan in late 1994 to increase the level of integration of the plan.

1.0 OVERVIEW

1.1 BACKGROUND

On 11 September 1991, a meeting was held to discuss the fire danger on Bribie Island. Representatives attended from QFS, DEH, DoL, CSC, the Bribie Island Chamber of commerce, the Lions club and Apex. At this meeting, it was decided that a total management plan for the area would be produced by DoL, with co-operation from all interested organisations, such as DEH, CSC and QFS. This integrated fire management plan is one result of that meeting.

1.2 THE AIMS OF THIS FIRE MANAGEMENT PLAN

1. Create consistency between the individual fire management plans of the organisations involved in fire management on Bribie Island;
2. Increase awareness and understanding of the fire problem on Bribie Island;
3. Increase involvement by the responsible organisations in fire management on Bribie Island.
4. Allow each of the organisations involved to be kept informed of:
   a. the latest fire management plans and timetables of the other organisations;
   b. relevant information obtained by the other organisations (e.g., new fire modelling algorithms and software, new papers on fire management, biological data on species distribution and fire tolerance).

1.3 FUTURE VERSIONS OF THIS FIRE MANAGEMENT PLAN

This document will be periodically updated, as:

a. funding and weather conditions alter timetables;
b. new research affects the fire management philosophies of this document;
c. the experience gained from implementing the fire management philosophies modifies the approaches followed.

1.4 FIRE AS A LAND MANAGEMENT TOOL

The complexity of fire and its interaction with a number of other variables in both space and time provides an uncertain environment within which to operate. Consequently, the land manager must have a good understanding of the interaction of the following variables:

1. current species composition and distribution;
2. weather conditions (rainfall, temperature, humidity, wind speed and direction) and their effect on burning;
3. vegetation as a source of dry matter (litter and senescent material) and flammable material still on the tree;

4. the intended future use of the area - the good manager policy
(e.g., DoL managing an area of VCL in a way that was compatible with its future status as a National Park);

5. neighbouring land uses - the good neighbour policy
(e.g., minimise risks to life and property on neighbouring properties and the subsequent risk of legal liability, by minimising the potential of a fire escaping the property);

6. fire response and behaviour, fire regimes, potential scenarios, compromise situations (both legal and ecological), mosaic burns, etc.

1.5 ORGANISATIONAL RESPONSIBILITY FOR THE LAND

BODY	FIRE MANAGEMENT RESPONSIBILITY
DoL	Vacant Crown Land
DEH	National parks and environmental parks
CSR	Pine plantations (leasehold and freehold)
CSC	Reserves for which CSC is trustee, principally: R2811-Water treatment & Sewage Effluent Disposal Reserve R930 -Water and Recreation Reserve R1056-Racecourse Reserve
QFS	Urban areas
UQ	Research lease

Map 1 indicates the areas controlled by these organisations.

1.6 KNOWLEDGE AND CAPABILITIES OF THE ORGANISATIONS

1. DEH has a good deal of experience with ecological burns, mainly gained from experience in the Cooloola National Park.

2. The Fire Services Section of Emergency Services and CSR have much experience in dealing with fires from an operational perspective.

3. CSR and DEH (to a lesser extent) have the necessary equipment to manage a fire away from an urban area, such as commonly occurs on Bribie Island.

4. DoL has recently created detailed guidelines for firebreaks on the rural-urban fringe and has created a GIS covering Bribie Island.

5. CSC has plant and equipment that may be of assistance in a fire emergency.

2.0 FIRE BEHAVIOUR

2.1 WIND DIRECTION

Winds are predominantly from the south east. However, the worst case would be a hot dry north west wind. Consequently, firebreaks on north-western boundaries should be the widest and most secure. Firebreaks on the eastern and western sides would be less threatened and firebreaks on south-eastern boundaries can be the least robust.

2.2 SLOPE

Infrastructure at the top of a slope is particularly at risk in the path of a fire. Fuel accumulations on a down slope area which faces west also present problems. However, slopes on Bribie Island are minimal and have no significant effect on fire spread.

2.3 VEGETATION

It is important to take into account the vegetation community specific aspects such as volatility.

2.4 FUEL ACCUMULATION

The amount of fuel accumulated over the preceding period was traditionally assumed to be only dead and down material. However, live material often makes a contribution as well, particularly in a wildfire.

2.5 THE WATER LEVEL

On Bribie Island, water can be left standing (above surface) or be present below the surface for long periods after rain periods. This may be an important factor in the dynamic behaviour of the vegetation and on fuel accumulation and volatility.

2.6 OTHER FACTORS

Short term weather conditions, such as temperature, humidity and wind speed are important factors in the intensity and rate of spread of a wildfire.

Long term weather conditions influence the drought stress on plants, and hence their volatility (days since last rain).

2.7 POSSIBLE FUTURE WORK

The accumulation of fuel and the volatility of vegetation do not necessarily parallel each other in their rate of growth and decay. A four-dimensional (time and space) study of an area 's fire factors (the accumulation, volatility, moisture content and temperature of fuels) would provide valuable information for any future fire model on the island.

However, the organisations involved have yet to decide on whether work is justified on developing a fire model for Bribie Island. Consideration would have to be given to the model's likely:

1. accuracy (Will reality conform to the theory?);
2. usefulness (Would we do anything different in fire management and fire response, if we had such a model?):
3. cost-effectiveness (Would the resources be better spent on more extensive firebreaks, or more controlled burning, or more firefighting equipment?).

3.0 THE EFFECT OF VEGETATION ON FIRE MANAGEMENT

3.1 FACTORS TO CONSIDER

1. Different communities have different fire tolerances;

2. Different communities have different values:
   a. The pine plantations have commercial value.
   b. Some Melaleuca stands contain rare species of flora (a species may be rare, threatened, vulnerable, or abundant);.
   c. The heathlands contain areas of great floral beauty.

Map 2 indicates the areas covered by the various vegetation types.

3.2 VEGETATION COMMUNITIES AND FIRE BEHAVIOUR

COMMUNITY	COMMENTS
10a *Melaleuca quinquenervia* (Woodland)	In some places where there is standing water, there is little understorey and thus a reduced fuel accumulation and a low probability of frequent fires.
10b *Melaleuca quinquenervia*, *Lophostemon suaveolens*, *Eucalyptus* species (Woodland)	Fuel accumulation depends on the understorey (twigs, leaf accumulation, etc). If a fire starts and there is little understorey, a long cool burn may result. If fire promoting species are present, the frequency and intensity of fires may increase dramatically.
13b *Casuarina glauca* (Low open forest)	This community normally occurs near the dune systems. There is often a blady grass understorey, which when dry, burns particularly well and quickly (western areas are prone to dry out more). It is not a great fire hazard.
Peat areas	Peat can cause very high temperatures to be generated in a fire. Even smothering with water will not extinguish such fires. Peat areas should be avoided, when locating firebreaks.
Heath understoreys	Heathland fires are often more intense, because of the volatile gases they release. Both open and closed heath can burn very intensely in the wrong weather conditions.

4.0 FIRE HAZARD MAPPING

4.1 DEFINITIONS

1. Fire *hazard* is normally concerned with the condition of fuel, taking into consideration such factors as quantity, arrangement, current or potential flammability and the difficulty of suppression, should the fuel be ignited.

2. Fire *risk* is the relative chance or probability of a fire starting, and is dependant on a causative agent. As fire cannot burn without fuel, hazard must be studied in conjunction with risk.

3. Fire *danger* is a combination of all factors which determine whether fires will start, spread and do damage and whether and to what extent they can be controlled.

[Luke and McArthur, (1978)]

4.2 THE DERIVATION OF THE FIRE HAZARD MAP

Map 3 is essentially a fire danger map, concerned primarily with the possible ignition and subsequent spread of a fire. It is a product of the Bribie Island GIS, created by DoL for land use allocation and fire management. The vegetation, track network, cadastral, contour and drainage layers of the GIS were used to create this map.

It does not take into account the difficulty in suppression outside the urban fringe (i.e, the distance further than a standard hose, or combination of hoses could reach from a fire hydrant). It is possible for a water truck to traverse the tracks on the island. However, these trucks would not carry enough water (at the required pressure and spread) to halt a wildfire and would have to have a four wheel drive capability to avoid getting bogged on loose sand sections of track.

The fire hazard map was produced using methods derived from Chuvieco and Congalton, 1991 from the Mediterranean area. Each of the variables involved provides a broad estimate of the fire danger over the island and was altered to reflect Australian conditions.

4.3 THE VARIABLES

The variables in determining fire danger are (excluding meteorological conditions):

1. *Vegetation*
   (the major influence in fuel loads and conditions);

2. *Slope*
   (not a major issue on Bribie due to it's low topography, but it can be a major factor in hilly areas);

3. *Land Use*
(the land use type [e.g., urban, rural, open space, industrial], providing a possible danger for life, property and ignition);

4. *Aspect*
(the direction in which the general area [in this case a 10 x 10 metre grid square] is facing - typically areas facing west suffer more from the drying influences of westerly winds);

5. *Roads*
(as a source of possible accidental or intentional ignition - for roads up to 50 metres on either side and for tracks up to 150 metres on either side).

6. *Elevation*
(the height of an individual grid square, often related to the vegetation type - this was not considered for this model, because elevation changes were not viewed as significant [the maximum elevation was 14 metres AHD]).

4.4 THE MODEL

Hazard = 100***Vegetation** + 30***Slope** + 20***Landuse** + 10***Aspect** + 5***Roads**

Each variable has a possible range of 0 (very low) to 5 (very high) rating, equating to a hazard rating range of between 160 and 800. The final hazard map has seven classes of hazard (very low, low , medium low, medium, medium high, high, very high).

While an equation provides a quick and easy method of evaluating the hazard/risk, it is difficult to evaluate the correctness or validity of the model with field data to back it up. Every attempt has been made to adjust the model to local conditions on Bribie Island. This was done by ensuring the subsequent values of each variable agreed with expert opinion, either in the literature or from personal advice. The advice obtained from one expert was correlated with one or two other experts in the field to reduce possible bias.

4.5 USING THE MODEL

The risk of an ignition is demonstrated by the proximity of flammable areas of vegetation or landuses to causative agents such as roads. Once an ignition takes hold, the degree of danger will give a rough idea of the potential spread of the fire (in calm, sterile conditions). It provides an overview of the types of issues which need to be addressed in a local fire plan for the island, in the different land use types.

4.6 VEGETATION/COMMUNITY

VEGETATION/ COMMUNITY	HAZARD RATING	VEGETATION/ COMMUNITY	HAZARD RATING
Disturbed (See Land Use)	-	*Acronychia imperforata* (Closed Sedgeland)	1
Freshwater	0	*Acacia* species (Open Sedgeland)	2
Mangroves	0	Beach Ridge (Open Sedgeland)	1
Saltmarsh	1	Heath species (Open Heath)	3
Melaleuca quinquenervia (Woodland)	2 - 4	Closed Sedgeland (Closed Heath)	1
Melaleuca quinquenervia, *Lophostomon suaveolens*, *Eucalypt* species (Woodland)	4	*Melaleuca quinquenervia* *Eucalyptus robusta* (Open Forest)	2 - 4
Eucalyptus intermedia (Low Open Forest)	2 - 4	*Melaleuca quinquenervia*, (Open Forest)	2 - 4
Casuarina glauca (Low Open Forest)	1	*Melaleuca quinquenervia*, *Eucalyptus tereticornis* (Open Forest)	3 - 4
Banksia aemula (Low Woodland)	1	*Eucalyptus intermedia*, *Callitris* (Open Forest)	2 - 4

Source: Department of Primary Industries, Queensland Herbarium (personal communication), Department of Environment and Heritage (personal communication).

