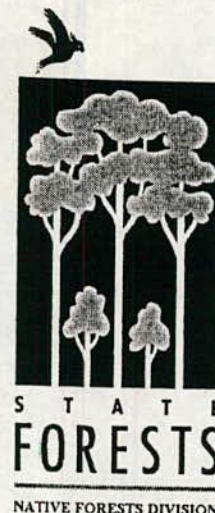


Northern Rivers Region

File 356 D



Ewingar State Forest, Compartment 605 - Masked Owl Nest Site.

A Masked Owl nest site is situated in compartment 605 adjacent to road 605/605 between dumps 24 and 25.

The nest site is excluded from harvesting as it is incorporated into the Squirrel Glider protection zone. However, the Mask Owl is susceptible to noise and disturbance likely by logging trucks using road 604/605 to dump 24 during harvesting.

In order for a better appreciation of the likely impacts of traffic past the nest site, the following recommendation will apply :

1. No logging trucks or harvesting machinery must use 604/605 road through & past the nest site until such time as Ken McCray (Ecologist) has thoroughly examined the impacts of such activity.
2. Harvesting must not proceed east of dump 25 until the Ecologist has inspected the nest site for likely impacts.
3. The SFO must inform the Forest Planner or Ecologist at least 5 working days prior to requiring access along 604/605 road to dump 24.


Kevin Petty
Forest Planner
25th February 1998



CASINO MANAGEMENT AREA NATIVE FOREST HARVESTING PLAN

AREA: EWINGAR STATE FOREST No.845

LOCATION: Compartments 604 - 608

OPERATION: FOREST HARVESTING

PLAN No.: CAS 604-608 23/2/98

COPY.

MANAGERING - CARING - SUSTAINING



NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE

Bob Smith
Chief Executive Officer
State Forests of NSW
Locked Bag 23
PENNANT HILLS NSW 2120

Attention: The Manager
Our reference: Forest Planning Branch
Your reference:

Dear Mr Smith,

RE: TEMPORARY SECTION 120 LICENCE TS006
Casino and Casino West Management Area

I refer to temporary section 120 licence TS006 for the Casino and Casino West Management Area issued on 7 November 1997. As requested, I have varied this licence as detailed below.

(1) Section 2 of the 7 November 1997 licence variation is amended by this variation to read as follows:

"2. Non-IDFA Compartments

Unless otherwise stated, this licence variation applies to all compartments listed below:

Royal Camp SF: compartment 18

Camira SF: compartments 79, 80, 82

Gibberagee SF: compartments 115, 117, 125, 126, 118, 119, 120, 121, 122, 123, 127, 128, 129

Mt Belmore SF: compartments 399, 401, 402, 403, 404, 406, 407, 412, 414, 415, 416, 417, 418, 421, 422, 423, 424, 445, 446

Mt Marsh SF: compartment 442

Ewingar SF: compartments 604, 605, 606, 607, 608, 625, 626, 627, 628, 644, 647, 649, 650, 652, 656, 665, 668, 673

Billilimba SF: compartments 666, 667, 678, 679

Northern Zone
GIO House
24 Mconee Street
Coffs Harbour NSW
Australia
PO Box 914
Coffs Harbour 2450
Tel: (02) 6651 5946
Fax: (02) 6651 6187

Head Office
43 Bridge Street
Hurstville NSW
Australia
PO Box 1967
Hurstville 2220
Tel: (02) 9585 6444
Fax: (02) 9585 6555

Washpool SF: compartments 684, 685, 718, 719, 720, 721, 722"

(2) Section 5 of the 7 November 1997 licence variation is amended by this variation to read as follows:

"5. Duration for which this licence variation applies

Unless otherwise specified or authorised in writing by Manager, Threatened Species, Northern Zone, National Parks and Wildlife Service (NPWS), this licence variation applies to operations within the areas specified in Section 2 of this letter from 1 January 1997 to 28 February 1998."

(3) The following Section is added to the 7 November 1997 licence variation:

"14. Pre-roading and pre-logging surveys

Unless otherwise authorised in writing by the Manager, Threatened Species Northern Zone National Parks and Wildlife Service, no specified forestry activities may be undertaken in any compartment unless the following pre-logging and pre-roading surveys have been conducted. This condition applies to compartments currently licensed by National Parks and Wildlife Service but not listed in Section 2, and also includes continuing operations and operations not yet commenced.

1 Introduction

As specified in the Threatened Species Protocol (TSP) of November 1996, pre-logging and pre-roading surveys are required for certain threatened species. Threatened flora and fauna requiring surveys are listed in Appendices 1 and 2 of this condition respectively. These species are those that require species-specific prescriptions or site-specific prescriptions under the Threatened Species Protocol. The surveys set out below are designed to specifically target these species.

SFNSW may decide to invoke a particular prescription for a species rather than conducting surveys for species. However there are only limited circumstances where this will be possible as most prescriptions are triggered by a record.

1.1 Principles of survey design

- To provide information in order for managers to maintain and enhance local viable populations of threatened species within timber production forests for the duration of the IAP.
- Surveys are to have regard to cost-effectiveness and take account of currently used methods.
- To provide enough information to allow a justified decision with regard to the dual objectives of the Government Forestry Policy.

1.2 Objectives

- To provide a trigger to apply species prescriptions.
- To conduct surveys in a coordinated, systematic and efficient manner which ensures a standardised approach across SFNSW Regions.
- To set minimum standards for survey techniques and effort.

520npp-KG

FACSIMILE TRANSMISSION

To	Dr. Neil Shepherd, Environment Protection Authority P O Box 1135 CHATSWOOD NSW 2057		
Attention	Dr Barbara Richardson Catchments Branch	Date	19 Feb 1998
Your Fax	(02) 9415 2949	Our Fax	(02) 9484 0057
From	Kris Gounder Sustainable Forest Management Branch	Phone	(02) 9980 4217 (015) 271 625
No of Pages	1 (including this cover page)		

**RE: NOTICE UNDER SECTION 17D(3) OF THE POLLUTION
CONTROL ACT 1970**

In terms of Clause 13(b) of the Pollution Control Regulations, State Forests of New South Wales hereby notifies you that no appeal will be made against EPA's decision to vary Licence No. 4017 on the 19 February 1998 to include the following areas:

Comp No.	State Forest	Management Area
604 - 608	Ewingar	Casino

for **KRIS GOUNDER**
for Manager
Sustainable Forest Management

For State Forests Use Only (Page 1 of 2) </

Regional Forester: Northern Rivers

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment on **19 February 1998**. Accordingly you may start logging these compartments on **21 February 1998**.

Manager, Sustainable Forest Management



State Forests of
New South Wales

Building 2
423 Pennant Hills Road
Pennant Hills NSW
2120
Phone (02) 980 4100

COPY

CERTIFIED MAIL

FORESTRY COMMISSION OF NSW T/A STATE FORESTS
OF NSW
BUILDING 2, 423 PENNANT HILLS ROAD
PENNANT HILLS NSW 2120

Environment
Protection
Authority
New South Wales

PO Box 1135 Chatswood NSW 2057
Tel .02. 9795 5000 Fax .02. 3325 5678

Our Reference: 600000/D00/Not. Nos. 005081

Your Reference:

19 February, 1998

NOTICE UNDER SECTION 17D(3)
OF THE POLLUTION CONTROL ACT 1970

WHEREAS .

- (a) FORESTRY COMMISSION OF NSW T/A STATE FORESTS OF NSW is the holder of licence number 004017 in respect of premises situated at LAND IN THE NORTHERN REGION, - which expires on 7 August, 1998.

TAKE NOTICE THAT .

In accordance with the powers vested in the Environment Protection Authority (EPA) under Section 17D(3) of the Pollution Control Act 1970, the EPA with respect to licence number 004017 from the date of this Notice hereby:-

1. Varies this licence by inserting the following compartment description, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

"Compartment Description

Compartments 604, 605, 606, 607 & 608
Ewingar State Forest No. 845

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3.
2	Greater than 3 and less than or equal to 13.
3	Greater than 13 and less than or equal to 30.
4	Not applicable.

Proportion of dispersible soils: A horizon less than 10%
B horizon greater than 10%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 604, 605, 606, 607 & 608, Ewingar State Forest No. 845, prepared by State Forests of NSW, received by the EPA on 6 February 1998, and as amended by addendum 1 received by the EPA on 18 February 1998.

Water Quality Monitoring Site

To be determined

Date of licence variation

19 February 1993."

2. Varies this licence by inserting the following compartment description, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

"Compartment Description

Compartments 282, 283 & 285
Tuggolo State Forest No. 312

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 6.
2	Greater than 6 and less than or equal to 29.
3	Greater than 29 and less than or equal to 30.
4	Not applicable.

Proportion of dispersible soils: A horizon greater than 10%
B horizon greater than 10%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 282, 283 & 285, Tuggolo State Forest No. 312, prepared by State Forests of NSW, received by the EPA on 13 February 1998, and as amended by addendum 1 received by the EPA on 18 February 1998.

Water Quality Monitoring Site

To be determined

Date of licence variation

19 February 1998."

NEIL SHEPHERD

Director-General

Per 

Barbara Richardson
Manager Waters & Catchments
Policy
WATERS AND CATCHMENTS
(by Delegation)

March 2, 1998

North East Forest Alliance
C/- Big Scrub Environment Centre
123 Keen Street
Lismore 2480 NSW

Georgia Beyer,

State Forests of NSW has reviewed the proposals put forward by NEFA regarding enlarging the logging exclusion zone for protection of the Brush-tailed Rock Wallaby (BtRW) foraging areas.

An onsite inspection was carried out on the 2/3/98 by Brett Cann (Planning Forester) and Jim Rankin (Planning Forest Assistant) to review the options available to State Forests and any possible impacts associated with the implementation of proposal put forward by NEFA on the 20/2/98.

State Forests has enlarged the Wildlife Connection Corridor within compartment 608 to cater for BtRW foraging areas from a minimum 80 metres upto 120 metres in some sections. Also the soft edges of the corridor will lead to an effective connection corridor in excess of the marked Corridor.

A 200 metre modified logging zone has been established which runs from the Connection Corridor in compartment 608 East to log dump 2. The area contained within the modified logging zone will be subject to minimal disturbance of ground cover by the use of Walkover Technique to retain foraging attributes for the BtRW.

Two sections of the Net logging area previously indicated as available for logging will be reserved and retained to increase the width of the exclusion zone. These sections are South of road 607/608 between log dumps 6 and 7, and a section to the North West of the indicated Owl Habitat in compartment 608.

Substantial areas of the Net harvest area will be subject to minimal disturbance by logging due to the scattered nature of sawlogs in these low yielding compartments. The harvesting operation planned for this area will be low intensity retaining sections of the overall canopy untouched and utilising walkover techniques where possible to minimise disturbance to ground cover. Also foraging area's to the north of cpts 608 and 607 in the timber reserve will not be subject to disturbance providing foraging resource for the Bulldog Rock population.

Sincerely,

Brett Cann

For: Robert Williams

Planning Manager

**TIMBER INDUSTRY INTERIM PROTECTION ACT 1992
REGULATORY AND PUBLIC INFORMATION COMMITTEE**

423 Pennant Hills Road
PENNANT HILLS NSW 2120

Chairman
Mr David Ridley
Tel: (02) 9980 4551
Fax: (02) 9980 7042

Secretary
Mr Kris Gounder
Tel: (02) 9980 4217
Fax: (02) 9980 7042

Chief Executive
State Forests of NSW
Locked bag 23
Pennant Hills NSW 2120

Dear Sir,

**Determination of Compartments 604-608
Ewingar State Forest, Casino Management Area**


I refer to your request for the Committee's determination on proposed operations within the following compartments in Casino Management Area:

Compartment No.	State Forest
604-608	Ewingar

The Committee has reviewed the plan and associated documents and has determined that the operations detailed in the Harvesting Plan for the above area may proceed with the following condition:

- a) Downhill snigging prescriptions apply to all areas of downhill snigging.

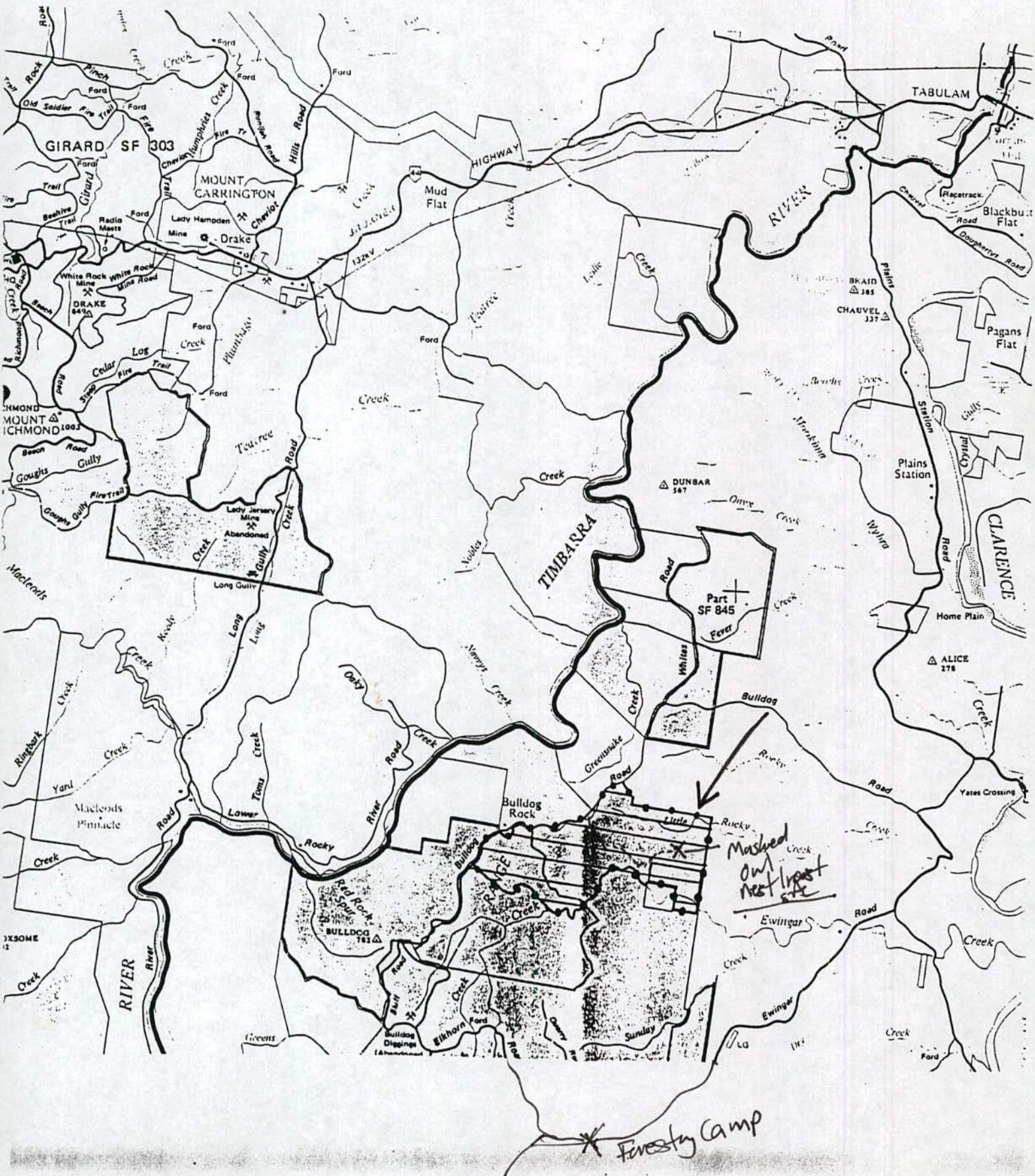
This decision was made by the Committee at Meeting No. 77 conducted on 20 February 1998.


Secretary
Regulatory and Public Information Committee
24 February 1998

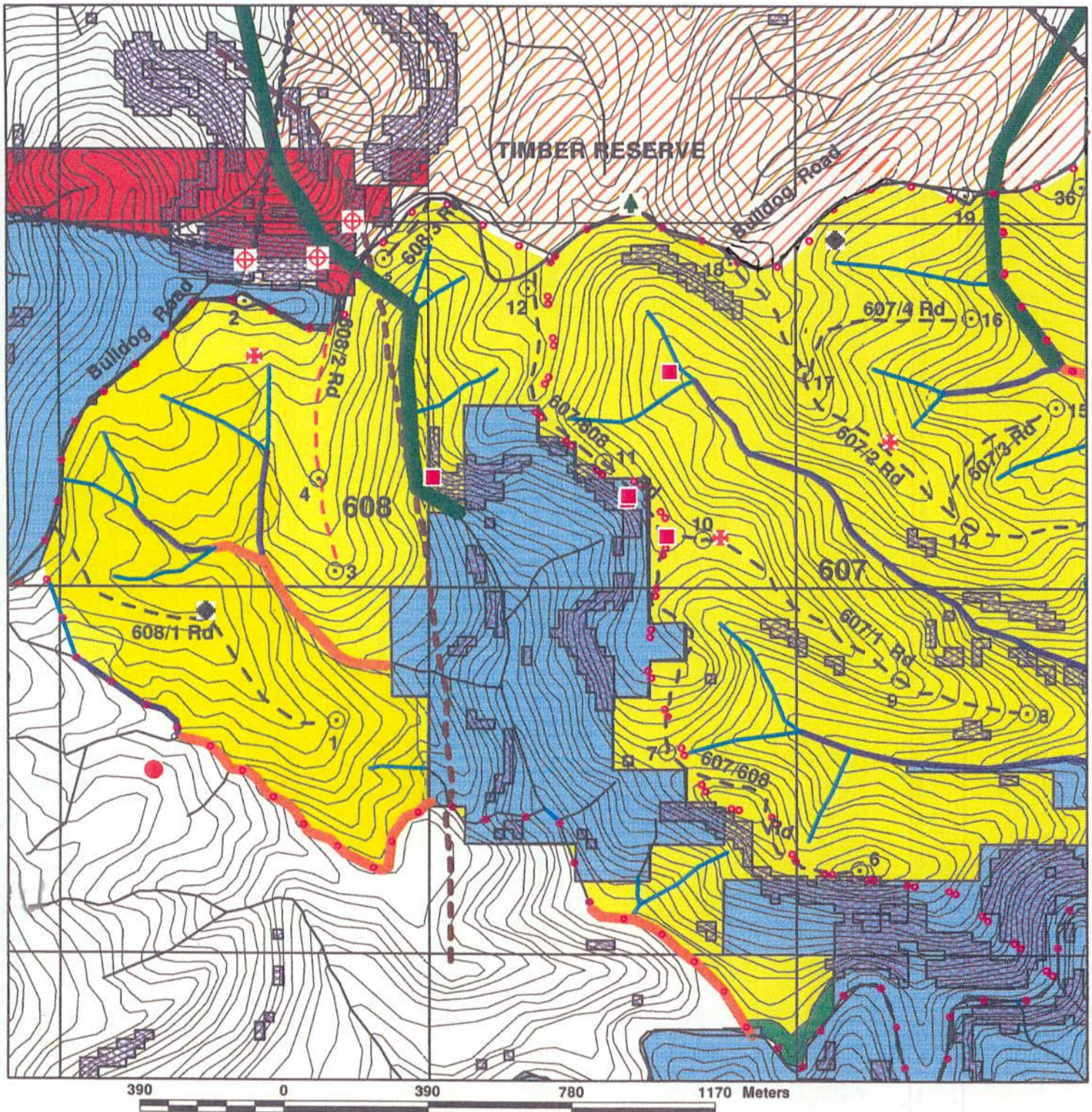
LOCALITY MAP

Compartments 604-608 Ewingar SF

Scale 1: 125 000



NORTHERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 608
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:10 000, DATE 23/02/98, V3



BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- - - Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Green PMP1.1.7 Flora & Fauna (40m)
- Dark Green Connection Corridor (80m)
- Blue Slopes likely over 30 degrees
- Light Blue Fauna Protection (Owl Habitat)
- Dark Blue Fauna Protection (Squirrel Glider Protection 8ha)
- Red Old Growth

DRAINAGE

- Blue External Drainage
- Thick Blue 1st Order Stream (10m buffer)
- Medium Blue 2nd Order Stream (20m buffer)
- Orange 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

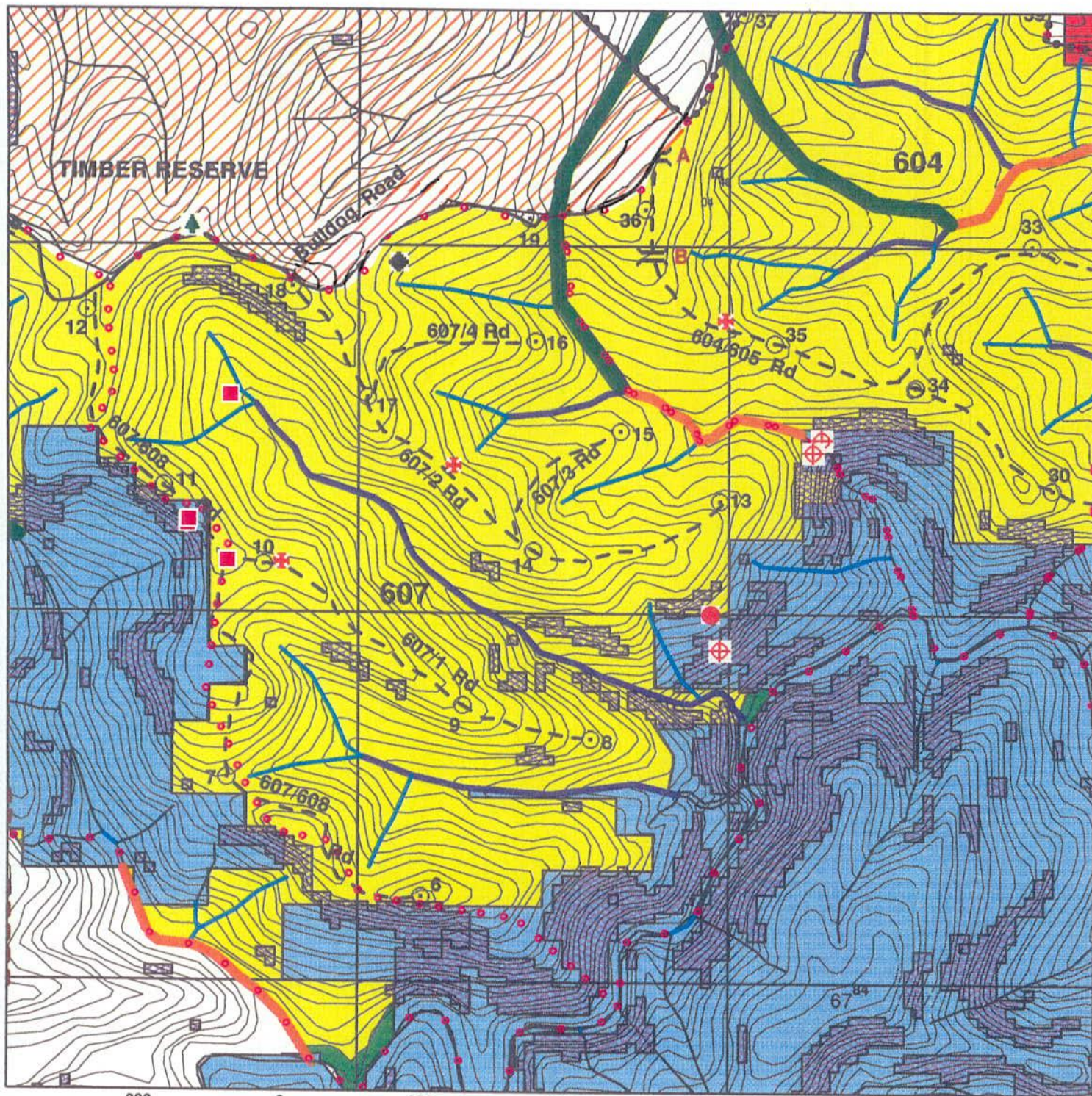
- Circle with dot Temporary Dry
- Square with dot Temporary Wet
- Star Soil Sample
- Circle with cross Soil Boundary
- Double line Approved Crossings

RECORDED SPECIES

- Red square Sooty Owl
- Black diamond Masked Owl
- Green triangle V-nctch Tree
- Blue circle Squirrel Glider
- Red circle with cross Powerful Owl
- Red circle Glossy Black Cockatoo
- Blue circle with dot Masked Owl Nest Site

MN
|
|
|

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 607
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:10 000, DATE 23/02/98, V3



BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- - - Natural Surface
- Sealed or Gravelled
- ... Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Green PMP1.1.7 Flora & Fauna (40m)
- Dark Green Connection Corridor (80m)
- Blue-hatched Slopes likely over 30 degrees
- Light Blue Fauna Protection (Owl Habitat)
- Dark Blue-hatched Fauna Protection (Squirrel Glider Protection 8ha)
- Red Old Growth

DRAINAGE

- Blue External Drainage
- Thick Blue 1st Order Stream (10m buffer)
- Dark Blue 2nd Order Stream (20m buffer)
- Orange 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

- Temporary Dry
- Temporary Wet
- * Soil Sample
- Soil Boundary
- Approved Crossings