4.7 SLOPE

PERCENTAGE SLOPE	HAZARD RATING	PERCENTAGE SLOPE	HAZARD RATING
0 - 3	1	15 - 20	3
3 - 5	2	20 - 30	4
5 - 7	2	30 - 40	5
7 - 10	2	40 - 50	5
10 - 15	3	> 50	5

Source: Bushfire Hazard Planning in Queensland, Local Government Department, 1991.

4.8 LAND USE

LAND USE	HAZARD RATING
Vegetation (See Vegetation/Community)	-
Open Space / Parkland	2
Urban / Housing	3
Dense / Uncleared	4
Industrial	5

4.9 ASPECT

ASPECT	HAZARD RATING	ASPECT	HAZARD RATING
Flat	2	South	2
North	5	South West	3
North East	3	West	4
East	3	North West	5
South East	2		

Source: Bushfire Hazard Planning in Queensland (Local Government Department, 1991) DEH, personal communication

4.10 POSSIBLE FUTURE ENHANCEMENTS TO THE MODEL

1. Incorporate past ignition sources and points, such as lightning strikes.

2. Include the knowledge of people who have co-ordinated or fought wildfires on the island.

3. Obtain better knowledge of the proximity of homes and businesses to vegetation (i.e., allow for buffer zones and other open space).

4. Verify the models correctness. At present, we know only that each of the variables play a role in determining the fire hazard, the fire risk and the fire intensity).

5.0 FIREBREAK CREATION AND MAINTENANCE

5.1 THE PURPOSE OF A FIREBREAK

A firebreak is not a static defence that, unattended, will stop a high-intensity fire. Such a break would need to have a width of several hundred metres. A firebreak is intended to allow access to firefighters and to provide a line for backburning - it should thus be as straight as possible to facilitate backburning. It also gives some protection, by increasing the distance between buildings and the adjacent bushland.

5.2 THE WIDTH OF A FIREBREAK

The width of a firebreak in residential areas has been ten to twelve metres, which:

a. allows for turning manoeuvres
b. allows sufficient room for stacking and burning, in the creation of the firebreak;
c. allows ample access and room for backburning against a wildfire;
d. is also cost-effective.

After the November 1994 fires, most firebreaks were burnt out. The opportunity will be taken to widen these to fifteen or sixteen metres in November 1994.

5.3 NATIVE TITLE

Native title is extinguished in areas of freehold land and commercial leases. Native title has thus been extinguished over the pine plantations. Native title has often not been extinguished on vacant Crown land, Council-controlled reserves and national or environmental parks.

On Bribie Island, the present position in the non-urban areas can be summarised as:

1. Native title has been extinguished over:
   a. the pine plantations;
   b. the national park;
   c. most of the eastern EP;
   d. the University of Queensland lease;
   e. the VCL north of the sand quarry.
2. Native title has not been extinguished over:
   a. most of the northern tip of the island;
   b. a small section of the eastern EP, north of Welsby Lagoon;
   c. the Buckley's Hole EP;
   d. most of the VCL, south of the sand quarry;
   e. Reserves R2811, R1056 and R930 (apart from the golf course).

Where native title has not been extinguished, the creation of a firebreak must be a low-impact operation. A firebreak must mimic the situation after a bushfire - undergrowth and most saplings removed, but major trees remaining.

5.4 THE LOCATION OF A FIREBREAK

Firebreaks are usually not constructed, where a formed road separates bushland from residences or commercial property - the road itself is considered to be a firebreak.

BODY	GENERAL LOCATION OF A FIREBREAK
DoL	Bush-covered VCL, bordering residential and commercial property.
DEH	Borders of the parks and separating major components of the parks.
CSR	Borders of the pine plantations and separating blocks of pines.
CSC	Bush-covered CSC-controlled reserves, bordering residential and commercial property.
QFS	None (does not control land).
UQ	Around their buildings in the Research Lease.

5.5 THE APPEARANCE OF A FIREBREAK ON THE RURAL-URBAN FRINGE

Many residents oppose completely-cleared strips bordering their properties, because:
a. they fear that the creation of a track will attract thieves and/or traffic;
b. they bought their properties to be close to nature and abhor 'death strips' on their property boundaries.

DoL and CSC firebreaks are thus now designed to present an attractive, park-like appearance to enhance the appearance of a neighbourhood, not detract from it.

This approach will discourage the practice of many residents to use firebreaks as a dumping ground for rubbish. This antisocial practice:
a. produces visual ugliness;
b. makes likely the spread of weeds or other undesirable species along the firebreak and spreading into the adjacent bushland;
c. makes the backburning process itself more difficult and dangerous.

See Appendix A for details of the criteria for:
a. the removal or retention of trees on such firebreaks;
b. the creation and maintenance of firebreaks.

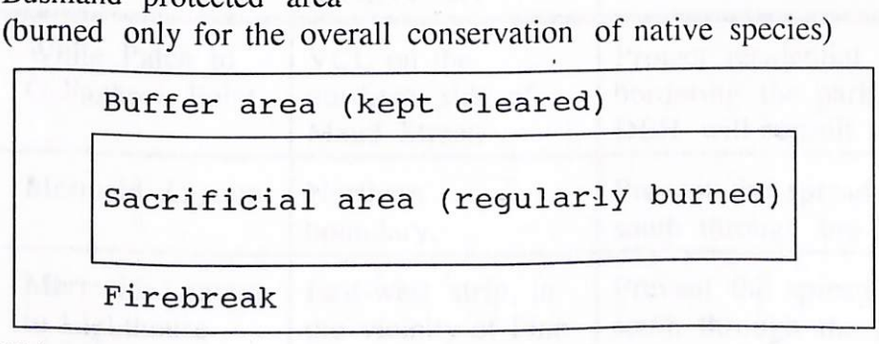
5.6 POTENTIAL FIREBREAK LOCATIONS ON THE URBAN-RURAL FRINGE

SITE	BODY	HISTORY AND STATUS	FUTURE PLAN
Esplanade, White Patch	DoL	This firebreak was created in May 1994.	Maintain.
Anchor Court, Banksia Beach	DoL	No firebreak exists. The Vercorp haul road provides protection. The area is being transferred to DEH.	No work planned.
Verdoni Street, Bellara	DoL	No official firebreak exists. Residents maintain their own firebreak.	No work planned.
Ford Street, Bongaree	DoL	A firebreak was created in 1992, but was poorly levelled and logs left to rot. It became overgrown and was backburned in the September 1994 fires.	Remodel to 1994 standard. Maintain.
Webster Street, Bongaree	DoL	A firebreak was created in 1992, but residents prevented some of the work and logs were left to rot. It became overgrown and was backburned in the September 1994 fires.	Remodel to 1994 standard. Maintain.
Flinders to Hill Streets, Bongaree	DoL	A steep bank and boggy creek bed make a firebreak impractical. A one-metre pathway was cleared between the edge of the bank and the fenceline, in June 1994.	Maintain.
Industrial Estate, Bongaree	DoL	A firebreak was created during the November 1994 fires.	Naintain.
Bracken Street, Woorim	DoL	A firebreak was created in 1993.	Maintain.
Sixth Avenue, Woorim	DoL	Residents obtained permission to create their own firebreak and have done so.	Widen firebreak. Maintain.
Eighth Avenue, Woorim	DoL	No firebreak exists, as residents opposed its creation. Some clearing has been done unofficially by residents.	Create firebreak. Maintain.
North Street, Woorim	DoL	No firebreak exists. Space for a firebreak exists north of Third Avenue. South of Third Avenue, Freshwater Creek restricts access.	Create firebreak. Maintain.

SITE	BODY	HISTORY AND STATUS	FUTURE PLAN
Aquaculture Centre, Woorim	DPI/ DoL	No firebreak exists along the southern and eastern boundaries with the VCL.	Create firebreak. Maintain.
Horace Street, White Patch	CSC	This firebreak was created in 1994.	Maintain.
Western boundary of Racecourse Reserve First Avenue Bongaree	CSC	A firebreak was created in August 1994.	Maintain.

5.7 FUEL REDUCTION BUFFERS

The buffer area / sacrificial area / protected area concept of firebreaks is technically superior to the single strip firebreak. This concept utilises a 50-to-200-metre-wide sacrificial area surrounded by an 10-to-12 metre cleared strip.



However, this concept has practical disadvantages that limit its widespread use:

1. It is much more expensive to create and maintain (compared with a single ten-twelve-metre strip). Thus, with limited funding, fewer firebreaks could be created and maintained.

2. It would be difficult to obtain permission for the expenditure of resources to conduct annual burns of the sacrificial area.

3. If this strip adjoins residences, residents may well complain about annual or two-yearly burns.

4. The width of sacrificial strip appears excessive for the relatively restricted areas of Bribie Island. A wide sacrificial strip would be unsightly and incompatible with the image of the island.

5.8 DEH FUEL REDUCTION BUFFERS

DEH presently uses the existing track system in the parks as firebreaks. Such tracks have an average width of approximately eight to ten metres.

DEH also plans to construct fuel reduction buffers, using chipped lines, which will be:
a. 50 metres wide;
b. burned every two to three years;
c. monitored for weed species;
d. monitored for the effect of season and fire frequency on the effectiveness in achieving fuel reduction objectives.

BLOCK	BUFFER LOCATION	OBJECTIVE
W1: White Patch to Gallaghers Point	VCL on the northern side of Maud Street.	Protect residential areas, bordering the park. DEH will consult with DoL.
E2: Mermaid Lagoon	Northern boundary.	Prevent the spread of wildfires, south through the EP.
E3: Mermaid Lagoon to Lighthouse Reach	East-west strip, in the vicinity of Pine Block 13.	Prevent the spread of wildfires, south through the EP, by dividing E3 into two sections.

5.9 VCL FIREBREAKS

Map 4 displays the existing track network in the VCL. These tracks act as potential containment barriers to wildfires in the VCL. Under favourable conditions, a fire may be contained without human intervention. The VCL is a DoL responsibility, but DoL has no firefighting capability and so a wildfire in the VCL may be left to burn. Other organisations may attempt to control a wildfire in the VCL, because it represents a threat to life or property.

The major tracks acting as a potential protective barrier for urban areas are:

a. the Cotterill Avenue - McMahon Road track, providing defence-in-depth for the industrial estate;
b. the Eighth Avenue - McMahon Road track, providing defence-in-depth for Woorim;
c. the Bracken Street track, providing defence-in-depth for Woorim.

On parts of the Eighth Avenue and Bracken Street tracks, the canopy has closed overhead, making any backburning a dangerous operation. Consequently, DoL plans progressively to open up the canopy along the Eighth Avenue track and then the Bracken Street track to allow these tracks to be used for backburning.

5.10 PLANTATION FIREBREAKS

Map 5 displays the main CSR firebreaks, which are located on the perimeters of the pine plantations and also separate blocks of pines within the plantations.
CSR maintains the firebreaks as cleared strips.
The perimeter firebreaks are forty metres wide and the internal firebreaks are approximately twenty metres wide.
These firebreaks are slashed and graded annually.

6.0 CONTROLLED BURNING

6.1 THE EFFECTS OF FIRE

Controlled burns (also called prescribed burns or broad-area burns) play a significant role in the structure and appearance of the Australian environment. Aborigines successfully used controlled burns to provide food for their communities. The Australian fauna and flora are well adapted to fire, which is a natural (and introduced) part of their ecosystem. "Its constant use for thousands of years favoured the growth of grass and fire resistant eucalypts ...thus transforming the vegetation pattern of the continent" [Blaney (1982), Young (1991)].