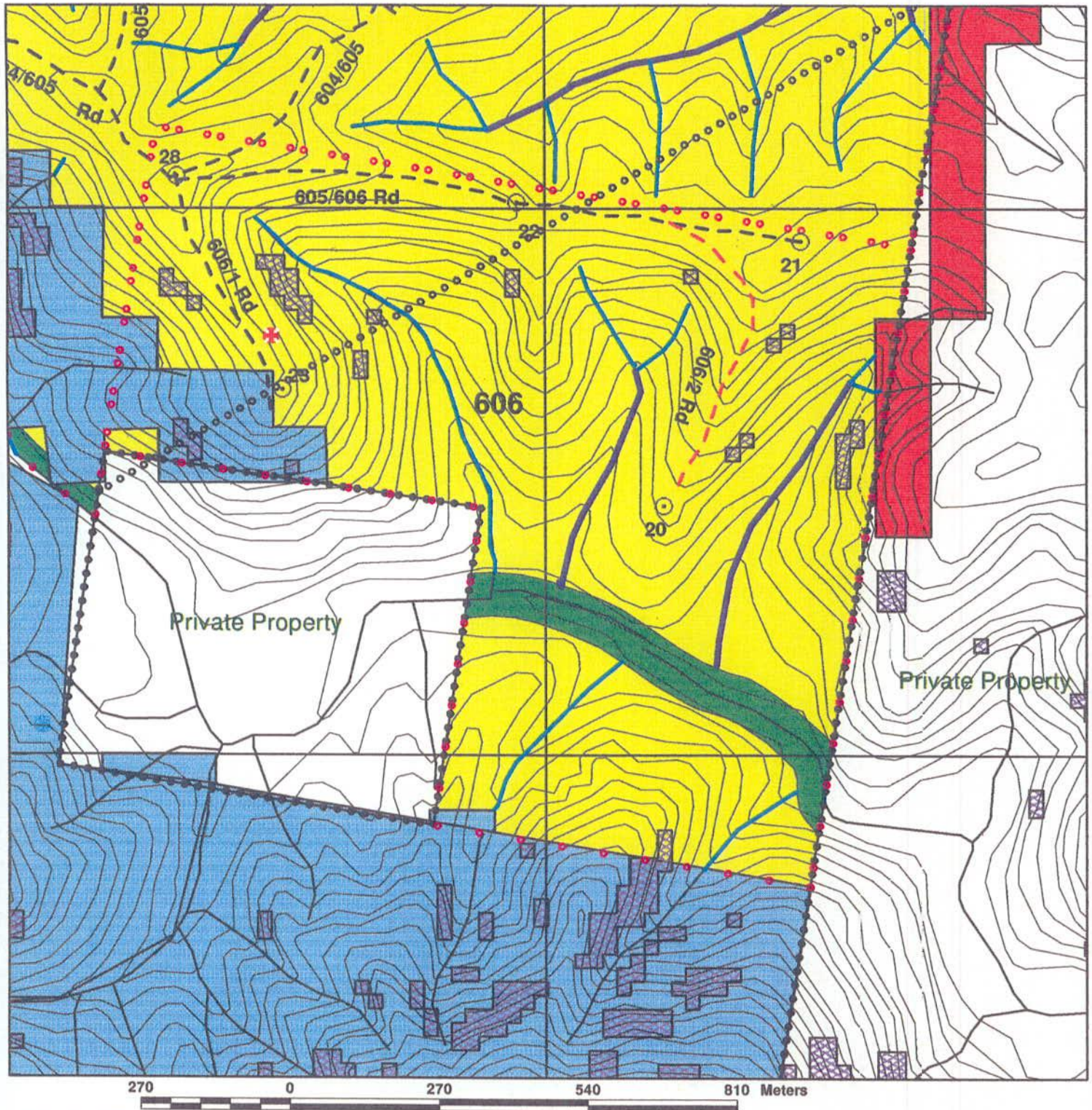
RECORDED SPECIES

- Red square Sooty Owl
- Black diamond Masked Owl
- Green triangle V-notch Tree
- Blue circle Squirrel Glider
- Red cross Powerful Owl
- Red circle Glossy Black Cockatoo
- Blue circle Masked Owl Nest Site

MN
11

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA
HARVEST PLAN OPERATIONAL MAP

COMPARTMENT 606
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:10 000, DATE 23/02/98, V3



BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Green PMP1.1.7 Flora & Fauna (40m)
- Dark Green Connection Corridor (80m)
- Blue Slopes likely over 30 degrees
- Light Blue Fauna Protection (Owl Habitat)
- Dark Blue Fauna Protection (Squirrel Glider Protection 8ha)
- Red Old Growth

DRAINAGE

- Blue External Drainage
- Thick Blue 1st Order Stream (10m buffer)
- Medium Blue 2nd Order Stream (20m buffer)
- Thin Blue 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

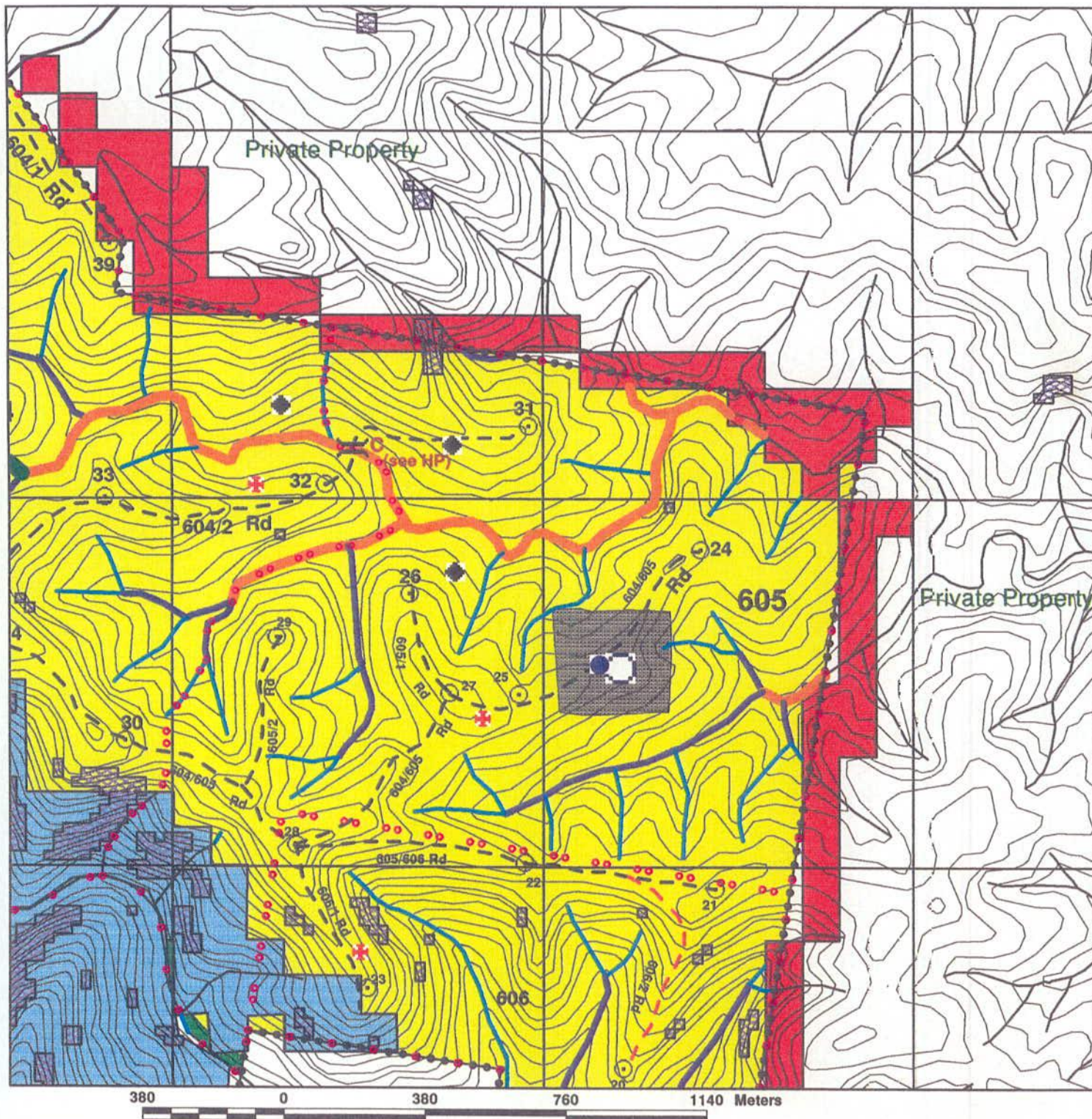
- Temporary Dry
- Temporary Wet
- ✱ Soil Sample
- Soil Boundary
- Approved Crossings

RECORDED SPECIES

- Red Square Sooty Owl
- Black Diamond Masked Owl
- Green Triangle V-notch Tree
- Blue Circle Squirrel Glider
- Red Circle Powerful Owl
- Red Circle Glossy Black Cockatoo
- White Circle Masked Owl Nest Site

MN

NORTHERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 605
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15 000, DATE 23/02/98, V3



BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow box Harvestable Area

NON HARVEST AREAS

- Green box PMP1.1.7 Flora & Fauna (40m)
- Dark green box Connection Corridor (80m)
- Patterned box Slopes likely over 30 degrees
- Blue box Fauna Protection (Owl Habitat)
- Dark blue box Fauna Protection (Squirrel Glider Protection 8ha)
- Red box Old Growth

DRAINAGE

- Blue line External Drainage
- Thick blue line 1st Order Stream (10m buffer)
- Medium blue line 2nd Order Stream (20m buffer)
- Orange line 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

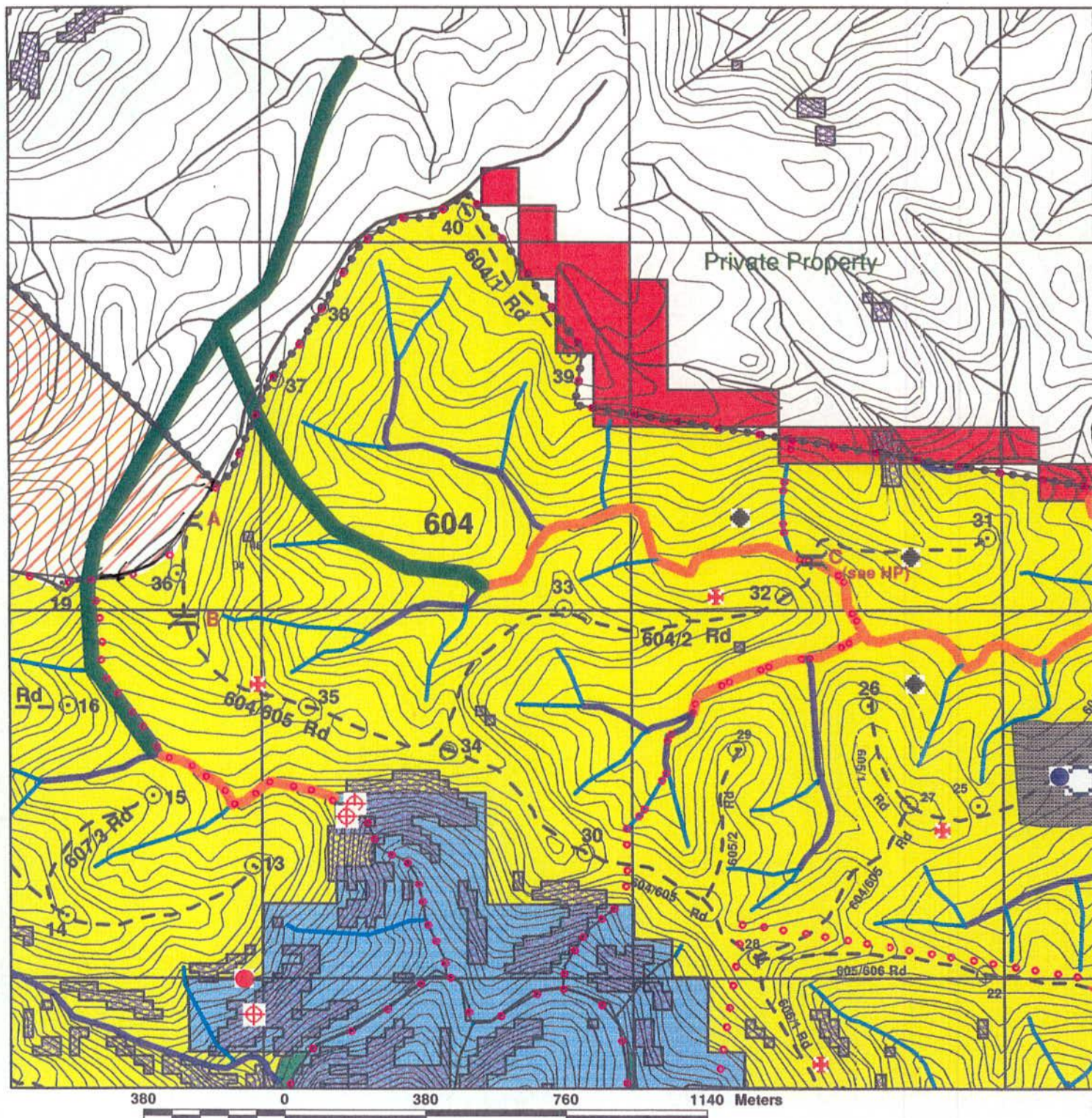
- Circle with dot Temporary Dry
- Square with dot Temporary Wet
- Star Soil Sample
- Thick line Soil Boundary
- Double line Approved Crossings

RECORDED SPECIES

- Red square Sooty Owl
- Black diamond Masked Owl
- Green triangle V-notch Tree
- Blue circle Squirrel Glider
- Red diamond Powerful Owl
- Red circle Glossy Black Cockatoo
- Open circle Masked Owl Nest Site

MN

NORTHERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 604
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15 000, DATE 23/02/98, V3



BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Green PMP1.1.7 Flora & Fauna (40m)
- Dark Green Connection Corridor (80m)
- Blue-hatched Slopes likely over 30 degrees
- Light Blue Fauna Protection (Owl Habitat)
- Dark Blue-hatched Fauna Protection (Squirrel Glider Protection 8ha)
- Red Old Growth

DRAINAGE

- Blue External Drainage
- Thick Blue 1st Order Stream (10m buffer)
- Medium Blue 2nd Order Stream (20m buffer)
- Orange 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

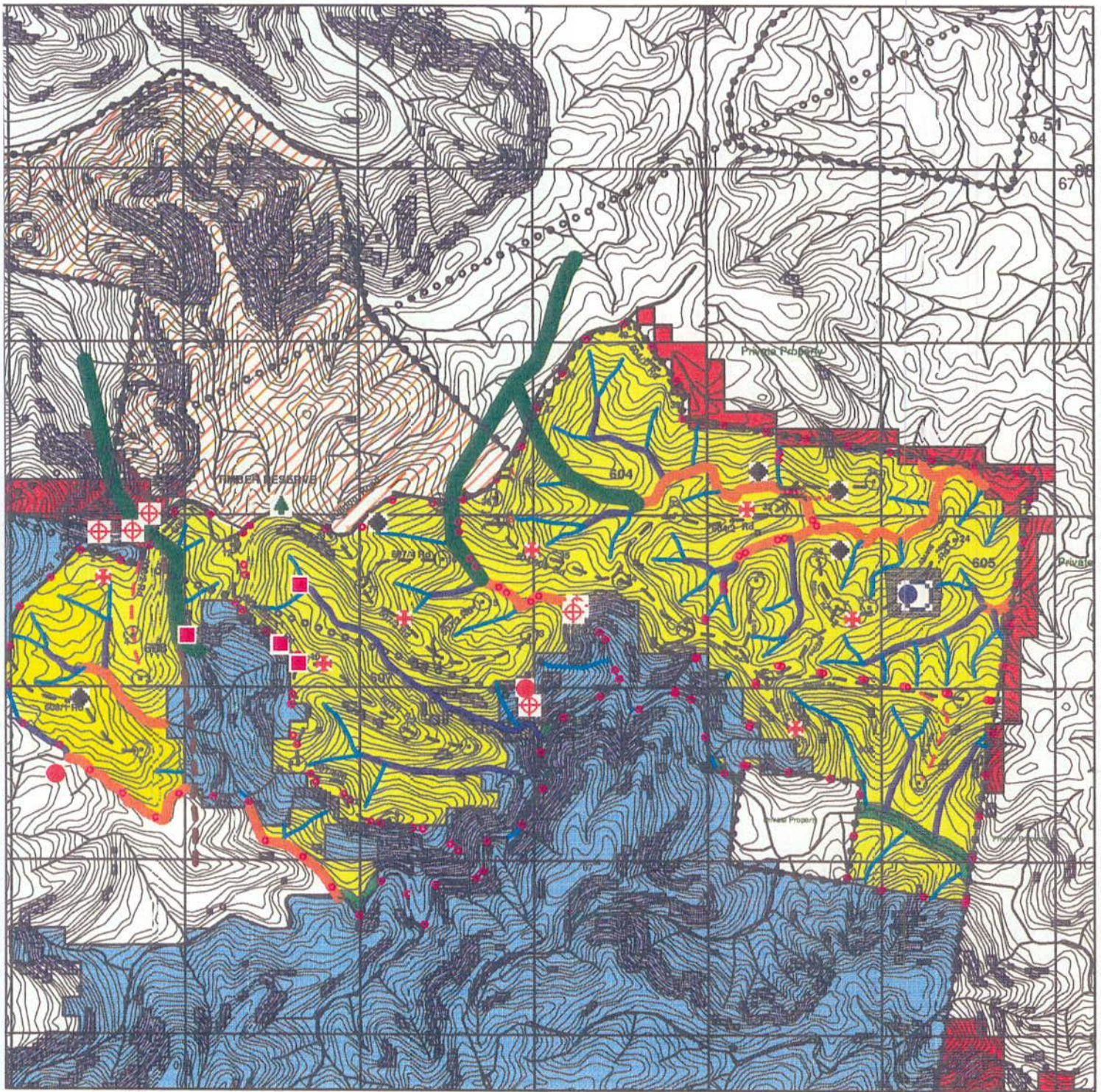
- Temporary Dry
- Temporary Wet
- * Soil Sample
- Soil Boundary
- || Approved Crossings

RECORDED SPECIES

- Red square Sooty Owl
- Black diamond Masked Owl
- Green triangle V-notch Tree
- Blue circle Squirrel Glider
- Red cross Powerful Owl
- Red circle Glossy Black Cockatoo
- White circle Masked Owl Nest Site

MN

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 604-608
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15 000, DATE 23/02/98, V3



800 0 800 1600 2400 Meters

BOUNDARIES

- State Forest Boundary
- ○ Compartment Boundaries

ROADS

- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- - - Proposed Road

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Green PMP1.1.7 Flora & Fauna (40m)
- Dark Green Connection Corridor (80m)
- Diagonal Lines Slopes likely over 30 degrees
- Blue Fauna Protection (Owl Habitat)
- Dark Blue Fauna Protection (Squirrel Glider Protection 8ha)
- Red Old Growth

DRAINAGE

- Black External Drainage
- Blue 1st Order Stream (10m buffer)
- Dark Blue 2nd Order Stream (20m buffer)
- Orange 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

- Temporary Dry
- Temporary Wet
- ✱ Soil Sample
- Soil Boundary
- || Approved Crossings

RECORDED SPECIES

- Red Square Sooty Owl
- Black Diamond Masked Owl
- Green Triangle V-notch Tree
- Blue Circle Squirrel Glider
- Red Diamond Powerful Owl
- Red Circle Glossy Black Cockatoo
- Blue Circle Masked Owl Nest Site

11

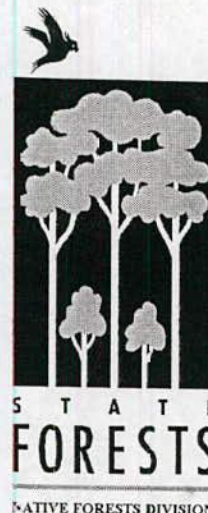
Harvesting Plan No CAS 604-608
EWINGAR STATE FOREST No. 845
COMPARTMENTS 604, 605, 606, 607 and 608
HARDWOOD DIVISION - NORTHERN RIVERS REGION

Contents

PART 1	OPERATIONAL MAPS, FOREST TYPE MAP AND LOCALITY MAP	
PART 2	FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS.....	2
2.1	PHYSICAL FEATURES.....	2
2.2	FOREST MANAGEMENT AND SILVICULTURE.....	4
2.3	FLORA PROTECTION.....	9
2.4	FAUNA PROTECTION.....	9
2.5	SOIL EROSION AND WATER POLLUTION CONTROL.....	13
2.6	FOREST ZONING AND SPECIAL ATTRIBUTES.....	30
PART 3	AUTHORISATION.....	31
3.1	COMPLIANCE.....	31
3.2	CERTIFICATION.....	33
3.3	DISTRIBUTION.....	34
3.4	INDUSTRY ENDORSEMENT.....	34
3.5	BUSH SUPERVISORS ACKNOWLEDGMENT.....	34
PART 4	OPERATIONAL CONDITIONS.....	35
4.1	HARVESTING ACTIVITY DESCRIPTION.....	36
4.2	TREE MARKING CODE AND HARVEST REGULATION.....	36
4.3	ORDER OF WORKING.....	37
4.4	SILVICULTURE.....	37
4.5	FLORA AND FAUNA PROTECTION.....	38
4.6	SOIL EROSION AND WATER POLLUTION CONTROL CONDITIONS.....	50
4.7	RESEARCH AND INVENTORY PLOTS.....	56
4.8	MODIFIED HARVEST CONDITIONS.....	56
4.9	SPECIFICATION OF TYPES OF PRODUCTS TO BE REMOVED.....	57
PART 5	CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFO'S).....	60
5.1	SFO's AUTHORITY TO SUPERVISE HARVESTING OPERATIONS.....	60
5.2	TREE MARKING AND OTHER HARVESTING CONTROL REQUIREMENTS.....	61
5.3	MONITORING AND REPORTING.....	62
5.4	PRE- AND POST-LOGGING BURNING.....	63
5.5	OTHER INSTRUCTIONS.....	63
5.6	SUPERVISING FOREST OFFICER'S ACKNOWLEDGMENT.....	63
ATTACHMENTS.....		
1) CLEARANCE CERTIFICATE.....		64
2) CONDITIONS FOR OPERATIONS SFO'S.....		66
3) LOG DUMP USAGE RECORD.....		72
NOTES.....		73
APPENDIX 1: EROSION HAZARD ASSESSMENT.....		74
APPENDIX 2: APPLICATION OF THE KOALA PROTOCOL (KOALA SURVEY SUMMARY)...		75
AMENDMENTS TO PLAN AS REQUIRED BY.....		76
ENVIRONMENTAL IMPACT STATEMENT COMPARTMENT LEVEL CHECK.....		77
SOIL SAMPLING RESULTS, REPORT AND SOIL MAPPING UNIT MAPS		

Northern Rivers Region

File 356 D



Ewingar State Forest, Compartment 605 - Masked Owl Nest Site.

A Masked Owl nest site is situated in compartment 605 adjacent to road 605/605 between dumps 24 and 25.

The nest site is excluded from harvesting as it is incorporated into the Squirrel Glider protection zone. However, the Mask Owl is susceptible to noise and disturbance likely by logging trucks using road 604/605 to dump 24 during harvesting.

In order for a better appreciation of the likely impacts of traffic past the nest site, the following recommendation will apply :

1. No logging trucks or harvesting machinery must use 604/605 road through & past the nest site until such time as Ken McCray (Ecologist) has thoroughly examined the impacts of such activity.
2. Harvesting must not proceed east of dump 25 until the Ecologist has inspected the nest site for likely impacts.
3. The SFO must inform the Forest Planner or Ecologist at least 5 working days prior to requiring access along 604/605 road to dump 24.


Kevin Petty
Forest Planner
25th February 1998

Northern Rivers Region



Summary of Critical boundaries, areas in Ewingar SF 604-608.

1. Koala Intermediate use area in cpts 606 & 608 : refer to page 47.
2. Brush-tailed rock Wallaby in cpt 608 : refer to page 44.
3. Unidentified plant species in cpt 607. No harvesting in cpt 607 until further notice : refer to page 38.
4. Owl Habitat Reserve boundaries : refer to operational maps.
5. Old growth area : refer to operational maps.
6. Squirrel glider Protection ; refer to cpt 605 operational map.
7. Connection corridors, cpts 604, 607 & 608 : refer to maps.
8. Flora 7 fauna PMP 1.1.7 cpts 606 & 608 : refer to maps.



Kevin Petty
Forest Planner.

24/2/98

**TIMBER INDUSTRY INTERIM PROTECTION ACT 1992
REGULATORY AND PUBLIC INFORMATION COMMITTEE**

423 Pennant Hills Road
PENNANT HILLS NSW 2120

Chairman
Mr David Ridley
Tel: (02) 9980 4551
Fax: (02) 9980 7042

Secretary
Mr Kris Gounder
Tel: (02) 9980 4217
Fax: (02) 9980 7042

Chief Executive
State Forests of NSW
Locked bag 23
Pennant Hills NSW 2120

Dear Sir,

**Determination of Compartments 604-608
Ewingar State Forest, Casino Management Area**

I refer to your request for the Committee's determination on proposed operations within the following compartments in Casino Management Area:

Compartment No.

State Forest


604-608

Ewingar

The Committee has reviewed the plan and associated documents and has determined that the operations detailed in the Harvesting Plan for the above area may proceed with the following condition:

- a) Downhill snagging prescriptions apply to all areas of downhill snagging.

This decision was made by the Committee at Meeting No. 77 conducted on 20 February 1998.


Secretary
Regulatory and Public Information Committee
24 February 1998

FACSIMILE TRANSMISSION

To	Dr. Neil Shepherd, Environment Protection Authority P O Box 1135 CHATSWOOD NSW 2057		
Attention	Dr Barbara Richardson Catchments Branch	Date	19 Feb 1998
Your Fax	(02) 9415 2949	Our Fax	(02) 9484 0057
From	Kris Gounder Sustainable Forest Management Branch	Phone	(02) 9980 4217 (015) 271 625
No of Pages	1 (including this cover page)		



State Forests of
New South Wales

Building 2
423 Pennant Hills Road
Pennant Hills NSW
2120
Phone (02) 980 4100

**RE: NOTICE UNDER SECTION 17D(3) OF THE POLLUTION
CONTROL ACT 1970**

In terms of Clause 13(b) of the Pollution Control Regulations, State Forests of New South Wales hereby notifies you that no appeal will be made against EPA's decision to vary Licence No. 4017 on the 19 February 1998 to include the following areas:

Comp No.	State Forest	Management Area
604 - 608	Ewingar	Casino

for **KRIS GOUNDER**
for Manager
Sustainable Forest Management

For State Forests Use Only (Page 1 of 2) ✓

Regional Forester: Northern Rivers

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment on **19 February 1998**. Accordingly you may start logging these compartments on **21 February 1998**.

Manager, Sustainable Forest Management



NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE

Bob Smith
Chief Executive Officer
State Forests of NSW
Locked Bag 23
PENNANT HILLS NSW 2120

Attention: The Manager
Our reference: Forest Planning Branch
Your reference:

Dear Mr Smith,

**RE: TEMPORARY SECTION 120 LICENCE TS006
Casino and Casino West Management Area**

I refer to temporary section 120 licence TS006 for the Casino and Casino West Management Area issued on 7 November 1997. As requested, I have varied this licence as detailed below.

(1) Section 2 of the 7 November 1997 licence variation is amended by this variation to read as follows:

"2. Non-IDFA Compartments

Unless otherwise stated, this licence variation applies to all compartments listed below:

Royal Camp SF: compartment 18

Camira SF: compartments 79, 80, 82

Gibberagee SF: compartments 115, 117, 125, 126, 118, 119, 120, 121, 122, 123, 127, 128, 129

Mt Belmore SF: compartments 399, 401, 402, 403, 404, 406, 407, 412, 414, 415, 416, 417, 418, 421, 422, 423, 424, 445, 446

Mt Marsh SF: compartment 442

Ewingar SF: compartments 604, 605, 606, 607, 608, 625, 626, 627, 628, 644, 647, 649, 650, 652, 656, 665, 668, 673

Billilimbra SF: compartments 666, 667, 678, 679

Northern Zone
GIO House
24 Moonee Street
Coffs Harbour NSW
Australia
PO Box 914
Coffs Harbour 2450
Tel: (02) 6651 5946
Fax: (02) 6651 6187

Head Office
43 Bridge Street
Hurstville NSW
Australia
PO Box 1967
Hurstville 2220
Tel: (02) 9585 6444
Fax: (02) 9585 6555

Part 2 FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

A Locality Map and Harvesting Operational Map (Part 1) are attached to this plan.

<u>DIVISION</u>	HARDWOOD	<u>REGION</u>	Northern Rivers
<u>STATE FOREST</u>			Ewingar No 845
<u>COMPARTMENTS</u>			604 to 608
<u>NORTH-EASTERN CORNER</u>		Bulldog Rock 1:25000 Sheet	450850E 6786250N
<u>SOUTH-WESTERN CORNER</u>		Bulldog Rock 1:25000 Sheet	444950E 6785100N

The harvest area is within the Northern Rivers Region of State Forests Hardwood Division. It is bounded to the west by State Forest, to the north west by Crown Lease, to the north and east and to the south by State Forest and a small island of Private Property.