Controlled burns form a powerful and potentially dangerous land management tool. The complexity of the use of fire (in effect humans playing God) has been well stated. Even in a carefully planned and monitored situation, the use of fire for effective land management is not straightforward or well understood. However, the fact remains that "the fire regime can be used as a tool in managing land" [Anon (1985)]. There are guidelines available from DEH, the Rural Fires Board and the Forestry Commission, which can assist in providing advice for conducting controlled burns, either from an ecological or a protection of life and property perspective.

Fire in a planned, controlled and managed situation can be used to:

a. reduce fire hazard danger from wildfires;
b. return nutrients to the soil;
c. provide a direct contact for seeds with the soil;
d. assist in increasing and maintaining biodiversity within a landscape;
e. promote generation of certain fire reliant tree species.

Christie (1985) advises that the reasons for burning (not just controlled burns) include:

a. remove senescent material;
b. stimulate regrowth and produce quality forage for herbivores;
c. control regrowth of woody weeds and to clean up fallen timber to favour certain desirable species;
d. attract animals to areas that might be left ungrazed and to control the distribution of animals;
e. remove the hazard of wildfires and establish firebreaks;
f. control pests and diseases;
g. pre-treatment for oversowing;
h. produce ash for fertilisation;
i. facilitate management and occupancy.

The effects of the type of fire on the major components in a bushfire in the Australian environment are outlined in the table below [Adapted from Christie (1985)].

COMPONENT	CONTROLLED BURN	WILDFIRE
Wildlife	Most organisms can escape or hide until the fire passes.	Only fast-moving animals escape and only well-buried or protected animals will survive unscathed.
Soil	Normally not openly exposed.	Normally exposed to the elements and scorched.
Litter	Only the top layer is burnt, leaving 0.5-1.0cm of litter to protect the soil.	All litter is normally incinerated.
Grasses and low growing shrubs	Usually burnt to some degree.	Mostly incinerated. Some may survive in crown fires and skip areas.
Trees	Most are not harmed at all. Some foliage may be scorched. If the trunk is protected by bark, it may be well-insulated.	Trees may be harmed if flames persist for 2-3 minutes. Many trees with a bark less than 2 cm thick may perish.
FOR	Controls or restricts the intensity of a possible future wildfire.	Some species rely on high-intensity fire for germination or dispersal.
AGAINST	Favours certain species and assemblages. The long-term effects are uncertain and possibly undesirable.	Most species of flora are adversely affected. Loss of life and/or property damage may result. Scorching and/or erosion may occur. Fighting fires is costly and consumes resources.

6.2 HAZARD REDUCTION

6.2.1 Aim

The principal aim of hazard reduction burns in an urban/rural situation is to protect life and property, with traditionally little regard for ecological diversity or habitat stability. This is often the case with vacant crown land or land which suffers from a lack of perceived management from an ecological perspective.
Anon (1985) states that "The reduction of fuel will generally prevent massive fires developing and will reduce fires spreading and spotting.

6.2.2 Effects

However, controlled burning is a controversial subject amongst professional fire fighters as well as foresters, largely because the long-term effects on forests are uncertain". This is especially true in areas of heath and sedge, which are extremely complex and can vary in their flammability and fire behaviour. This variability results from micro effects (vegetation, litter and moisture) and macro effects (wind, humidity and temperature).

6.3 SPECIES CONSERVATION

6.3.1 Aim

The deliberate use of fire in natural areas is not always detrimental and fire can be applied to achieve certain environmental objectives. Controlled burning for ecological management can be used where the intention is to:

a. provide a diversity of age classes of vegetation;
b. provide successional stages of vegetation;
c. favour species, communities and habitats;
d. return areas to pre-European conditions;
e. create conditions conducive to the return of locally extinct species.

6.3.2 Effects

The deliberate application of fire can have unforeseen consequences and may not be successful. The Australian Conservation Foundation identified three requirements before environmental fire management should be applied:

a. adequate scientific data about the effects of fire on native ecosystems;
b. a total local fire suppression capability, so that only prescribed fires burn in the area;
c. accurate weather prediction for specific areas so that burning prescriptions can be accurately applied.

The use of controlled burns performed at strict intervals over large areas, as opposed to smaller areas being burnt at dynamic temporal intervals in responses to levels of particular environmental variables, "will favour some species, resulting in a loss of variety" [I.R. Nobel in Anon (1985)]. This is the case for both flora and fauna and is influenced by species mobility, adaptability to fire, fecundity, life cycle habits, fire intensity, rate of spread, etc.

6.3.3 Knowledge needed

Species conservation can be achieved through knowledge of the spatial location of various rare and threatened species, in combination with knowledge of the species behaviour, feeding habits, breeding habits, etc. There may be a life cycle conflict between various flora and fauna, which will have to be taken into account in the planning process.

The general use of controlled burning to manipulate habitats should not be applied until our knowledge and technology improves. DEH has performed much research into this field in the use of fire for management of national parks in Queensland. In particular, work by Caroline Sandecoa and others has emphasised the need for:

a. an in-depth knowledge of the past history of fires in the area concerned;
b. an understanding of the processes in operation, at a range of levels (community, local, regional);
c. distribution and abundance of species, and their reaction to fire;
d. collection of field information before, during and after a fire.

The House of Representatives Standing Committee on the Environment and Conservation does not generally support broad scale burning for environmental objectives, until more is known about the ecological consequences. However, it believes that there are cases where limited burning appears justified. This is particularly true in national parks where some species of ground parrot (in Tasmania and Queensland) rely on the incidence of fire to conserve their habitat. In these cases, burning is relatively easy to justify - without burning, the species may become extinct.

6.4 POLICY

BODY	POLICY
DoL	DoL does not propose to undertake any controlled burning of the bushland under its control, in 1994/1995, because: 1. the necessary data on fauna and flora species in the VCL, their numbers and their fire tolerances does not yet exist; 2. no priorities on the objectives to be achieved have yet been set; 3. DoL has never previously carried out such work on the island, or elsewhere (and so funding has never been set aside for such work). This policy may be reviewed in 1995, when more is known of the likely consequences and funding likely to be available.
DEH	DEH conducts controlled burning to: 1. reduce accumulated fuel loads in buffer strips and key locations, to minimise the potential hazard of wildfires to human life and property; 2. restore the 'natural' fire regime by control burning areas which have remained unburnt for too long; 3. ensure the survival of fauna by producing a mosaic of vegetation blocks recovering from fire (and so preventing the broad scale habitat depletion caused by wildfires); 4. enhance the environment for targeted fauna and flora species; 5. control weeds.
CSR	CSR employs protective burning to maintain low fuel levels on selected sites to limit the intensity and spread of wildfire within the pine plantations. Underburning of the pine plantations is employed to reduce the fire risk and the intensity of any wildfire. Grazing of the plantation areas may also be employed.
CSC	CSC does not propose to undertake any broad-area burning of the bushland under its control, in the short term. This policy may be reviewed in the future.
QFS	QFS is not a property holder and is has no rural responsibility on the island. Consequently, it has no policy regarding broad-area burning.
UQ	UQ does not plan to implement any broad-area burning regime on the Research Lease.

6.5 CONDITIONS

PARAMETER	BODY	DETAILS
Season	DEH	Not during the main breeding seasons for fauna. During Autumn, Winter or even Summer, but not in Spring (August-October).
	CSR	From early April to late August (preferably the months of May, June and July).
Cycle period	DEH	Minimum eight to ten years for a block (except where fire is to be excluded totally). Two to three years for fuel reduction buffer strips.
	CSR	Two to three years.
Fire danger rating	DEH	
	CSR	Up to 10.
Temperature	DEH	
	CSR	Mild (less than 25 degrees C).
Relative humidity	DEH	
	CSR	Medium (40% to 60%).
Wind speed	DEH	
	CSR	Less than 15 kph, preferably 10 to 15 kph.
Direction of burn	DEH	Westerly from the eastern boundary against a westerly breeze.
	CSR	Westerly from the eastern boundary against a westerly breeze.

6.6 DEH PLANS

The DEH areas are divided into the following blocks (See Map 6):

1. E1 (Dingo Creek to beacon crossing);
2. E2 (Mermaid Lagoon);
3. E3 (Mermaid Lagoon to Lighthouse Reach);
4. I1 (Thooloora Island);
5. I2 (Long Island);
6. N1 (Lighthouse Reach to the northern point of the spit);
7. S1 (Buckleys Hole Environmental Park);
8. W1 (White Patch to Gallaghers Point);
9. W2 (Gallaghers Point to Poverty Creek);
10. W3 (Poverty Point to Thooloora Island);
11. W4 (Thooloora Island to Westaways Creek);
12. W5 (Westaways Creek to lighthouse Reach).

OBJECTIVE	FIRE REGIME	STRATEGY	BLOCK
Maintain existing vegetation diversity and habitat.	Control burn.	Where possible, suppress wildfires in the recovery period between control burns.	E1 E2 E3 S1 W1 W2 W3 W4 W5
Allow vegetation & successional changes to occur.	Exclude fire totally.	If possible, suppress all wildfires. Prohibit camping and campfires.	I1 I2 N1
Protect localised patches of *Callitris columellaris*.		Where possible, backburn from significant patches of *Callitris* during wildfires or controlled burns.	E1 E2 E3 W1
Protect adjacent pine plantations.		Co-ordinate with CSR. Carry out prescribed burns under nil or westerly wind conditions.	E1 E2 E3
		Co-ordinate with CSR. Carry out prescribed burns under nil, easterly or south-easterly wind conditions.	W1 W2 W3 W4 W5

OBJECTIVE	FIRE REGIME	STRATEGY	BLOCK
Protect picnickers at Lighthouse Reach Picnic Ground.		Backburn from the picnic ground, during wildfires or prescribed burns, where necessary.	N1 W5
Protect campers at Gallaghers Point and Mission Point Camp Grounds.		Backburn from the camp grounds, during wildfires or prescribed burns, where necessary.	W2 W3
Protect structures at Lighthouse Reach, Poverty Point, Mission Point, WW2 fortifications and the DEH base.		Backburn from the structures, during wildfires or prescribed burns, where necessary.	N1 W1 W3
Protect aboriginal sites.		Determine their location. Avoid such sites for roads or firebreaks.	W1 W2 W3 W4 W5
Protect residential areas surrounding Buckleys Hole EP.		Co-ordinate with CSC & QFS.	S1

Prior to each controlled burn, the bordering firebreaks are examined and (where found to be deficient) improved to conform with requirements.
On the first day of a burn, the fires are lit and their progress monitored.
On the second day of a burn, the fires peter out and mopping-up begins.
On the final day of a burn, mopping-up ends.

6.7 CSR PROCEDURES

6.7.1 Timetable

See Map 7.

6.7.2 Checklist

1. Notify neighbours.
2. Notify the Bribie Island fire station.
3. Advise the general public via advertisements in local newspaper(s).
4. Erect warning signs.
5. Gather resources (personnel, vehicles, materials).
6. Confirm that the current burning indices are favourable.
7. Confirm that the weather forecasts are favourable.
8. Confirm that smoke dispersal will not be a severe problem.

6.7.3 Conditions

Time of day

The best time of day for a controlled burn is 9:30 am to 4:00 pm.
There is often too much dew on the ground, outside these hours.
The temperature also often drops significantly, between 4:00 pm and 8:00 pm.

Moisture content of the vegetative ground litter

1. When both the upper layers and lower layers of pine needles on the plantation floor are wet, any controlled burn will self-extinguish.