Natural Features

General: Compartment 604 is bound to the north by Crown Lease and private property, to the south by Ewingar Creek and by a drainage line that forms part of its headwaters, to the west by Crown Lease and to the east by tributaries of the Little Rocky Creek headwaters, which also form the western boundary of compartment 605. The northern and eastern boundaries of 605 are private property, and the southern boundary is Ewingar Creek and cadastral lines that also form the northern and western boundary of compartment 606. The eastern boundary of 606 is private property and the southern boundary part private property and part State Forest.

The northern boundary of compartment 607 is Crown Lease, the eastern boundary with compartment 604 is a drainage line that forms part of the headwaters of Ewingar Creek, the southern and south eastern boundary is Ewingar Creek and the south western and western boundary is a ridgeline that also forms the eastern boundary of compartment 608. The southern boundary of 608 is Ewingar Creek and a drainage line that forms part of its headwaters and the western and northern boundaries are Crown Lease and private property.

Catchment: The harvest area is within the Clarence River catchment. Compartments 606, 607 and 608 and the southern sections of 604 and 605 drain in a southerly and south easterly direction into Ewingar Creek which forms the southern boundary of the harvest area. Ewingar Creek drains in an easterly direction out of the forest into the Clarence River approximately 10 kilometres east of the harvest area. The northern sections of compartments 604 and 605 drain in an easterly direction into Little Rocky Creek which also drains in an easterly direction into Rocky Creek and then the Clarence River approximately 10 kilometres east of the harvest area.

Altitude range: 180 metres above sea level along Ewingar Creek in compartment 606 to 630 metres asl along Bulldog Road on the northern boundaries of compartments 607 and 608.

- Aspect:* Generally easterly to south easterly over the whole of the harvest area.
- Topography:* The harvest area varies from undulating along sections of Bulldog Road and in the northern and central sections of compartments 604 and 605 to very steep on the southern falls into Ewingar Creek.

Artificial Features

- Roads:* The bitumen surface Bruxner Highway lies approximately 20 kilometres to the north of the harvest area. From the Bruxner Highway primary access to the harvest area is via the gravelled Baryulgil Road and then via the gravelled and natural surface Bulldog Road.
- Minor Roads:* From the Bulldog Road internal access to the harvest area is via a series of maintained and un-maintained Class IV and V harvesting roads.

Description 2 Special Warning of Critical Boundaries or Non-harvest Areas

(a) Private Property Boundaries

Private property forms the north western and northern boundary of compartment 604, the northern and eastern boundary of 605 and the eastern and part southern boundaries of 606. Private property boundaries are either fenced or marked with a yellow blaze.

(b) Non-Harvest Areas

Rare Non-commercial Forest Types

There are no rare non-commercial forest types within the harvest area.

Old Growth Forest

See Description 8(b).

Rainforest

No category A, B or C rainforest is recorded within the harvest area on Forest Type or BOGMP maps.

Riparian Buffers

Riparian Buffers exist on all drainage lines within the harvest area that are shown on the CMA 1:25000 map, unless the prescribed width of Filter Strips under the PCL or Wildlife Corridors under PMP 1.1.7 are greater.

Connection Corridors

Connection Corridors are 80 metres wide and are shown on the Operational Maps. One connects Little Rocky Creek in compartments 604 and 605 to Greensnake Creek in the Timbarra River catchment to the west of the harvest area. Another corridor connects Ewingar Creek with the Timbarra river via a drainage line that forms the boundary between compartments 604 and 607 and another connects Ewingar Creek with the Timbarra river via a drainage line in compartment 608. In addition the wildlife corridor and broad band of confirmed old growth along the northern side of Ewingar Creek will serve as another connection corridor. Specified forestry activities will be excluded from connection corridors, with the exception of road construction and maintenance where there is no other means of practical access.

Wildlife Corridor

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

Sites of Cultural and Heritage Significance

There is an artefact site at Bulldog Rock (AMG 445400E, 6785850N). This site is on the northern side of Bulldog Road and outside the harvest area. It will not be impacted on by the operation. There are no other records or evidence of any cultural or heritage sites within the harvest area. Further inspections will be undertaken by the Casino Aboriginal Cultural Heritage Officer on commencement of operations. In the event that further sites are detected appropriate measures will be taken to protect them after consultation with the relevant Land Council.

Conservation Protocols

Other non harvest areas to protect threatened flora and fauna habitat and the Conservation Protocol prescriptions to be applied are detailed in Conditions 4.5 of this plan.

Water Pollution Hazard Category (WPHC) 4 Areas

Water Pollution Hazard Category 4 areas must be determined and identified in the field by the Supervising Forest Officer using the Operational Maps as a guide. Indicative areas in excess of 30° are shown on the Operational Maps.

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

The gross and net areas of the five compartments by forest type are set out in Table 1 (to the nearest hectare).

Description 4 Broad Description of Vegetation

(a) Forest Types

The following forest types are present within the harvest area:

Commercial Forest Types

- Type 74 - *Spotted Gum-Ironbark/Grey Gum*. This forest type dominates the harvest area, occurring extensively in all five compartments, principally as type 74a, but also as 74b. It occupies approximately 852 hectares of the gross area (92% of the net harvest area), occurring over all landscape elements. White Mahogany, Tallowwood, Red Ironbark and Grey Box are common associated species, with scattered Blackbutt in the transition zone between this and the Blackbutt type.
- Type 37 - *Dry Blackbutt*. This type occurs as type 37a in compartments 607 and 608 where it occupies 61 hectares of the gross area (3% of the net harvest area). It is dominated by coastal Blackbutt, with associated species including Tallowwood, Bloodwood and White Mahogany. Where it adjoins type 74 Spotted Gum is found in the transition zone between the two types.

- Type 65 - *Forest Red Gum- Grey Gum/Grey Ironbark- Roughbarked Apple*. This type occurs over small areas in compartments 606 and 607 and occupies only 22 hectares of the gross area (2% of the net harvest area).
- Type 53 - *Brush Box*. Relatively small and isolated areas of this forest type occur in all 5 compartments within the harvest area, mainly associated with drainage features. It occupies 51 hectares of the gross area (2% of the net harvest area).
- Type 62 - *Grey Gum-Grey Ironbark-White Mahogany*. This type only occurs in the southern section of compartment 608 where it occupies only 15 hectares of the gross area (1% of the net harvest area).

Non-commercial Types

- Type 220 - *Cleared* The cleared area occupies approximately 96 hectares of the gross area in the western section of compartment 608 and the southern sections of compartments 605 and 606.
- Type 234 - *Rock* This type occupies only 7 hectares of the gross area, occurring as very small isolated outcrops in compartments 604, 605 and 607.

Overstorey species

The dominant overstorey species in the harvest area are Spotted Gum, Grey Ironbark, White Mahogany, Blackbutt, Grey Gum and Tallowwood.

Site height varies from 20 metres in the poorer quality stands to 30-35 metres in the better Spotted Gum and Blackbutt dominated stands.

Reference Forestry Commission NSW (1989). Research Note 17. *Forest Types in New South Wales*

(b) Understorey

The understorey within the majority of the harvest area is typically dry and open, made up largely of eucalypt regrowth, Acacias, scattered Forest Oak and occasionally ferns and grass trees. Scattered lantana also occurs in some areas. Vines, mesophytic shrubs and ferns occur closer to the moister gullies.

(c) Ground-cover

The ground cover is mostly characterised by a moderate leaf litter layer under native grasses.

(d) Rare or threatened species

See Description 7.

References Binns. D. *Flora Survey Report, Casino Management Area. Supporting Document No. 7, Casino Management Area EIS*. 1995.

Flora and Fauna Survey of Compartments 604 - 608, Ewingar State Forest. Robert M. Kooyman August 1997.

(e) Rare Non-commercial Forest Types

No rare non-commercial forest types exist within the harvest area.

Table 1

Area of plan by forest type and stand description

COMPARTMENT 604								
FOREST TYPE	53	74a	74b	234	Total			
Gross Cpt Area (ha)	5	198	27	1	231			
Inaccessible and Drainage Protection (PCL)	2	1			3			
Confirmed Old Growth	3	7	9	1	20			
Riparian Buffers		27	1		28			
Wildlife * /Connection Corridors		4			4			
Net Cpt Area (ha)	0	159	17	0	176			
COMPARTMENT 605								
FOREST TYPE	53	74a	74b	220	234	Total		
Gross Cpt Area (ha)	4	82	133	2	1	222		
Inaccessible and Drainage Protection (PCL)	1				1	2		
Confirmed Old Growth	2	9	17			28		
Riparian Buffers	1	6	12			19		
Wildlife * /Connection Corridors		4				4		
Cleared pasture				2		2		
Net Cpt Area (ha)	0	63	104	0	0	167		
COMPARTMENT 606								
FOREST TYPE	53	65	74a	74b	220	Total		
Gross Cpt Area (ha)	7	8	73	13	22	123		
Inaccessible and Drainage Protection (PCL)								
Confirmed Old Growth		1	6			7		
Riparian Buffers	3		4			7		
Wildlife/Connection Corridors			1			1		
Cleared pasture					22	22		
Net Cpt Area (ha)	4	7	62	13	0	86		
COMPARTMENT 607								
FOREST TYPE	37a	53	65	74a	74b	234	Total	
Gross Cpt Area (ha)	21	21	14	199	14	5	274	
Inaccessible and Drainage Protection (PCL)				2		3	5	
Confirmed Old Growth		9	2	32	2	2	47	
Riparian Buffers	1	6	2	10			19	
Wildlife * /Connection Corridors								
Net Cpt Area (ha)	20	6	10	155	12	0	203	
COMPARTMENT 608								
FOREST TYPE	37a	53	62a	62b	74a	74b	220	Total
Gross Cpt Area (ha)	40	14	12	3	63	50	72	254
Inaccessible and Drainage Protection (PCL)	7		8		2	2		19
Confirmed Old Growth	30	11	3		8	37		89
Riparian Buffers	1	2	1		4	1		9
Wildlife * /Connection Corridors								
Cleared pasture							72	72
Net Cpt Area (ha)	2	1	0	3	49	10	0	65

* In compartments 604, 605, 607 and 608 the wildlife corridor along Ewingar Creek is embedded in the reserved Owl Habitat.

(f) Rainforest

No typed rainforest exists in the harvest area.

(g) Old Growth Forest

See Descriptions 8(b) and Table 1 in Description 3 (Page 6).

(h) Exotic weeds

There is some scattered lantana through the compartments.

(i) Regeneration and seral stages

Most of the harvest area falls within the medium forest site quality. The compartments carry a multi-age forest consisting of a few remnants of the original stand and maturing regrowth resulting from the last logging in the early 1980's.

Description 5 Forest and Crop Condition

Logging records indicate that compartments 604 to 608 were last logged in 1980/81. Limited logging for veneer logs over small areas in the northern and southern sections of compartment 608 was undertaken in 1992.

These logging events have induced growth responses of varying extents on retained stems and allowed some regeneration to become established. Mostly the gaps created have been insufficient in size for widespread regeneration development. The current stand is mainly mature or maturing with groups of younger regrowth. Average growth rates would be low to moderate. There is a need to replace a proportion of the stands over the next few cutting cycles to maintain stand vigour and increase growth rates. The areas of younger regrowth shall be taken into consideration when carrying out this group selection activity. The compartments will now yield a range of log types.

The forest has a long history of grazing, and part of the harvest area is Crown Lease.

Description 6 Forest Management Activities

(a) Silviculture

The silvicultural prescriptions in the Casino Management Plan 1984 and the Silvicultural Workshop Notes prepared by the Silviculturist, Forest Planning Branch 1994 should generally be followed in determining silvicultural conditions.

On a net area basis the selective logging will be of a low intensity. It is estimated that in excess of 20% of the net harvest area, particularly the poorer quality stands on the shallow ridgetop soils, will not be impacted upon by the operation by virtue of their low or nil commercial value.

Otherwise the harvesting operation will aim at optimising the production of quota sawlogs, poles, veneer, ex-quota sawlogs and salvage. It is envisaged that the long-term timber production potential of the better site quality Spotted Gum stands will be improved as a result of harvesting activity.

A moratorium on gap and cluster silviculture techniques currently exists. For stands exhibiting mature trees with little or no advanced growth, application of the "Australian group selection" silviculture, as detailed in Jacob's (1955) is an acceptable logging technique during the period of review. It will include the "occasional formation of canopy gaps following the removal of small groups of trees by logging, provided that these gaps:"

- (i) be randomly distributed rather than more or less regularly spaced;
- (ii) be of a range of sizes that average about 40-50 metres diameter, rather than generally larger gaps averaging about 80 metres; and
- (iii) a small amount of site preparation is allowable to encourage development of new regeneration. Site preparation can include;
 - limited felling or tractor pushing of non-commercial trees;
 - creation of an acceptable seed bed and reduce fire hazard by some heaping and burning of tree heads and logging debris;
- (iv) full site preparation is not the aim, and preservation of some advanced growth and understorey vegetation is desirable.
- (v) if necessary some enrichment planting of commercial tree species naturally occurring in the stand will take place.

The main silvicultural objectives are to:

- maintain the natural forest in a healthy condition, with some areas in a relatively undisturbed state. This will include the provision of habitat trees and provide for their future replacement;
- obtain adequate post-harvesting regeneration that is similar in species composition to that of the original forest;
- provide for growth and development of regeneration;
- produce multi-aged stands on a broader area basis.

The wildlife corridor, riparian buffers, connection corridors and filter strips in the compartments will remain in a relatively undisturbed state (refer Condition 4.5). Hollow-bearing and recruitment trees will be retained to meet wildlife habitat requirements (refer Condition 4.5).

(b) Harvesting Method

The harvesting method will be an integrated operation. The operation comprises:

- Chainsaw felling using directional felling techniques.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

A number of different log types will be produced by the harvesting. These will be segregated at the dumps and usually transported to different purchasers.

(c) Fire Management

Fire management is required to;

- limit damage to stands caused by wildfires
- ensure the establishment and survival of regeneration
- maintain wildlife habitat
- maintain hydrological conditions
- meet State Forests' obligations under the Rural Fires Act.

Fire management entails the quick response to wild fire occurrence to limit fire spread, and the maintenance of fine fuels at low levels, usually by burning under mild conditions, to decrease wild fire intensities. Activities are coordinated with other fire control agencies through the Casino District Fire Plan.

Pre-logging burning is not required.

All post harvest burning must be carried out in accordance with condition 4.5 of this plan, the Casino District Fuel Management Plan 1995 and the Conservation Protocols.

2.3 FLORA PROTECTION

Description 7 Presence of Threatened or Endangered Plant Species

Pre-logging targeted flora surveys for ROTAP species and Schedule 1 and 2 species (TSC Act) were undertaken by Robert M Kooyman assisted by Andrew Benwell and the reports forwarded to the Northern Zone, NPWS. No occurrences of rare or threatened flora were recorded.

The report from Robert Kooyman has been forwarded to NPWS Northern Zone.

Note : A plant species located in compartment 608 has not been taxonomically clarified. A specimen sent to Queensland Museum was returned without being able to be determined and the specimen is currently being assessed by John Williams. The plant (1 specimen only) was located on compartment 608 near the boundary of compartment 607. This area has been reserved through owl habitat. However, further surveys should be conducted in compartment 607 following taxonomic varification. **Harvesting must not proceed in compartment 607 until further surveys have been completed.**

Description 8 Application of the Conservation Protocols, November 1996

(a) Rare Non-commercial Forest Types

There are no rare non-commercial forest types within the harvest area.

(b) Presence of Old Growth Forest

A total of approximately 205 hectares of candidate old growth forest has been identified within the harvest area from BOGMP maps. These areas were inspected in June and September 1997. Stump counts were conducted in an area of candidate old growth forest in compartment 607 and an area of 14.3 hectares was determined as not candidate old growth and will be available for harvesting. It was decided that due to slope and forest condition a stump count of the remaining candidate areas (approximately 191 hectares) would not be subject to harvesting operations and the BOGMP maps will be accepted.

The candidate old growth areas are identified on the Operational Maps and the area by compartment and forest type is set out in Table 1. Boundaries have been modified to make field identification easier, without excluding any BOGMP candidate areas. These boundaries will be clearly marked in the field by the SFO.

Specified forestry activities, with the exception of the use of existing roads, will be excluded from these candidate old growth areas.

(c) Presence of Rainforest

There is no typed rainforest within the harvest area.

2.4 FAUNA PROTECTION

Description 9 Threatened and Endangered Fauna Occurrence

(a) GIS Records and Pre-logging Fauna Surveys

The harvest area was surveyed by Mr Robert Kooyman and other State Forests staff over ten days and nine nights, 19 August to 29 August 1997. Bat surveys were conducted over six nights. The results of these surveys have been forwarded to NPWS Northern Zone.

Based on these surveys, as well as State Forests GIS records, the following threatened fauna species (Schedules 1 and 2 of the Threatened Species Conservation Act 1995) have been recorded within 5 kilometres of the harvest area:

Schedule 1 and 2 Species recorded within and within 5 kilometres of the harvest area

Common Name	Recorded location	Source of Records	AMG *
MAMMALS			
Brush-tailed Rock Wallaby	1 record approx 0.5 km west of cpt 608. 1 record approx 1.5 km north west of cpt 608 1 record approx 2 km south east of cpt 606 3 records adjacent to cpt 608 2 records in cpt 607 1 record on boundary cpts 604/607	GIS GIS GIS Pre-logging survey Pre-logging survey Pre-logging survey	444500E 6784600N 443150E 6786300N 452200E 6782200N 445500E 6785900N 445700E 6785900N 445800E 6786000N 448225E 6785400N 447975E 6784900N 448250E 6785475N
Squirrel Glider	1 record in cpt 605	Pre-logging survey	450150E 6785550N
Yellow-bellied Glider	1 record approx 3 km south of cpt 608 7 records in cpt 607 3 records in cpt 605 3 records in cpt 608 2 records in cpt 604 1 record approx. 1km north of cpt 608	GIS Pre-logging survey Pre-logging survey Pre-logging survey Pre-logging survey Pre-logging survey	445700E 6781300N 448150E 6785350N 448100E 6785250N 446450E 6785820N 446680E 6785900N 447950E 6785425N 446850E 6785975N 448770E 6784540N 450200E 6785300N 450160E 6785575N 450100E 6785700N 446200E 6785650N 445800E 6785550N 446200E 6785750N 449225E 6786100N 448350E 6787050N 445550E 6785950N
Koala	1 record approx 4.5 km south west of cpt 608 1 record on boundary of cpts 605/606 1 record in cpt 605 1 record 500 metres north cpt 608	GIS Pre-logging survey Pre-logging survey Pre-logging survey	442500E 6780500N 449090E 6784975N 450200E 6785750N 445700E 6785470N
Long-nosed Potoroo	1 records approx. 3km south west of cpt 608	Pre-logging survey	443460E 6782820N
Rufous Bettong	1 record in cpt 608	Pre-logging survey	445300E 6785700N
Tiger Quoll	1 record approx 4.5 km south of cpt 608 1 record approx 5 km south of cpt 608	GIS GIS	446300E 6779600N 446900E 6779100N
Parma Wallaby	1 record approx 4.5 kms south of cpt 608 1 record in cpt 607 1 record near boundary of cpts 607/608 1 record approx. 3.5 km south of cpt. 608 2 records approx. 3 km south of cpt. 608	GIS Pre-logging survey Pre-logging survey Pre-logging survey Pre-logging survey	445700E 6779950N 446320E 6785400N 446300E 6785820N 444700E 6780740N 446770E 6780550N
Little Bent wing Bat	Not recorded	Pre-logging survey	Not known
Golden-tipped Bat	1 record approx 4 km south of cpt 608 1 record approx 2.5 km south of cpt 608	GIS GIS	445800E 6779900N 445700E 6781300N

Table 2 (cont'd)

Schedule 1 and 2 Species recorded within and within 5 kilometres of the harvest area

Common Name	Recorded location	Source of Records	AMG *
BIRDS			
Sooty Owl	1 record approx 3.5 km south of cpt 608	GIS	445400E 6780900N
	2 records 3 and 4 km south west of cpt 608	GIS	443750E 6782000N
	3 records near boundary of cpts 607/608	Pre-logging survey	443150E 6780850N
			446000E 6785300N
	1 record in cpt 607	Pre-logging survey	446540E 6785250N
	2 records in cpt 608	Pre-logging survey	446650E 6785600N
Masked Owl	1 record near boundary of cpts 605/606	Pre-logging survey	445400E 6784925N
	1 record in cpt 607	Pre-logging survey	447100E 6785950N
	1 record in cpt 604	Pre-logging survey	449300E 6786250N
	3 records in cpt 605	Pre-logging survey	449750E 6785800N
			449750E 6786150N
			450200E 6785540N
Powerful Owl	1 record approx. 4.5 km south of cpt 608	GIS	445700E 6779950N
Glossy Black Cockatoo	1 record approx 4.5 km south of cpt 606	GIS	450550E 6779050N
	1 record approx. 5 km south of cpt 608		446900E 6779100N
	1 record approx. 3 km south of cpt 608		445700E 6781300N
	1 record in cpt 607	Pre-logging survey	447950E 6785000N
	1 record approx. 500m south of cpt 607	Pre-logging survey	448150E 6783650N
	1 record in cpt 608	Pre-logging survey	445030E 6785220N
	1 record in cpt 604	Pre-logging survey	448500E 6788700N
REPTILES			
Three-toed Snake- toothed Skink	1 record approx 4 km south of cpt 608	GIS	445400E 6779950N

* AMG's for GIS records are approximate because of the scale of the GIS map records.

(b) Pre-logging Fauna Surveys - Koalas

A pre-logging Koala survey was undertaken in August 1997 according to the methodology prescribed in the Conservation protocols. Transects were undertaken by four Northern Rivers Region staff. Transect location maps and data sheets are stored in the Compartment History Files. A summary of the results of the transects are attached to this plan as Appendix 2.

A total of 55 koala scats were located under a total of 11 trees over a total transect length of 8.25 kilometres and 825 trees searched. Koala usage of the compartments within the harvest area based on the results of the transects is set out in Table 3.

A Star survey was carried out in **compartment 608** following the location of a travelling koala during a spot light survey. No scats were detected as a result of this survey but the compartment will be treated as an intermediate use area. **Compartment 606 will also be treated as an intermediate use area** despite the low number of scats. All other compartments are low use area.

Modified prescriptions for intermediate use areas identified in the are contained in Condition 4.5(d) of this plan (page 46).

Table 3

Summary of Koala usage - Compartments 604, 605, 606, 607 and 608

Compartment	Koala Use
604	Low use
605	Low use
606	Intermediate use
607	Low use
608	Intermediate use

There are no records within the harvest area for the schedule 1 and 2 species listed in table 4. However due to the presence of suitable habitat within or within the vicinity of the harvest area they could be expected to occur.

Table 4

Schedule 1 and 2 species for which suitable habitat could occur within the harvest area

MAMMALS	BIRDS
Long-nosed Potoroo	Square tailed Kite
Black-striped Wallaby	Red Goshawk
Red-legged Pademelon	Bush Thick-knee
Brush tailed Phascogale	Regent Honeyeater
Mormopterus norfolkensis	Swift Parrot
Miniopterus schreibersii	

The wildlife conservation prescriptions contained within the *Conservation Protocols for Timber Harvesting on State Forests for the Duration of the IFA Process, November 1996* and Temporary Section 120 Licence TS006 issued by NPWS and set out in **Condition 4.5** of this plan are expected to cater adequately for these species in the long term.

References Flora and Fauna Survey of Compartments 604 - 608, Ewingar State Forest. Robert M. Kooyman August 1997.

SF of NSW. *GIS Fauna Database*.

Description 10 Application of the Conservation Protocols, November 1996

(a) Retention of Hollow-bearing and Recruitment Trees

Sufficient hollow-bearing and recruitment trees exist across the net harvest area to allow for the retention of trees to meet Section 120 Licence requirements. Tree retention prescriptions are set out in conditions 4.5 and 5.2.

(b) Retention of Feed and Roost/Nest Trees

Pre-logging surveys have identified Glossy Black Cockatoo feed trees, Yellow-Bellied Glider "V" notch trees and a Masked Owl Roost/Nest tree as follows in Table 5. Where they are in the harvest area these trees have been marked in the field (see Condition 4.5).

Table 5

Location of Roost/Den and Feed Trees identified by Pre-Logging Surveys

	Recorded location	AMG Reference
Glossy Black Cockatoo feed tree	Compartment 607	448200E 6785200N
Glossy Black Cockatoo feed tree	Compartment 606	445250E 6784500N
Yellow-bellied Glider V notch tree	Just north of Cpt 607	446550E 6786050N
Glossy Black Cockatoo feed tree	Compartment 604	449380E 6785260N
Yellow-bellied Glider V notch tree	Compartment 604	448840E 6785350N
Masked Owl Roost/Nest	Compartment 605	450200E 6785540N

(c) Riparian Buffers, Connection Corridors and Wildlife Corridors

See Description 2(b)

Riparian buffers and connection corridors are shown on the Operational Maps where they are not embedded in old growth forest.

Specified forestry activities, with the exception of road construction and road maintenance where there is no other means of practical access, will be excluded from riparian buffers and connection corridors.

The wildlife corridor is also shown on the Operational Maps where it is not embedded in old growth forest. Specified forestry activities will be excluded from this corridor.

(d) Refugia Areas

Refugia areas are contained in Owl and Squirrel Glider habitat, wildlife corridors, connection corridors and riparian buffers.

(e) Reporting Procedures

It is necessary to report and record confirmed sightings of species listed in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 to the NPWS through the appropriate channels (see Conditions 4.5 and 5.3).

2.5 SOIL EROSION AND WATER POLLUTION CONTROL

Description 11 Site Soil and Water Data and Other Information

(a) Location

Compartments 604, 605, 606, 607 and 608 comprise the north east section of Ewingar State Forest. Ewingar State Forest is located approximately 80 kilometres west of Casino. Refer to the 1:125,000 scale locality map and Operational Maps (Part 1) attached to this plan.

(b) Climate

Generally the climate in the Casino area is sub-tropical with hot summers, mild winters and a distinct winter/spring dry season.

Rainfall

The mean annual rainfall for the area in which the harvest area is located is 1107mm with a summer rainfall pattern. January to March is the wettest period and June to August the driest. Heavy rainfall events are common during summer and autumn.

The net harvest area just falls within rainfall distribution zone 2. The annual rainfall erosivity is $R = 2500$. The highest monthly rainfall erosivity values are 475 and 425 for January and February respectively. Erosivity values for all other months are below 400. Monthly erosivity values are set out in Table 6.

Table 6

Monthly Rainfall Erosivity Values - Compartments 604, 605, 606, 607 and 608

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Erosivity	475	425	300	100	50	75	50	50	150	175	275	375

Generally weather conditions will allow harvesting operations to continue throughout the year subject to normal wet weather restrictions. Occasionally operations may be stopped altogether by periods of high rainfall.