2. When both the upper layers and lower layers of pine needles on the plantation floor are dry, it is too dangerous to conduct a controlled burn.

3. When the upper layers of pine needles on the plantation floor are dry and the lower layers are wet, the moisture content is about 17% to 26% and favourable for a controlled burn.

Wind speed

Wind speed should be in the range 10 to 15 kph. If the wind speed is more than 15 kph, the fire may become uncontrolled. If the wind speed is less than 10 kph, the fire hangs around and can become fluky in direction.

In dry conditions with little wind, the flames are upright, causing needles to drop off the trees and feed the fire. It is better to operate under wetter windier conditions, when the flames bow over in a mild breeze and the canopy is not scorched.

Wind direction
It is green fuel, rather than wet fuel that creates smoke. A constant westerly wind is preferred to minimise the smoke nuisance for residents - a north-east wind will blow smoke onto Bongaree and Bellara, a north-west wind will blow smoke onto Woorim and a south-east wind will blow smoke onto Caloundra.

Vegetation
Pine needles burn much more readily than leaves. The best conditions for a controlled burn are thus those where the pine needle litter of the pine plantations will burn, but the fire will stop at the wetter leaf litter of the eucalypt swamps.

Procedure
In the preferred conditions of moisture, temperature and a moderately westerly breeze, spot fires are started along the eastern boundary of the block, beginning at the north east corner. Then spot fires are started along the northern boundary, starting at the north east corner. The fires progressively backburn through the block.

If conditions are cold and wet, backburning often does not work at all - the fires self-extinguish after travelling only a couple of metres. Assuming such conditions and a moderate westerly breeze, spot fires are started on the western side of the block and the breeze pushes the fires through the block. This procedure is particularly favoured, when the far boundary ends in a swamp.

Controlled burns are not carried out at all, when conditions are dry.

6.8 THE DoL CONTRIBUTION

6.8.1 Intentions

DoL has no present plans to conduct controlled burning on VCL, in 1994/1995. Prior to work on this fire management plan, the possibility had not been envisaged. DoL had not studied the problem and DoL has little experience in dealing with fires from either an ecological, or fire fighting perspective.

6.8.2 Fire management and the VCL

Roberts (1989) states that "...muchneeds to be done to gain an understanding of fire as an ecological management tool in Queensland" and further suggests that "the problems of multiple use of Crown Land are complex and warrant a combined planning exercise aimed at developing an Integrated Fire Research Program which is drawn up in combination by foresters, wildlife ecologists, hydrologists, botanists and recreation planners."

This concept was envisaged for the Bribie Island Land Management Pilot Project, which has not yet reached its full potential. The integrated approach would operate perfectly on Bribie Island, which would serve as an invaluable research field site.

6.8.3 Information gaps

With the Bribie Island GIS, DoL currently has a broad information base, which has been used in the compilation of this fire management plan. However, if the GIS were expanded to include the following datasets, future fire management plans would benefit significantly:

a. more detailed species distribution information;
b. the responses of these species to fire;
c. the role of these species in building or maintaining diversity;
d. the desired weather and ground conditions for a controlled burn;
e. the desired fire intensity and temperature for a controlled burn.

Additional information could be collected:

a. from the Nature Search 2000 work of DEH;
b. by gaining the co-operation of local conservationists who worked on the Nature Search 2000 program to gather more intensive biological data on the VCL;
c. by using University volunteers (trained in a particular survey method), wishing to gain experience.

6.8.4 The use and abuse of the track network

Tracks are useful in fighting fires. They can:

a. act as firebreaks, allowing a wildfire to be quarantined;
b. act as block boundaries, when creating a mosaic of burned and recovering vegetation blocks, in controlled burns;
c. provide access for firefighters to control a wildfire;

but they also give arsonists and careless humans the access and opportunity to start fires.

DoL has been given limited funding to close and revegetate tracks in the VCL that serve no useful purpose. This work must be finalised by 30 April 1995.

6.8.5 A possible trial burn procedure

Because DoL was required to create an integrated fire management plan for Bribie Island, with the co-operation of other organisations, some DoL staff have made a preliminary study of the concept of controlled burning.

Their preliminary conclusion was that, if DoL is to undertake such work in future, then the preferred initial procedure would be:

1. Collect as much detail as possible regarding the historical occurrence of fire for the area in question, to determine the effects of fire on the area (the frequency, severity and coverage of the fires and the resulting damage). This would be done by asking locals or people intimately familiar with the area (such as CSR staff), or by analysing aerial photography or satellite imagery.

2. Conduct a biological survey of the area in question to determine the current condition of the area (the species present, their numbers or densities, their locations, their fire tolerances).

3. Divide the area into its component species types with similar fire response and accessibility, probably by using the existing track network as block boundaries.

4. Determine the importance of each objective to be achieved by controlled burning.

5. Determine the factors necessary to achieve the required result.

6. Conduct a first burn on one or a few of the individual blocks.

7. Estimate the severity of the burn and other effects.

8. Monitor regeneration of the bushland.

9. Perform a first burn on other blocks in a mosaic pattern, over eight to ten years, as the first blocks that were burned recover.

6.8.6 The second burn

The timing and effects of the second burn on an area can have a major effect on the future ecology of the area. So, DoL would not undertake a second burn of an area, without weighty evidence to support the expected results.

6.8.7 Future plans

Future plans may include:

a. a study of methods to minimise the possibly adverse short term effects of a fire on the environment (erosion, species loss, etc);

b. the implementation of a well-considered education and information plan for the local community, to minimise community antipathy to controlled burns;

c. the creation of a simple expert system, containing local experience in firefighting, fire behaviour, fire control and fire management.

7.0 RESPONSE TO A WILDFIRE

7.1 POLICY

BODY	POLICY
DoL	DoL has no equipment to fight wildfires on vacant Crown land, no staff trained in firefighting and no funds to fight wildfires. Wildfires on VCL will be left to burn.
DEH	DEH will respond to all wildfires within national and environmental parks and has sole control of firefighting operations within the parks. DEH will respond to wildfires less than 3 km from park boundaries, if personnel are available (DEH personnel may be fully engaged on fires within the parks).
CSR	CSR will respond to all wildfires within the Emanuel leasehold and freehold areas and to external wildfires that pose a potential threat to the pine plantations.
CSC	Council plant and staff are available to assist in fighting wildfires on the southern end of Bribie Island, where development is at risk. Council staff and plant will operate only under the direction of the QFS.
QFS	QFS is responsible for the urban area only. If QFS firefighters can reach a small fire in bushland, they will attempt to extinguish the fire before it grows and spreads to become a major threat. Otherwise, they will monitor its progress as a potential threat to the urban area.
UQ	UQ has no equipment to fight wildfires on the University of Queensland lease, no staff trained in firefighting and no funds to fight wildfires. Wildfires on the Research Lease will be left to burn.
CSR and DEH	CSR and DEH have a co-operative arrangement, where both parties will help each other at fires of mutual interest, with each bearing its own cost. This mutual assistance is co-ordinated through official channels and at Fireboss level at the fire. At fires that concern only one party, the other may request aid which will be provided if possible, with the potential to recover costs. These arrangements are organised only by the CSR Resources Manager and the DEH Ranger In Charge.

7.2 EQUIPMENT

BODY	FIRE-FIGHTING EQUIPMENT	
	Equipment	**Details**
DEH	one 4WD Toyota, with slip-on unit (The Beerwah and Kondalilla/Conondale bases each has a similar unit)	The unit: * has a tank capacity of 500 litres; * carries one 30-metre length of 25mm-diameter hose; * is fitted with a Dosatron foam applicator, chainsaw, rake hoes, shovel, brush hook, crowbar, axe and 20-litre fire fighting knapsacks.
CSR	4WD Toyotas, with slip-on units four 4*4 Bedfords D3 bulldozer small grader	* The slip-on units have a tank capacity of 400 litres. * The Bedfords have a tank capacity of 3 000 litres.
CSC	one 2WD water tanker two front end loaders one grader three 4WD utilities two 6-tonne trucks (Additional plant is available from other CSC depots in a major emergency. CSC does not operate any tracked equipment)	* The tank capacity is 4 000 litres and a spare tank also has a capacity of 4 000 litres. * Water can be spread from the spray bar, or the tanker can refill the tank of a fire pump. The backhoes with bucket attachments can be used to cut narrow firebreaks.
QFS	one International 1800 fire pumper	The unit: * has a tank capacity of 1 800 litres; * carries fourteen 30-metre lengths of 64mm-diameter hose; * carries five 30-metre lengths of 38mm-diameter hose (which can couple with 64mm-diameter lengths or other 38mm-diameter lengths); * carries two 30-metre lengths of 25mm-diameter hose (which can couple only with other 25mm-diameter lengths). See note.

NOTE ON THE QFS FIRE PUMPER:

The tank can be used to fight bushfires beyond hose reach from the nearest hydrant. Using a 25mm-diameter hose, the tank holds a 30-to-40-minute supply of water. The larger diameter hoses are not suitable to fight bushfires, because the pressure is too high and the tank is emptied too quickly (a 38mm-diameter hose would empty the tank in 15 minutes and a 64mm-diameter hose would empty the tank in 5 minutes). When the tank is emptied, it must be refilled at the nearest hydrant.

7.3 COMMAND AND CONTROL

BODY	RESPONSIBLE OFFICER
DEH	The ranger in charge (RIC) of the park is in charge of the fire and the way in which the fire is managed. In the event of fire, the RIC: * informs park neighbours, QFS, the District Manager and family members of fire-fighting staff the location of the fire, direction of spread and action to be taken; * can authorise the hire of earthmoving equipment up to $500. The district manager: * provides logistical support to the RIC; * organises assistance from other parks in the district (or, if necessary, other districts in the region, or other regions) * can relieve the RIC as fire control officer, or nominate someone else to relieve as fire control officer.
CSR	The FIREBOSS system is used, where the most senior experienced person assumes control.
QFS	The senior QFS officer attending the fire is always in charge of the fire fighting operation and controls all resources - including that of the Police, SES, Ambulance and CSC - UNLESS a Police officer (with the rank of Inspector, or above), either invokes the Public Preservation Act or declares a State of Emergency. In these cases, Police will have ultimate command.
CSC	Any CSC assistance in fighting wildfires is to be authorised by either: * Director of Engineering Services (N Pollock) - 074 95 0255 * Deputy Director of Engineering Services (J Hall) - 074 95 0252

7.4 FIREFIGHTING STAFF

BODY	FIREFIGHTING STAFF
DEH	Normal employees are used in fire fighting and are expected to be familiar with the wildfire response procedure.
CSR	Normal employees are used in fire fighting, instead of a specialised force. Fire crews are maintained on standby after-hours, as necessary. The firefighting force is well trained. The annual hazard reduction program is used as a training tool.
QFS	Officers may be permanent or auxiliary. These are no volunteers.
CSC	Council staff are not trained in firefighting and will not become independently involved in firefighting.

7.5 PREDICTION

7.5.1 Drought Index

Drought index is a measure of moisture deficiency, on a scale of 0 (complete saturation) to 800 (total evaporation from the soil). The drought index assumes that 200 mm of rain will fully saturate the soil. The maximum temperature and rainfall for each day up to the present is required to calculate the present drought index. CSR uses the Byram Keetch Drought Index (BKDI) to predict the fire danger rating.

7.5.2 Fire danger rating

The BKDI, the number of days since last rain and the amount of last rain produce a drought factor. The drought factor is combined with current weather variables (the relative humidity, air temperature and wind speed) to determine the *McArthur Fire Danger Level*, which estimates fire behaviour in tall eucalypt forests.