References Rosewall C.J. & Turner J.B. *Rainfall Erosivity in New South Wales. Technical Handbook No. 11* (1st Edition), Soil Conservation Service of New South Wales (1992)

Temperature

Mean maximum temperatures range from 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 15° mid summer to around 0° July/August. These data give an indication that ground cover growth can be prolific during the warmer months but slows down considerably during the cooler drier winter periods.

(c) Geology

The soils of compartments 604, 605, 606, 607 and part 608 are developed on Drake Volcanics comprising acid to intermediate eruptives with minor interbedded sediments.

The soils of part compartment 608 are developed on Stanthorpe Adamellite comprising biotite adamellite.

References Veness and Associates Report Number VA2097C (24 August, 1997)
Veness & Associates (1994). Soils Report Casino Management Area Environmental Impact Statement

Bedding planes

There are no obvious bedding or fracture planes in the area and no indications of mass movement.

(d) Soils

The harvest area is included in the Casino Management Area EIS Study Soils Report prepared by Veness and Associates (published 1994). This study identifies the soils within the harvest area as falling within either the Soil Mapping Unit D (Soils developed on Granitoids) or Soil Mapping Unit I (Soils developed on Volcanics).

Soil sampling of the harvest area, verification of soil units and determination of erodibility and dispersibility was carried out in August 1997 by J Veness, accredited Soil Scientist, of Veness & Associates Pty Ltd. A and B horizon samples were collected from eight (8) locations within the harvest

area, representing the range of landform units. The AMG locations of the sampling sites are set out in Table 7. The report from Veness & Associates is attached to this plan.

Erodibility (K factors) for topsoil and subsoil were determined using method B4 of the PCL, Sch 3 Part B. Dispersibility was determined using method D2 in the same schedule.

Soil types

The soils of Mapping Unit I (compartments 604, 605, 606, 607 and part 608) are Krasnozems, Yellow podzolic soils and Lithosols. The soils of Mapping Unit D (part compartment 608) are Chocolate soils.

Description and profile

The soils of Mapping Unit I are derived from the Drake Volcanics comprising of acid to intermediate eruptives with minor interbedded sediments. They are generally characterised by a thin organic layer or O horizon over a brownish black to dark brown, moderately structured, water repellent to porous, stony, fine sandy loam, clay loam or fine sandy clay loam topsoil layer or A horizon, over a dark reddish brown, brown to dull yellow orange, weakly to strongly structured, porous to dense, often very stony, clay loam, fine sandy clay loam, or light medium clay main subsoil or B2 horizon often over a strongly weathered parent material or C horizon.

The soils of Mapping Unit D are derived from Stanthorpe Adamellite which comprise of biotite adamellite. They are generally characterised by a thin organic layer or O horizon over a brownish black to very dark brown, strongly structured, water repellent to porous, bioturbated, light sandy clay loam or sandy clay loam topsoil layer or A, A1 horizon, sometimes over a dull reddish brown, unbleached, moderately structured, porous, light sandy clay loam lower topsoil or A2 horizon, always over a dark reddish brown to reddish brown, moderately structured, porous, stony, light clay main subsoil or B2 horizon. Weathered parent material or C horizon was not reached at depth.

References Veness and Associates Report Number VA2097C (24 August, 1997)..

Erodibility

The erodibility factor (K factor) for the harvest area was determined using method B4 in Schedule 3, Part B of the PCL. The default K factor of 0.06 was adopted for the whole of the harvest area.

Texture

Soil texture for the harvest area as indicated by the eight soil samples taken ranges as follows:

Mapping Unit I - **Topsoil:** fine sandy loam, clay loam, fine sandy clay loam.
 Subsoil: clay loam, fine sandy clay loam, light medium clay.

Mapping Unit D - **Topsoil:** light sandy clay loam, sandy clay loam.
 Subsoil: light clay.

Dispersibility

Soil dispersibility was determined using method D2 in PCL Sch 3. An Emerson Aggregate Test (EAT) was undertaken for the soil samples taken from the eight (8) sites throughout the harvest area. EAT classes for the soil samples are set out in Table 7.

Inherent fertility

The soils are generally of low to moderate fertility. The compartments generally carry a medium quality stand.

Table 7

Emerson Aggregate Test (EAT) Classes - Compartments 604 to 608

Soil Sample	Soil Mapping Unit	AMG (Bulldog Rock Sheet)	EAT Class Topsoil	EAT Class Subsoil
SS1 - Cpt 604	Drake Volcanics	448050E 6785800N	8	5
SS2 - Cpt 605	Drake Volcanics	449600E 6786150N	8	5
SS3 - Cpt 605	Drake Volcanics	449900E 6785450N	8	2(1)
SS4 - Cpt 606	Drake Volcanics	449750E 6784875N	8	2(1)
SS5 - Cpt 607	Drake Volcanics	447250E 6785650N	8	2(1)
SS6 - Cpt 607	Drake Volcanics	446800E 6785125N	8	2(1)
SS7 - Cpt 608	Stanthorpe Adamellites	445650E 6785775N	8	5
SS8 - Cpt 608	Stanthorpe Adamellites	445525E 6785600N	8	5

References Veness and Associates Report Number VA2097C (24 August, 1997)

Depth to subsoils and bedrock

Field sampling indicates that for Mapping Unit I topsoil depth varies from 9 - 24cm and subsoil depth is 20 - 70+ cm to weathered bedrock. Topsoil depth for Mapping Unit D varies from 23 - 26 cm and subsoil depth is 70+ cm to weathered bedrock.

Existing erosion

There is no evidence of significant existing erosion within the compartments. Field evaluation of existing logging tracks and snig tracks from past operations dating back to the 1980's and early 1990's show little sign of past or existing erosion despite the fact that drainage was not up to current standards. On some sections of road within the harvest area there has been wash and rutting of the pavement surface as a result of drainage failure and when these roads and tracks are re-used the relevant drainage measures outlined in Condition 4.6 must be implemented.

(e) Landform**Slope**

The harvest area varies from undulating along sections of Bulldog Road and in the northern and central sections of compartments 604 and 605 to very steep on the southern falls into Ewingar Creek.

Indicative slope classes by percentage of the harvest area are set out in Table 8.

Table 8

Indicative Slope Classes - Compartments 604, 605, 606, 607 and 608

Slope	Indicative % of Harvest Area				
	Cpt 604	Cpt 605	Cpt 606	Cpt 607	Cpt 608
$0^\circ \leq 10^\circ$	20%	25%	15%	15%	20%
$>10^\circ \leq 20^\circ$	45%	45%	40%	35%	30%
$>20^\circ \leq 30^\circ$	30%	28%	40%	45%	40%
$>30^\circ$ (WPHC4)	5%	2%	5%	5%	10%

Terrain

Bulldog Road lies on the Gibraltar Range and forms the watershed between Ewingar and Little Rocky Creeks to the east and the Timbarra river to the west. The harvest area generally consists of a series of ridges and drainage lines falling to the east and south east into these two creeks.

Elevation varies over the harvest area from 180 metres above sea level along Ewingar Creek in compartment 606 to 630 metres asl along Bulldog Road on the northern boundaries of compartments 607 and 608.

Aspect

Aspect is generally easterly to south easterly over the whole harvest area.

Rockiness

Field inspections indicate that there are no major rock outcrops in the compartments.

Previous harvesting

Logging records indicate that all five compartment were last logged during 1980 and 1981 and limited logging also occurred in compartment 608 in 1992/1993. Private property, State Forest and Leasehold land surrounds the harvest area, the timbered areas of which also have a long history of selective logging.

(f) Hydrology

The harvest area falls within the Clarence River catchment.

Little Rocky Creek rises in the western section of the harvest area within compartment 604 and flows in a generally easterly direction through compartment 605. The northern tributaries of Little Rocky Creek rise outside the harvest area and flow in a generally south easterly direction to join Little Rocky Creek within the eastern section of compartment 605. Part of the headwaters of Ewingar Creek rise within compartments 607 and 608 and the southern section of 604.

Little Rocky Creek drains into Rocky Creek and Rocky and Ewingar Creeks drain into the Clarence River approximately 10 kilometres east of the harvest area.

Apart from Ewingar Creek and Little Rocky Creek there are no other prescribed streams within the net harvest area. There are no swamps or wetlands within the net harvest area and no major water storages occur adjacent to or downstream of the harvest area.

Verification of drainage lines

All drainage features verified during harvesting plan preparation as watercourses or drainage lines are shown on the harvesting plan Operational Map with filter strip protection (PCL) or riparian buffers, connection corridors or wildlife corridors. Other smaller drainage features which are not marked on the map must be inspected by the SFO during tree marking and given protection in accordance with the Pollution Control Licence.

Drainage line condition

Drainage lines within the harvest area are in good condition and stable with well vegetated banks and beds. There are broad and shallow to moderately incised and sometimes on bedrock (sandstone). With the exception of Little Rocky and Ewingar Creeks all other drainage lines within the harvest area are un-named.

Little Rocky Creek rises in the central and northern section of compartment 604 and private property to the north. A series of short, intermittent drainage lines in compartment 604 and the northern section of 605 combine to form a permanent watercourse as the creek leaves the eastern boundary of 605, where it has a total catchment of approximately 440 hectares. A southern intermittent tributary formed by a series of short drainage lines in the southern section of compartment 605, all with catchments of less than 40 hectares, has a total catchment of approximately 75 hectares as it exits the eastern boundary.

Ewingar Creek has a catchment of approximately 2,450 hectares where it joins the harvest area on the southern boundary of compartment 608. Compartments 607 and 608 and the southern section of 604 form the north western headwaters of the creek. A series of short, intermittent drainage lines join to form a single drainage line on the boundary of compartments 604 and 607. This drainage line has a catchment of approximately 135 hectares where it flows into Ewingar Creek as a semi-permanent watercourse on the southern boundary of the harvest area. Two other drainage systems south of this and rising within compartment 607 are intermittent and have catchments of approximately 105 and 70 hectares respectively where they flow into Ewingar Creek.

In compartment 608 two intermittent drainage systems rising within the compartment and another system that forms an intermittent drainage line on the southern boundary join to form a semi-permanent watercourse which has a catchment of approximately 325 hectares where it flows into Ewingar Creek.

In compartment 606, a series of intermittent drainage lines flow directly into Ewingar Creek, which flows through the south eastern section of the compartment. These drainage lines have catchments of less than 40 hectares.

Ewingar Creek has a total catchment of approximately 3,600 hectares where it leaves the harvest area on the eastern boundary of compartment 606.

Representative water monitoring sites

The adequacy of the monitoring program is under review. A representative water quality monitoring site for this harvest area is yet to be determined.

Upstream catchment water use

There is no upstream catchment as Ewingar Creek and Little Rocky Creek have their headwaters in State Forest and forested private property.

Downstream catchment water use

Downstream Ewingar and Little Rocky Creeks may be used for limited stock watering. The Clarence River is used for recreation and commercial fishing.

Domestic water use

There would be no domestic water use from Ewingar and Little Rocky Creeks. The Clarence River supplies domestic water to residents of the Clarence valley.

(g) Vegetation and ground-cover

Effect on ground-cover during Operations

Harvesting operations are expected to remove less than 20% overall ground-cover over the net harvest area.

Recovery time

Recovery will be relatively rapid with 70% live ground-cover being attained within 12 months. The tracks and minor roads previously utilised have revegetated.

(h) Proposed Operation System**Use of existing roads**

The harvest area is served by a fully maintained permanent road network as indicated on the Harvesting Plan Operational Maps and Locality Map.

The Bruxner Highway lies to the north of the harvest area. From the highway access to the harvest area is via the Baryulgil Road, is a Class II Shire maintained gravel road, across Yates Crossing to Plains Station Road, a bitumen Shire maintained road and then via Bulldog Road, a Class III gravel and natural surface road maintained by State Forests. From Bulldog Road Internal access to the harvest area is via a series of un-maintained Class V harvesting roads.

Haulage direction

Haulage will be east and south along Bulldog Road to Plains Station Road and the Baryulgil Road and then north to the Bruxner Highway or south along the Baryulgil Road.

Evaluation of existing roads to be used in this operation

Pursuant to Condition 82 the PCL, all existing roads, both permanently maintained and un-maintained, have been evaluated for use in this operation, including their drainage structures, drainage line crossings and potential to cause water pollution.

Permanently maintained roads within or bounding the harvest area to be used for this operation

All permanently maintained roads that are to be used for this operation are shown on the Operational Maps. Their condition is as follows:

Bulldog Road

- Type of road: Class III.
- Length of road to be used for the operation: 5.2 kilometres.
- Type of pavement: Gravelled and natural surface.
- Maximum road grade: 9°.
- Maximum sideslope: 20° (mainly ridgetop).
- Maximum width of running surface: 3-4 metres.
- Maximum clearing width either side of running surface: 2 to 3 metres.
- Maximum batter height: 2 metres.
- Maximum batter length: 300 metres.
- Existing road drainage: Crossfall on ridgetop to table and mitre drains and outfall or infall on sidecut to table drains and mitre drains. Appropriate for the road grade and stable table and mitre drains. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Well vegetated and stable.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: The road pavement is rough in places.

Maintenance required by State Forests:

- If required pre-operational grading will be carried on sections of Bull dog road during and following harvesting if conditions or the impact of logging trucks warrant it. The SFO will monitor the road condition and organise the contractor to carry out minor upgrades or notify the Forest Planner if grading is necessary.