1. A value of 00 to 04 means the level of fire danger is LOW;
2. A value of 05 to 11 means the level of fire danger is MODERATE;
3. A value of 12 to 23 means the level of fire danger is HIGH;
4. A value of 24 to 49 means the level of fire danger is VERY HIGH;
5. A value of 50 or above means the level of fire danger is EXTREME.

7.6 MONITORING

CSR and the DPI firetowers are in regular contact, via radio links. Information is relayed to other agencies as required, through the appropriate contact officer.

CSR constantly monitors the weather information.

FIRE DANGER RATING	CSR RESPONSE
Low	Normal operations. The firetower is not manned.
Medium	The fire situation is monitored and fire equipment checked. The tower operator is placed on standby.
High to very high	Firecrews are made available and supervisors keep in contact. The firetower is manned. The situation at the relevant DPI firetowers is monitored.
Extreme	The firecrews are sited strategically. Direct contact is made with other parties, such as DPI and DEH. The firetower is manned. The Fire Control Room is made operational.

DPI man the Beerburrum fire tower (which has a good view of Bribie Island) for six months of the year. DPI also man the White Horse Mountain tower on days of extreme fire risk and of poor visibility from Beerburrum mountain.

7.7 REPORTING

BODY	RESPONSIBLE OFFICER
DEH	The first DEH person aware of the fire: * ensures the safety of all concerned; * informs the ranger in charge (RIC) and the district manager of the fire; * assesses the situation: * takes immediate action to extinguish or control the fire, if possible; * if the fire is not quickly controlled, informs the RIC or district manager of the details of the fire (location, size, direction of spread, flame height, terrain, vegetation, weather conditions, personnel at the fire, equipment at the fir, assistance required).
CSR	When a fire is detected, a report is made to the responsible authority, giving the location of the fire, the class of smoke and the weather parameters. The buildup of the fire is monitored.
QFS	The firefighter in charge of a crew at the Fire Station will report to FireComm, via mobile radio when the crew is available for turnout, request incident report details and advise the names of the crews.
CSC	CSC staff on Bribie Island are requested to report any bushfires on Bribie Island to QFS.

7.8 RESPONSE PROCEDURES

BODY	PROCEDURE
DEH	* If suppression fails with the personnel and equipment on hand, other units in other parks can be called upon. * A major fire may require the evacuation of park visitors and campers.
CSR	* The strategy is first to directly attack the fire with water. The fire is initially and quickly attacked with Landcruiser 'slip-ons', with 400-litre tanks. * Backup is provided with four Bedford 4x4 3000-litre tankers. * If the direct attack on the fire appears likely to fail, a D3 bulldozer and small grader are used to construct breaks around the fire for backburning and for access for water units. * If the fire risk worsens, other resources and crews are called for support, from other logging sites. * CSR Softwoods and DEH have a co-operative arrangement at fires of mutual concern.
QFS	* A grass fire is initially a one-pump response. Additional units may be requested later, if this is a major fire, close to urban areas. * A house or building fire is initially a two-pump response. * The District Commander at Petrie (or the Assistant District Commander, if the Assistant District Commander is not available) must attend a three-pump fire. * Initially in a fire callout, the permanent fire officers and auxiliary fire fighters of the Bribie Island station (Station 29) are paged and the siren at the station sounded. * If the unit is already committed, or more than one pump is required, additional units are summoned from the nearest available stations - first Caboolture (Station 28), then Deception Bay (Station 27) and Petrie (Station 25). * The QFS Communications Centre (Firecom) in Brisbane advises crews of the required response (turnout, or standby). A Senior Officer via Firecomm is required to direct a response, when there are only one or two auxiliaries and no QFS officer.

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APPENDIX A: THE RURAL-URBAN FIREBREAK

A.1 REMOVING TREES

Remove:

a. dead trees;

b. trees expected to die within ten years (e.g., trees suffering dieback and short-lived species, such as acacias);

c. structurally unsound trees (such as those with hollowed, rotting or insect-riddled trunks);

d. trees with an excessive lean (say greater than fifteen degrees from the vertical);

e. exotic species (such as rubber trees) and undesirable non-local natives (such as umbrella trees), to minimise their contaminating spread into surrounding native forest;

f. trees that significantly overhang private property, or lop the overhanging branches.

Some authorities regard banksias as unacceptable on a firebreak, because a burning banksia may shower burning cones on nearby roofs and may catch alight, even when several hundred metres behind the back-burn line. However, in some areas such as Anchor Court, banksias are the dominant species and their total removal would be not only unaesthetic but also very expensive. The mandatory removal of all banksias would also contravene the low-impact provisions of native title, in areas where native title has not been extinguished. However, many banksias are insect-riddled, or have excessive leans and such trees can be removed.

A.2 RETAINING TREES

1. Retain major, healthy, structurally-sound, native trees, where they will not impede firefighting or maintenance operations.

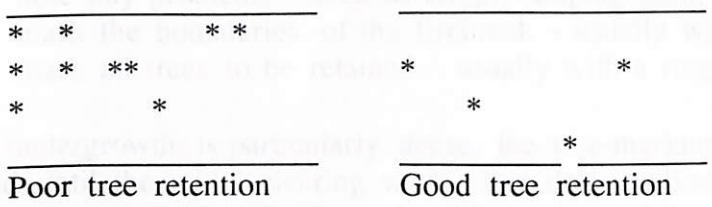
2. Where possible, retain several different varieties of native species. This may mean the retention of some saplings.

3. Give preference to trees that are mature and aesthetic in appearance.

4. Where possible, avoid large treeless expanses, for aesthetic reasons. This may mean the retention of some saplings.

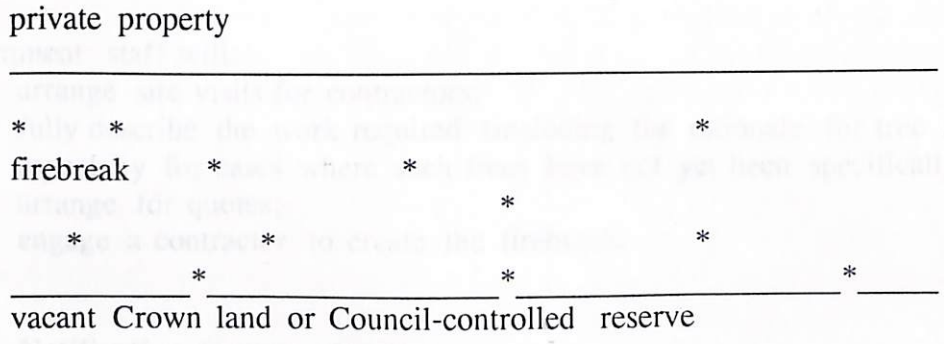
5. Leave a gap of at least 2.5 metres between trees or between a tree and the boundary with private property, to allow the easy movement of slashers (with a width of 1.8 to 2.1 metres) and fire-fighting vehicles.

6. Space retained trees so as to allow easy manoeuvring of slashers.



Poor tree retention Good tree retention

7. Retain trees across the width of the firebreak, so that there is no line-of-sight along the firebreak, except for the boundary strip with private property. This will minimise the likelihood of the firebreak being used as a vehicle track.



8. At times, a resident requests that a tree contravening these guidelines be preserved. In the past, the request has often been satisfied. However, residents change their minds, especially as a tree close to the fenceline grows. The resident may leave and the new resident demand that the tree be removed at government expense. It is far cheaper to remove all trees that are to be removed during the creation of a firebreak. Thus, in future, trees clearly violating these guidelines will be removed, despite the objections of residents.

A.3 CREATING THE FIREBREAK

A.3.1 The site survey

Government staff will:

a. note any problems - such as steeply sloping land;
b. mark the boundaries of the firebreak - usually with brightly-coloured ribbon;
c. mark all trees to be retained - usually with a ring of red or yellow spray paint.

If the undergrowth is particularly dense, the tree-marking operation can be partly delayed until the initial clearing work. The delay will allow easier sighting of the trees for tentative identification. It will also be easier to access the trees to mark them and to examine their bases for signs of structural weakness.

A.3.2 Engagement of a contractor

Government staff will:

a. arrange site visits for contractors;
b. fully describe the work required (including the rationale for tree retention, especially for cases where such trees have not yet been specifically identified);
c. arrange for quotes;
d. engage a contractor to create the firebreak.

A.3.3 Notification to property owners

Government staff will inform all residents and businesses affected of:

a. the intention to create a firebreak;
b. the guiding principles of firebreak creation;
c. the planned timetable for creating the firebreak;
d. the objection procedure.

A.3.4 Objection procedure for retention or removal of trees

A resident or business operator **directly opposite** the tree or trees in question may object within five (5) days of notification. The objector may request that the government remove a tree marked for retention, or retain a tree that would otherwise be removed. A government staff member will inspect the site and inform the objector of the result of the request and the reason(s) for any refusal of the request.

Any resident may later request the removal from the firebreak of a tree that:-

a. *meets firebreak guidelines* - the request may be rejected, or approved on the proviso that the objector pay for the tree's felling and removal;
b. *no longer meets firebreak guidelines* - the government will arrange for the tree's felling and removal, if funds permit.

A.3.5 The recommended procedure

This procedure is not a set of rigid rules, but it is highly recommended, because it is designed to minimise the impact on the land, minimise smoke generation and allow the firebreak to be created in one continuous operation.

1. The optional initial drott path

If the undergrowth is particularly dense, it may be preferable to begin the clearing operation by pushing a path through the strip with a drott. The path should swing in and out across the strip, to avoid creating a line-of-sight along the firebreak. The clearing should avoid the destruction of mature healthy native trees, where possible.

2. Chainsawing the undergrowth

Chainsaws are used to clear the undergrowth and unmarked saplings and fell trees not marked for retention. Saplings are cut off about 30-to-40 cm from the ground. This allows a bobcat, in a later operation, to gain purchase to rip out the root system.

3. Chipping

Undergrowth, saplings and living trees freshly felled are fed to the chipper. The chipper follows the chainsaw operators and either spreads the chip along the strip, or piles it for later removal and sale.

The use of a chipper:

a. greatly reduces the amount of material to be burned and so greatly reduces the amount of smoke produced;
b. further reduces the amount of smoke produced in the burning operation, by consuming the green fuel.

When the chip produced is left scattered on the ground, the layer of chip inhibits weed infestation and regrowth along the firebreak. This is the best use of the chip. However, if the cost of creating the firebreak can be significantly reduced by the contractor collecting and selling the chip, this may be the preferred option when budgets are tight.

4. Ripping out the base and root systems of felled trees

A bobcat with a toothed scoop is used to rip out the base and root systems of trees.

5. *Stacking and burning*

Long-dead timber can damage the chipper blades and some felled timber may be too large for the chipper. Such timber and tree bases ripped out by the bobcat are stacked and burned.

This stacking and burning operation can be carried out immediately, because there is little or no green fuel in the stacks. This is another advantage of the chipper - without it, the drott would have to return in a month's time for the stacking and burning.

Burning is begun late enough not to disturb the residents' sleep, but otherwise as early as possible to have the stack burning through most daylight hours. An 8 am start is reasonable. Material is often moved from one stack to accelerate the burning process.

If, near nightfall, the stacks are still burning and there is a significant amount of unburnt fuel, a QFS fire officer should be consulted. It is preferable to let the stacks burn out overnight. In this case, the affected residents must be informed and the situation explained. Alternatively, if the QFS officer refuses to agree to the overnight burning of stacks, the stacks must be dismantled and the burning material buried.

Cleared or felled vegetation is NOT to be merely pushed beyond the bounds of the firebreak. Such a buildup of combustible material along the edge of the firebreak not only produces visual ugliness. It also makes the backburning process itself more difficult and dangerous.

All rubbish is to be removed from a firebreak.

6. *Smoothing the firebreak*

The final operation is to smooth the firebreak, to simplify its later maintenance. This is usually done by the drott, with a levelling blade.

A.4 MAINTAINING THE FIREBREAK

A.4.1 Maintenance by local residents

Where possible, the affected residents and (especially) businesses will be encouraged to maintain the firebreak. It is, after all, in their own interests to do so. An attractively-maintained firebreak will also enhance the value of nearby residences.

1. Residents will NOT be allowed to use firebreaks to store goods, dump goods, house animals, or park vehicles.

2. If the affected residents maintain the firebreak themselves and their actions do not impede access along the firebreak, they will be allowed to use the firebreak for the following purposes:
   a. install **small** barbecue areas, if there is no risk of the neighbouring bushland being ignited;
   b. plant native species to improve the appearance of the firebreak and attract wildlife;
   c. plant **small** vegetable gardens.

A.4.2 Maintenance by Community Services workers

Maintenance can be carried out by citizens working off their Community Service obligations. However, despite several attempts by DoL staff, it has proved impossible to organise a maintenance schedule with Community Services. This approach has thus been abandoned.

A.4.3 Maintenance by Corrective Services workers

DoL has investigated the use of the Work Program in Corrective Services. However, prison labour is best used in large one-off projects, such as creating a firebreak.

A.4.4 Maintenance by the Australian Trust for Conservation Volunteers

DoL has investigated hiring a workgroup from ATCV (Australian Trust for Conservation Volunteers). ATCV is a national, non-profit organisation, which seeks to assist landholders with practical conservation projects. However, DoL concluded that ATCV was better suited to more sophisticated labour-intensive work, such as land rehabilitation.

A.4.5 Maintenance by workers in Government employment schemes

DEET (the federal Department of Employment, Education and Training) operates several schemes to train the unemployed. Schemes that may apply include:

* LEAP (Landcare and Environment Action Program);
* REEP (Regional Environmental Employment Projects);
* JobSkills schemes

DoL is examining the possibility of using workers in such schemes for community tasks, such as firebreak maintenance.

A.4.6 Maintenance by internal staff

CSC and DEH use their day labour organisation to create and maintain firebreaks.

A.4.7 Maintenance by contractor

CSC may also engage slashing contractors to maintain firebreaks.
DoL will also probably engage slashing contractors for firebreak maintenance, if the lower-cost alternatives prove not to be practical.

A.4.8 Maintenance costs met by developers

Firebreak provisions should be considered as an essential component of future subdivision design and approval. Various options are possible:

1. The boundary with government bushland could be a sealed road - thereby obviating the need for a firebreak.

2. The firebreak may be part of the developer's contribution to parkland. If the neighbouring bushland is later residentially developed, the firebreak could serve as a wildlife corridor.

A.4.9 Maintenance schedule

It would be preferable to maintain each firebreak twice a year:

1. a couple of months into the growing season (usually November-December);
2. at the end of the growing season (usually March-April).

Funding limitations and the increasing number of firebreaks make this schedule unlikely. DoL presently aims to maintain each firebreak in September - just prior to the bushfire and growth season.

MAPS

Map 1 : Bribie Island - land responsibilities

Map 2 : Bribie Island - vegetation

Map 3 : Bribie Island - fire hazard

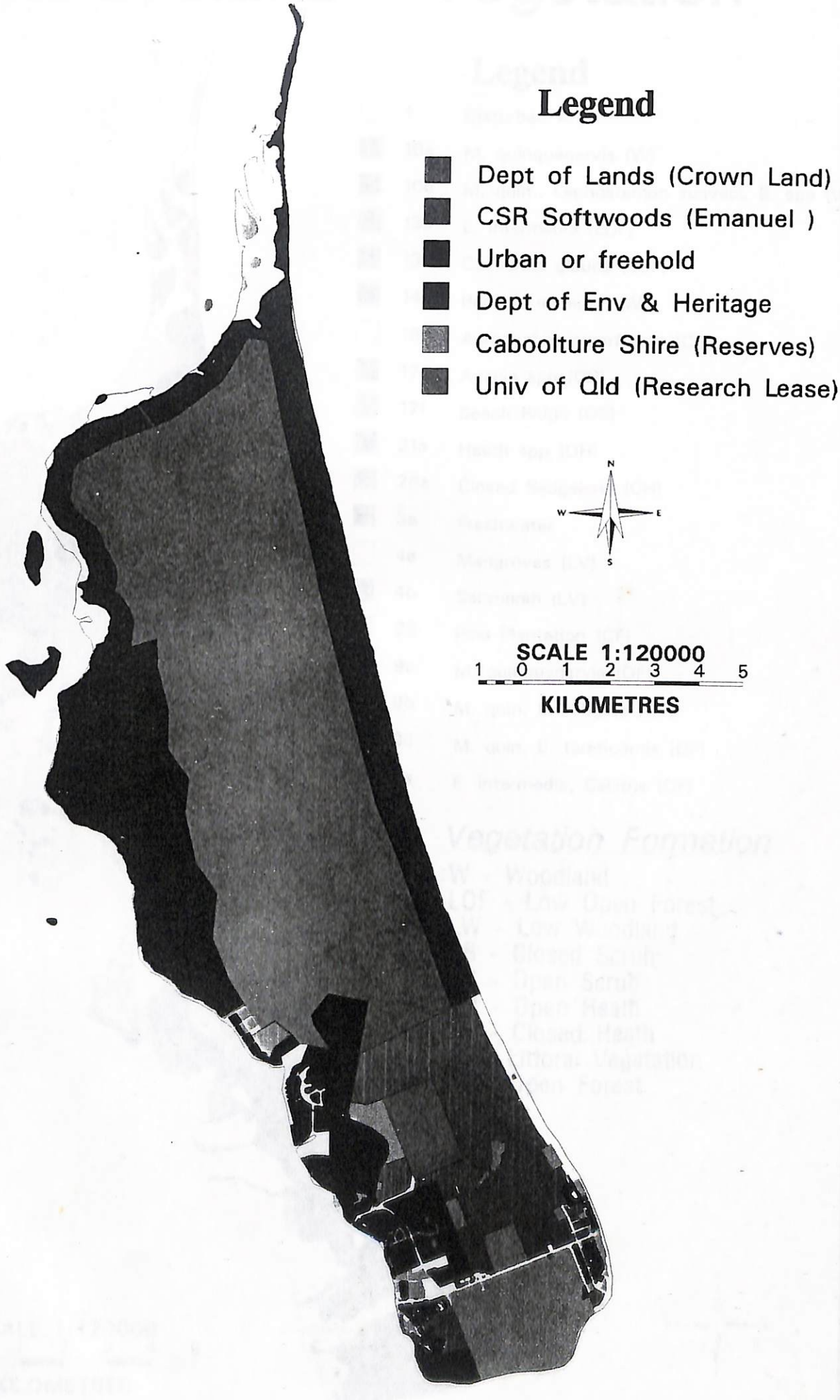
Map 4 : Bribie Island - VCL track network

Map 5 : Bribie Island - CSR firebreaks

Map 6 : Bribie Island - DEH vegetation blocks

Map 7 : Bribie Island - CSR controlled burn timetable

Bribie Island - Land Responsibilities



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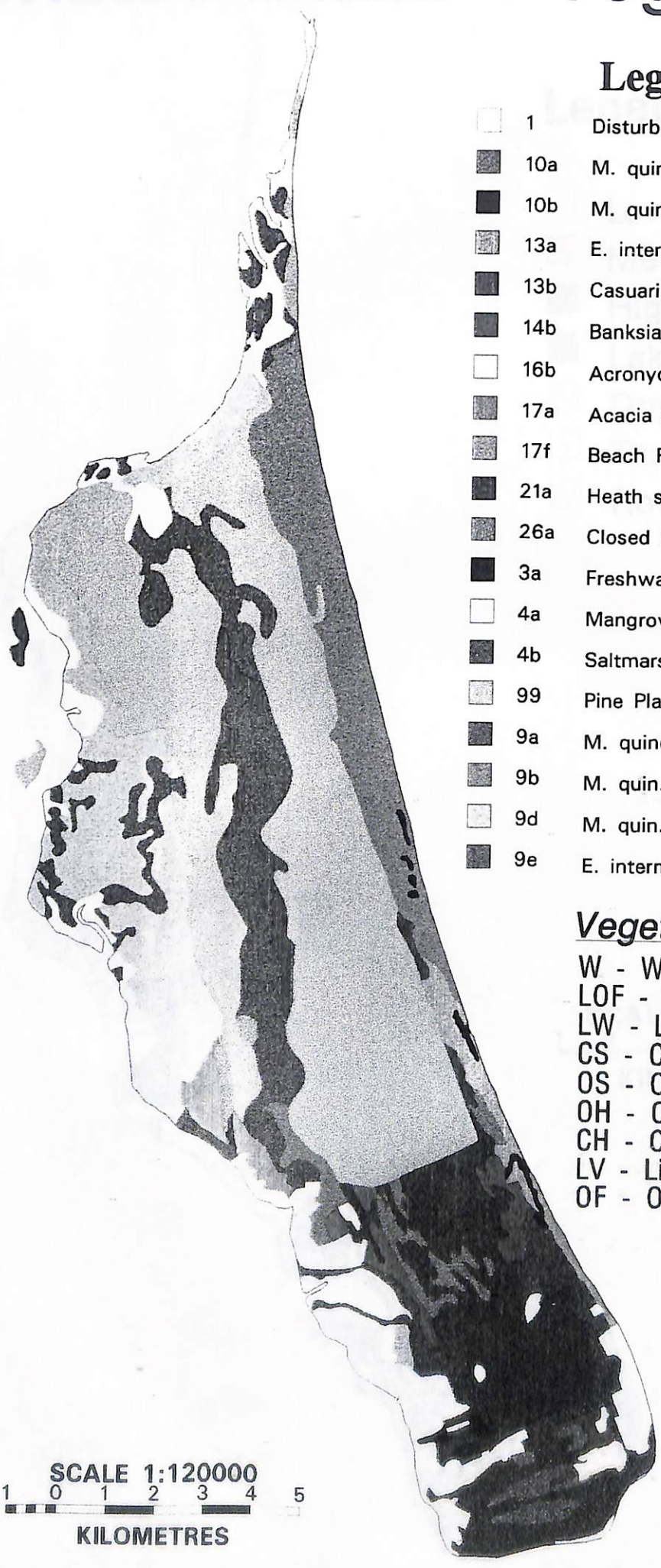
Bribie Island - Vegetation



Legend

	1	Disturbed Area
	10a	M. quinquenervia (W)
	10b	M. quin., Lephostemon suaveol. E. spp (W)
	13a	E. intermedia (LOF)
	13b	Casuarina glauca (LOF)
	14b	Banksia aemula (LW)
	16b	Acronychia imperforata (CS)
	17a	Acacia spp (OS)
	17f	Beach Ridge (OS)
	21a	Heath spp (OH)
	26a	Closed Sedgeland (CH)
	3a	Freshwater
	4a	Mangroves (LV)
	4b	Saltmarsh (LV)
	99	Pine Plantation (CF)
	9a	M. quinquenervia (OF)
	9b	M. quin. E. robusta (OF)
	9d	M. quin. E. tereticornis (OF)
	9e	E. intermedia, Callitris (OF)

Vegetation Formation

W - Woodland
LOF - Low Open Forest
LW - Low Woodland
CS - Closed Scrub
OS - Open Scrub
OH - Open Heath
CH - Closed Heath
LV - Littoral Vegetation
OF - Open Forest

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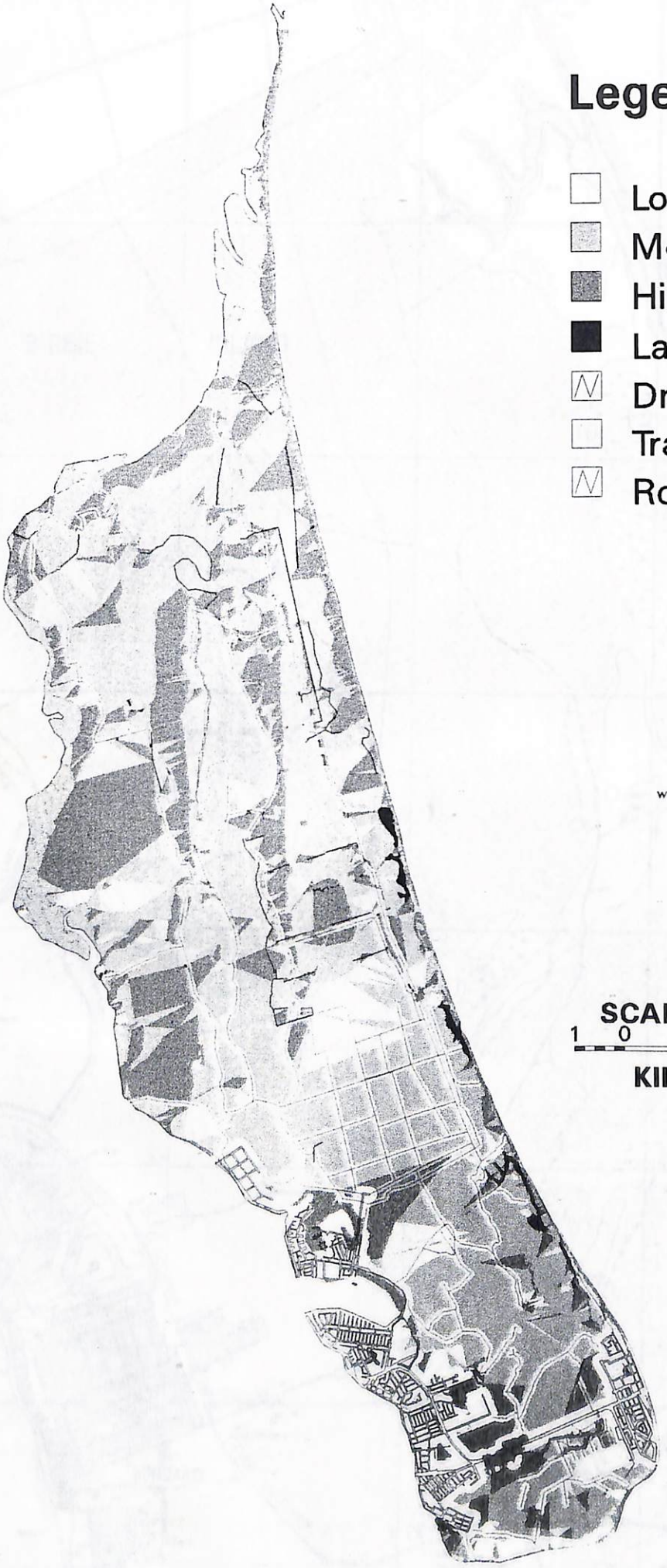
Bribie Island - Fire Hazard



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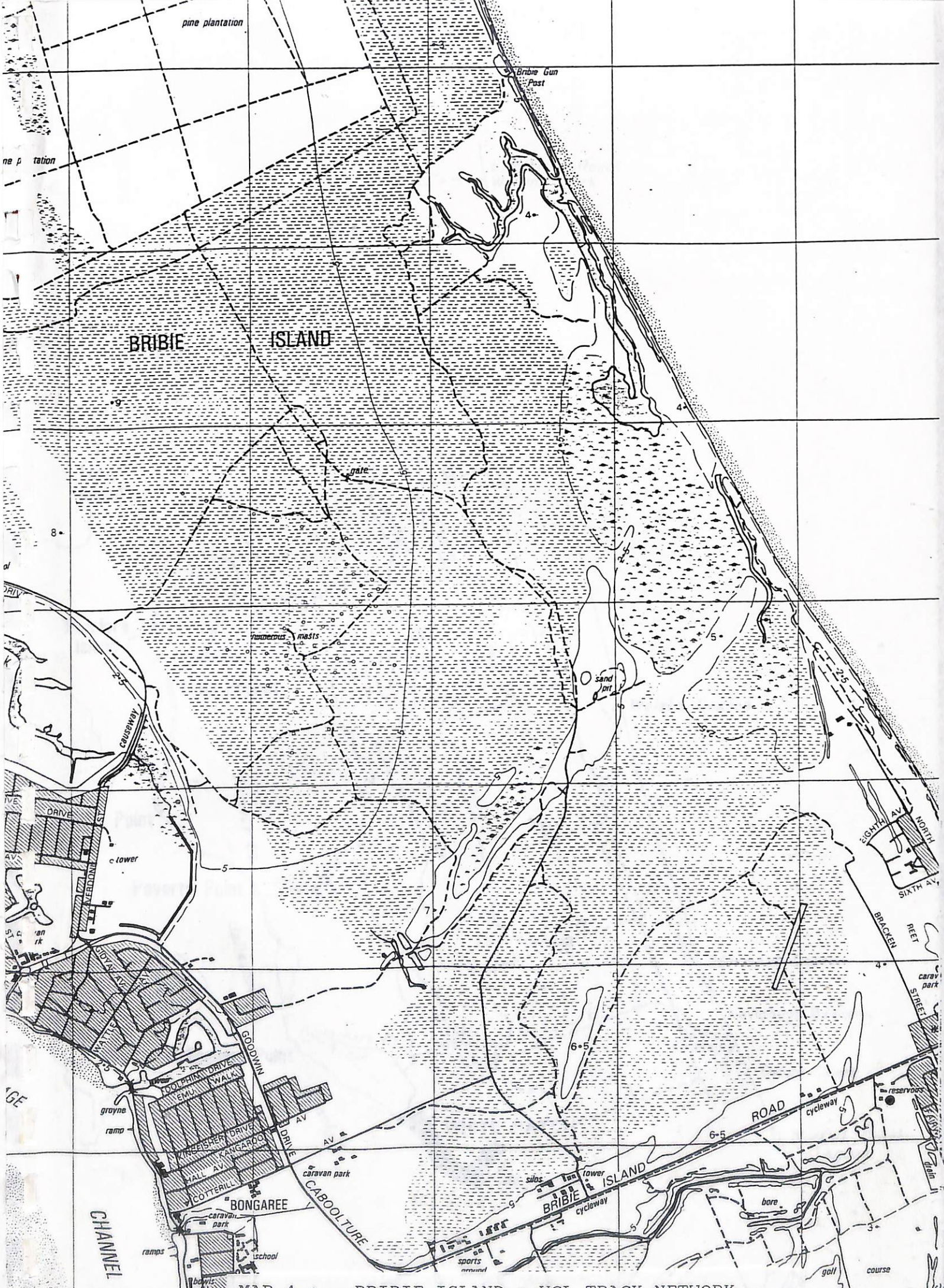
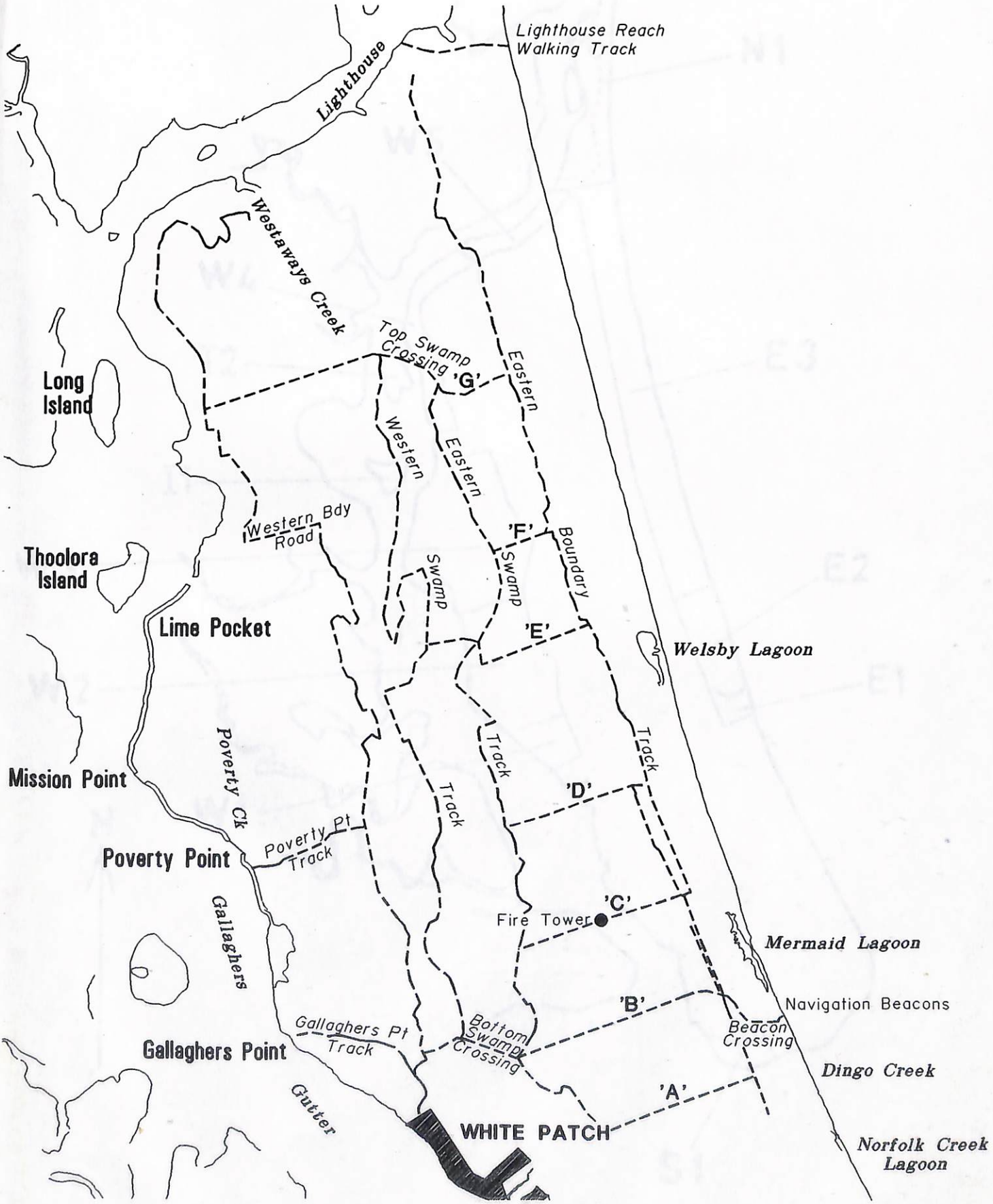
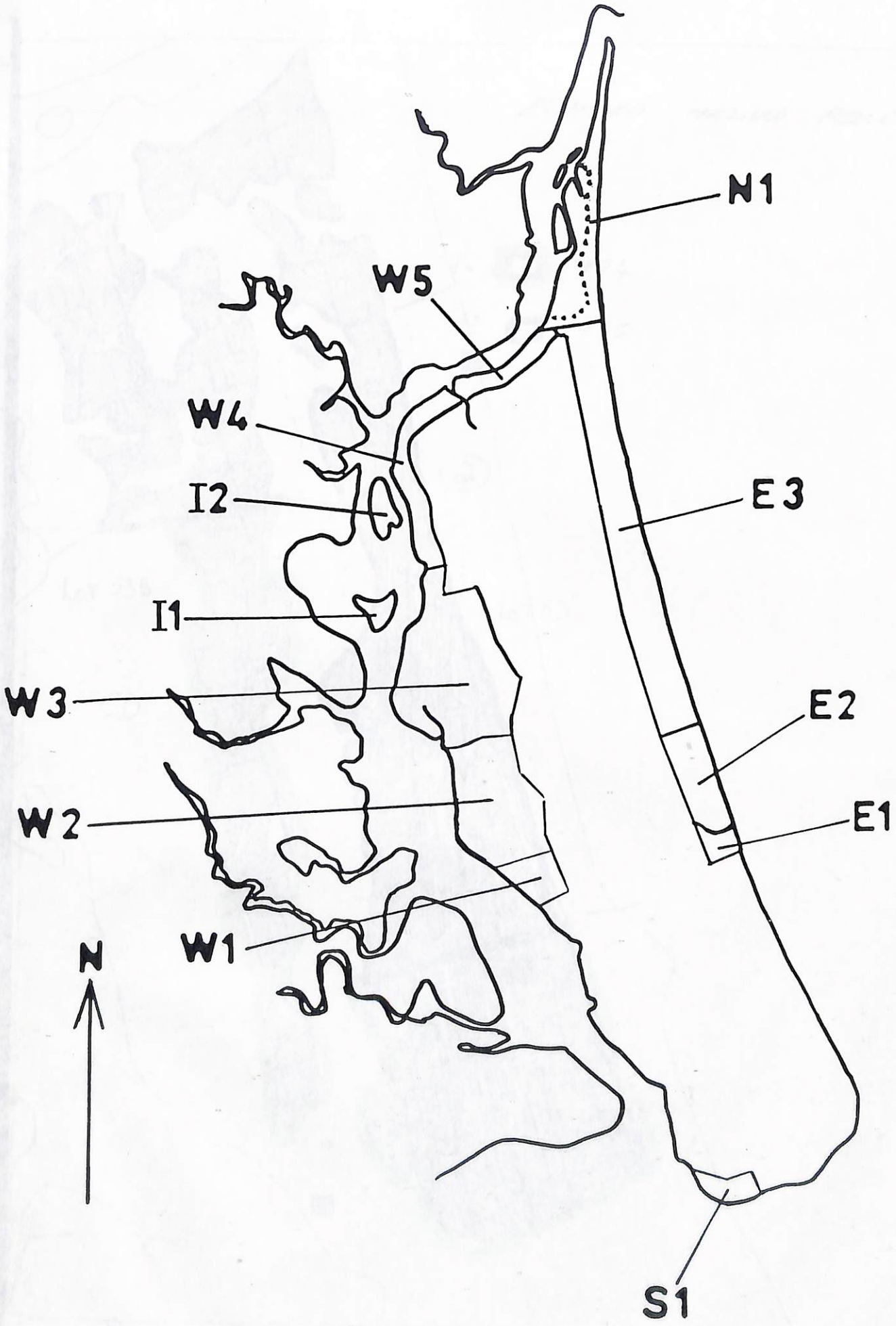


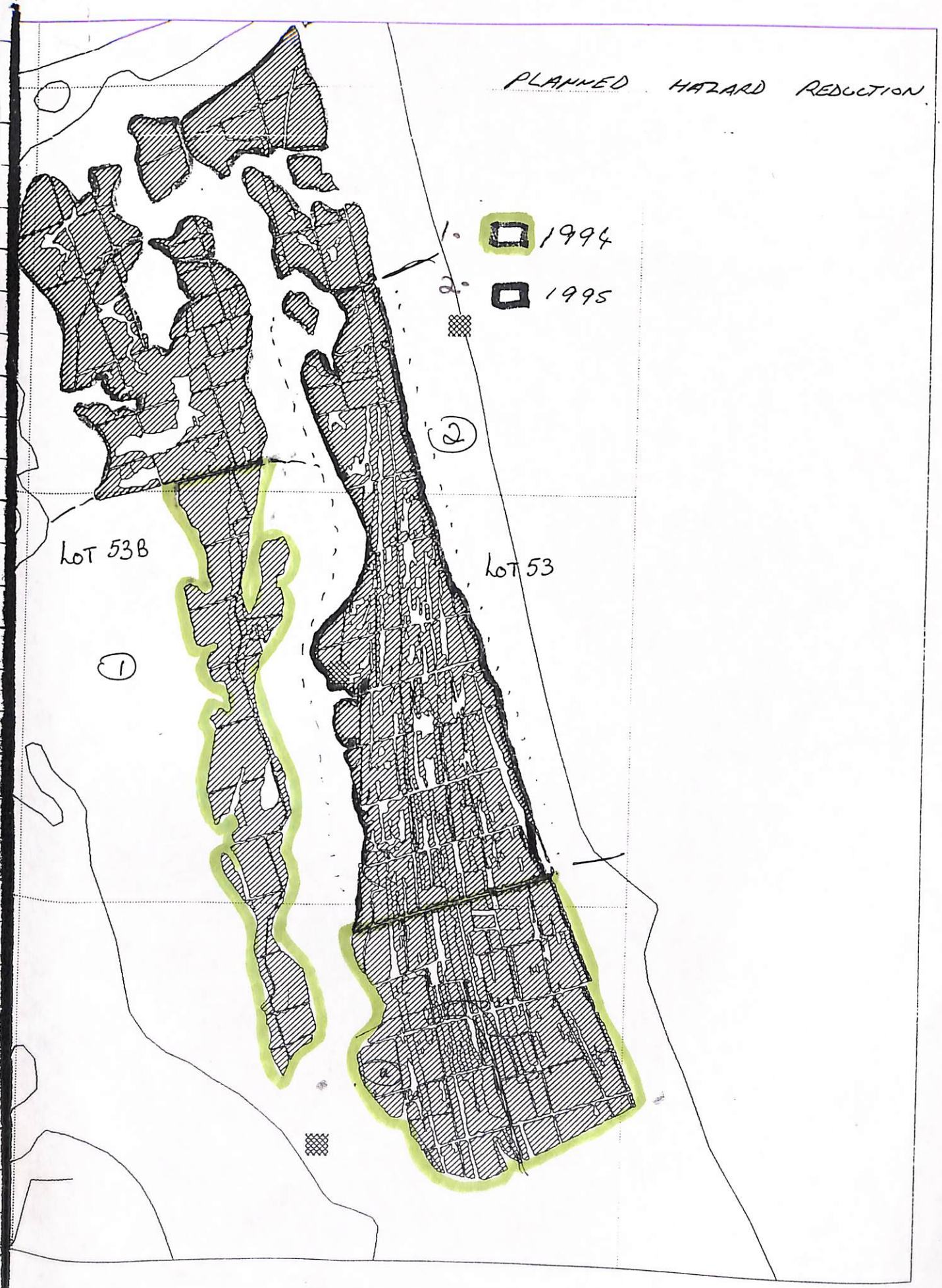
MAP 4 : BRIBIE ISLAND - VCL TRACK NETWORK



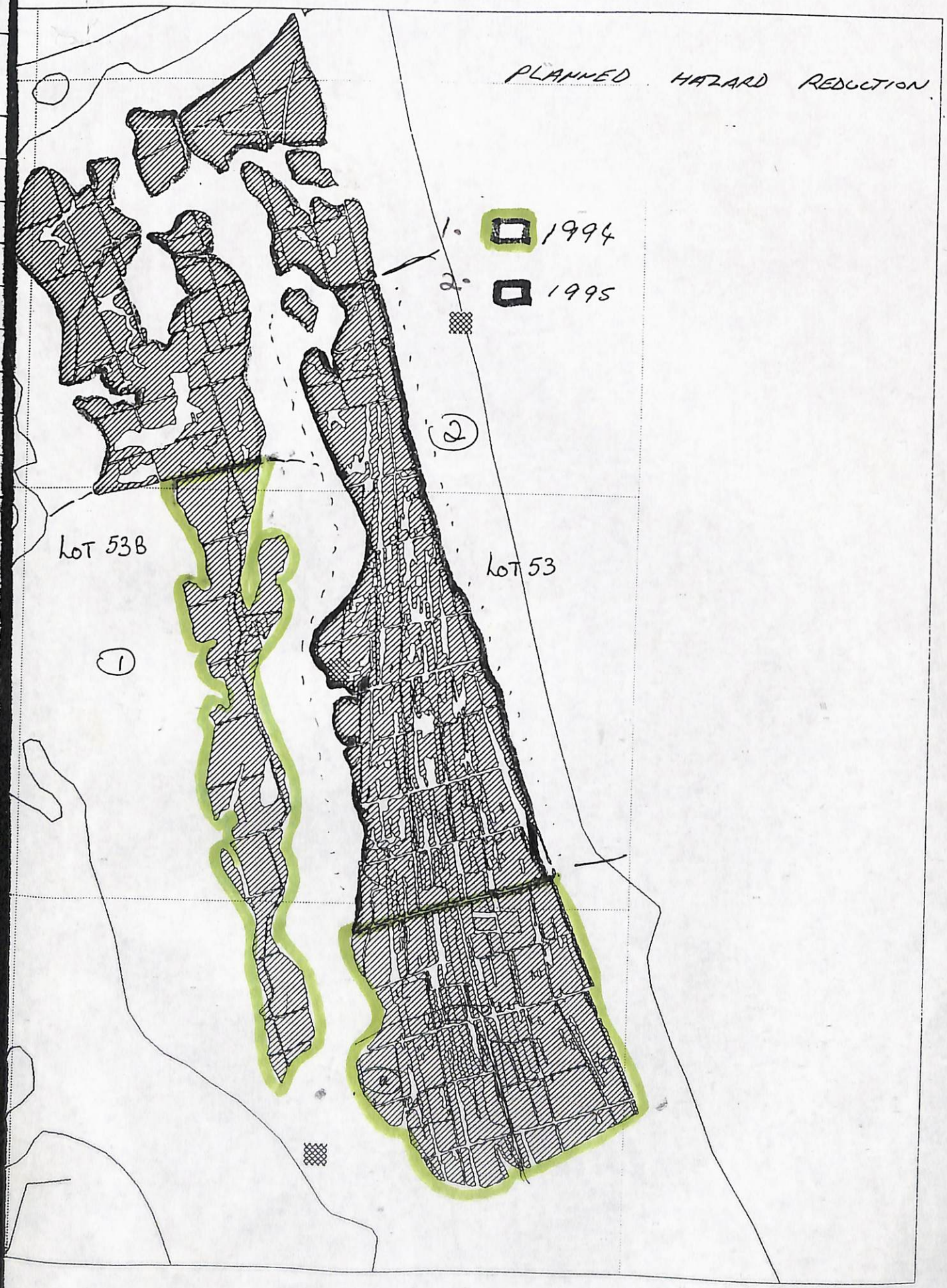
MAP 5 : BRIBIE ISLAND - MAJOR CSR FIREBREAKS



MAP 6 : BRIBIE ISLAND - DEH VEGETATION BLOCKS



MAP 7 : BRIBIE ISLAND - CSR CONTROLLED BURN TIMETABLE



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