Existing drainage feature crossing description - permanently maintained roads within or bounding the harvest area

There are no drainage feature crossings occurring on the permanently maintained road within or bounding the harvest area:

Un-maintained roads within or bounding the harvest area to be used for this operation

Un-maintained roads that are to be used in this operation are shown on the Operational Maps. All of these roads will be closed upon completion of use for this operation. Their description and condition is as follows:

604/1 Road (linking log dump 39 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 400 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 5°.
- Maximum sideslope: 15°
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: <0.5 metres.
- Maximum batter length: 100 metres
- Existing road drainage: Outfall drainage on sidecut and crossfall on ridgetop to well grassed road verges supplemented by rollover drains. Appropriate for the road grade, stable rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Overgrown and requires re-opening. The SFO must mark the road line and direct the contractor where it is difficult to distinguish.

604/605 Road (linking log dumps 24 to 28, 30, 34 and 35 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 3.7 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 9°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: < 1 metre.
- Maximum batter length: 300 metres

- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges supplemented by rollover and spoon drains to mitre drains. Appropriate for the road grade, stable mitre and spoon drains and rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some minor wash and rutting of the pavement over short sections

Maintenance required by State Forests:

- Partly overgrown and requires re-opening . Operational grading if required.

604/2 Road (linking log dumps 31 to 33 with 604/605 Road)

- Type of road: Class V.
- Length of road to be used for the operation: 2 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 8°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 1 metre.
- Maximum batter length: 300 metres
- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges supplemented by rollover drains. Appropriate for the road grade, stable mitre and rollover drains and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some minor wash and rutting of the pavement over short sections

Maintenance required by State Forests:

- Partly overgrown and requires re-opening and pre-operational grading.
- Additional Comments: Despite an extensive search the section of this road east of log dump 32 was very difficult to locate. Previous harvesting plans indicate its location as shown on the Operational Map. If this section of road cannot be located by the SFO during pre-logging inspections or tree marking, it must be reconstructed consistent with the conditions for road construction in Condition 4.6(g) - see also description of drainage line crossings on un-maintained roads. The harvesting plan must be amended accordingly. **The harvesting plan must only be amended following approval of a relevant variation for this work by the EPA.**

605/1 and 605/2 Roads (linking log dumps 26 and 29 with 604/605 Road)

- Type of road: Both Class V.
- Length of road to be used for the operation: 605/1 Road - 400 metres
605/2 Road - 350 metres
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 605/1 Road - 5°.
605/2 Road - Ridgetop.
- Maximum sideslope: 10° on 605/1 Road.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: < 1 metre on 605/1 Road.
- Maximum batter length: 100 metres on 605/1 Road.
- Existing road drainage: Outfall on sidecut and crossfall on ridgetop to well grassed road verges, supplemented by rollovers on 605/1 Road. Appropriate for the road grade and grassed road verges. Where rollovers are necessary, their spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Both are overgrown and require re-opening.

605/606 Road (linking log dumps 21 and 22 to 604/605 Road)

- Type of road: Class V.
- Length of road to be used for the operation: 1.2 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 8°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 1.5 metres.
- Maximum batter length: 100 metres
- Existing road drainage: Outfall drainage on sidecut and crossfall on ridgetop to well grassed road verges, supplemented by rollovers. Appropriate for the road grade and grassed road verges. Where rollovers are necessary, their spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some minor wash and rutting of the pavement over short sections.

Maintenance required by State Forests:

- Partly overgrown and requires re-opening. Pre-operational grading if required.

606/1 Road (linking log dump 23 with 604/605 and 605/606 Roads)

- Type of road: Class V.
- Length of road to be used for the operation: 500 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 8°.
- Maximum sideslope: Ridgetop.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: N/A
- Maximum batter length: N/A
- Existing road drainage: Crossfall drainage to well grassed road verges. Appropriate for the road grade and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Partly overgrown and requires re-opening.

607/608 Road (linking log dumps 6, 7, and 11 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 2.1 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 7°.
- Maximum sideslope: 25°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 2 metres.
- Maximum batter length: 200 metres
- Existing road drainage: Crossfall drainage to well grassed road verges on ridgetop and outfall to grassed road verges on sidecut. Appropriate for the road grade and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.

- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Partly overgrown and requires re-opening.

607/1 Road (linking log dumps 8, 9 and 10 with 607/6078 Road)

- Type of road: Class V.
- Length of road to be used for the operation: 900 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 5°.
- Maximum sideslope: Ridgeline.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1-2 metres
- Maximum batter height: N/A.
- Maximum batter length: N/A.
- Existing road drainage: Crossfall drainage to well grassed road verges. Appropriate for the road grade and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Partly overgrown and needs re-opening.

607/2 Road (linking log dumps 13, 14 and 17 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 1.6 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 10°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 1 metre.
- Maximum batter length: 200 metres.
- Existing road drainage: Crossfall on ridgeline and outfall on sidecut to well grassed road verges supplemented by rollover and spoon drains to mitre drains. Appropriate for the road grade, stable mitre and spoon drains and rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.

- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some wash and rutting of the pavement over short sections.

Maintenance required by State Forests:

- Partly overgrown and requires re-opening .Operational grading if required.

607/3 and 607/4 Roads (linking log dumps 15 and 16 with 607/2 Road)

- Type of road: Both Class V.
- Length of road to be used for the operation: Both 400 metres.
- Type of pavement: Both natural surface and natural gravel with grass cover.
- Maximum road grade: 7°.
- Maximum sideslope: 20°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 - 2 metres.
- Maximum batter height: 2 metres.
- Maximum batter length: 300 metres.
- Existing road drainage: Outfall drainage to well grassed road verges. Appropriate for the road grade and grassed road verges and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: On both roads the pavement is washed and rutted.

Maintenance required by State Forests:

- Both roads overgrown and need re-opening .Operational grading if required.

608/1 and 608/3 Roads (linking log dumps 1 and 5 with Bulldog Road)

- Type of road: Both Class V.
- Length of road to be used for the operation: 608/1 Road - 900 metres
608/3 Road - 250 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 7°.
- Maximum sideslope: 20° (608/1 Road is mostly on ridgetop).
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: < 2 metres.
- Maximum batter length: 250 metres.
- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges, supplemented by rollovers on 608/3 Road. Appropriate for the road grade and grassed road verges. Where rollovers spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.

- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- 608/3 Road is partly overgrown and requires re-opening. 608/1 Road is through cleared pasture.

Drainage feature crossings on un-maintained roads

There are three drainage feature crossings on un-maintained roads within the harvest area. They are as follows:

- Location: 604/605 Road, locations "A" and "B".
 - Type of drainage feature: Intermittent drainage depression.
 - Type of crossing: Natural causeway.
 - Type of pavement: Natural surface.
 - Approach drainage: Both approaches outfall to well grassed road verges.
 - Approach condition: Stable,
 - Table drain checks: No table drains. Outfall to grassed road verges.
 - Containment of fill: Natural ground surface.
 - Structure stability: Stable.
 - Bed and bank stability: Vegetated and stable.
 - Sediment control: Vegetative cover on road verges, partially grassed road surface.
 - Maintenance required by State Forests: Nil.
-
- Location: 604/2 Road, location "C".
 - Type of drainage feature: Semi-permanent watercourse.
 - Comments: This crossing could not be located, although indications on maps from previous harvesting plans shows that 604/2 Road crosses this drainage line. If the SFO is unable to locate this crossing during pre-logging inspections or tree marking, or it requires maintenance or replacement, the Forest Planner must determine what works are required, and a variation of the harvesting plan must be submitted to the EPA for approval. The harvesting plan must only be amended following approval of a relevant variation for this work by the EPA - refer also to condition 4.6(f).

Road construction

There are two (2) short sections of road that must be constructed for this operation. They are shown on the Operational Maps and are as follows:

1. 606/2 Road - approximately 400 metres of road, sidecut at first and then ridgetop, from 605/606 Road to access log dump 20; and
2. 608/2 Road - approximately 800 metres of road, sidecut at first and then ridgetop, from Bullcog Road to access log dumps 3 and 4.

The method of construction of these roads is set out in Attachment 2 (page 63) of this plan.

Description of new drainage feature crossings to be constructed

Unless a new drainage line crossing is required at location "C" on 604/2 Road (see above), no new drainage feature crossings are required to be constructed for this operation.

Location of log dumps

There are 40 log dumps in the harvest area, as indicated on the Operational Map. 10 dumps are located in compartment 604, 6 in compartment 605, 5 in compartment 606, 12 in compartment 607 and 7 in compartment 608. Wherever practicable log dumps are located on ridge tops to facilitate uphill snigging.

There will be limited downhill snigging to dumps 3, 4 and 7 in compartment 608, dumps 8 to 11, 13 to 17 and 19 in compartment 607, dumps 20, 21 and 23 in compartment 606, dumps 24 to 26, 29 and 31 in compartment 605 and dumps 32, 32 to 35 and 39 in compartment 604. This will reduce snigging distances and take advantage of previously constructed log dumps, snig tracks and drainage line crossings. These snig tracks and drainage line crossings are stable. Less than 40% of the snigging activity will be downhill.

Harvesting

The harvesting method proposed for the area is based on current accepted operational practices. It comprises:

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using an articulated rubber tyred skidder and/or a crawler tractor.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

The crawler tractor is used for construction work and snigging from steeper slopes including winching of logs and snigging larger logs. The rubber-tyred skidder is used on the flatter terrain, for snigging smaller logs and logs from steeper areas that have been bunched by the tractor.

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 3, Part A, Table 2) of $C = 0.108$. Post harvest burning will be carried out.

Pre-harvest burning

There will be no pre-harvest burning.

Post-harvest burning

All post harvest burning must be carried out in accordance with condition 4.5 of this plan, the Casino District Fuel Management Plan 1995 and the Conservation Protocols.

Post-harvest rehabilitation

Natural regeneration and natural re-seeding of overstorey, understorey and ground-cover plants will provide ground cover rehabilitation. Supervision by the SFO and fortnightly check sheets will assess that road surfaces, batters and drainage structures are stable at the completion of operations and prior to the shifting of the contractor.

Description 12 Soil Erosion and Water Pollution Control - Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution Hazard Categories

Soil Erosion and Water Pollution Hazard Ratings (SE/WPHR) have been assessed using SOILOSS 5.1. The Ratings have then been used to assess Soil Erosion and Water Pollution Hazard Categories (SE/WPHC) for the net harvest area as follows:

$SE/WPHR = R \times K \times LS \times C$ where:

R = 2500 over the whole harvest area
K = 0.06 the default factor, method B4 of the PCL, Sch 3 Part B
S = As factored in SOILOSS 5.1
L = 20 metres
C = 0.108 Table 2 Native Thin - Post Harvest Burning,
P = 1.0

Water Pollution Hazard Categories for the harvest area are set out in Table 9.

Table 9

Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Hazard Category	Indicative % of Harvest Area				
		cpt 604	cpt 605	cpt 606	cpt 607	cpt 608
$0 \leq 3^\circ$	1	10%	10%	5%	5%	5%
$>3^\circ \leq 13^\circ$	2	35%	35%	30%	30%	30%
$>13^\circ \leq 30^\circ$	3	50%	53%	60%	60%	60%
$>30^\circ$	4	5%	2%	5%	5%	10%
Roads	3					

The following factors for rainfall erosivity and soil erodibility also apply to road construction:

R = 2500

K = 0.06

(b) Dispersibility

Percent dispersible soil calculations are set out in Table 10. PDS% have been rounded to the nearest whole %.

Subsoils for one soil sample (SS6 in compartment 607) was determined as being dispersible and this has been applied over the whole of the harvest area.

Condition 4.6 contains prescriptions to protect dispersible soils.

References Veness and Associates Report Number VA2097C (24 August, 1997)

(c) Other Factors

There are no other factors which need to be considered in the planned harvesting of these compartments.

Table 10

Percent Dispersible Soil Values - Compartments 604, 605, 606, 607 and 608

Soil Sample	Horizon	EAT	Tested % Clay	Tested D%	PDS%
SS1 - Cpt 604	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS2 - Cpt 605	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS3 - Cpt 605	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	10	75	8
SS4 - Cpt 606	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	5	55	3
SS5 - Cpt 607	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	9	46	4
SS6 - Cpt 607	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	42	27	11
SS7 - Cpt 608	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS8 - Cpt 608	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required

2.6 FOREST ZONING AND SPECIAL ATTRIBUTES

Description 13 Forest Zoning and Special Attributes

(a) Research Plots

There are no research plots located within the harvest area.

(b) Permanent Growth Plots

There are no inventory plots or Permanent Growth Plots located in the harvest area.

(c) Special Attributes of the Area.

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

Subject to the non harvest areas set out in Description 2(a) and the Conservation Protocol and NPWS Section 120 Licence prescriptions set out in conditions 4.5 of this plan, the remainder of the harvest area has a Preferred Management Priority (PMP) zoning 1.1.1. Native Forest-General.

There are no other special attributes.

Part 3 AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

HARDWOOD DIVISION
NORTHERN RIVERS REGION
Ewingar State Forest No. 845
Compartments 604, 605, 606, 607 and 608

(b) Third Party/Lessee or Other Interest

The harvest area is covered by Crown Lease No. 1912/2 held by Leonard Reuben Rail and Crown Lease No 1932/6 held by D. Middleton for the purpose of grazing. There are no other third party interests.

(c) Environmental Compliance Requirements

This Harvesting Plan is prepared under contract by Norfor Pty Ltd (A.C.N. 071 356 860) trading as Northern New South Wales Forestry Services for State Forests of New South Wales (State Forests) under the authority of the Forestry Act 1916. This Harvesting Plan is a condition of all Timber, Forest Products, Contractors and Operators Licences issued in connection with the timber harvesting operations described in the Plan.

All operations conducted under the authority of the Timber Licence and other Licences and Agreements issued for the area covered by this Harvesting Plan must comply with:

- Licence conditions issued by State Forests under the Forestry Act 1916.
- The "Code of Logging Practice for Native Forests - State Forests and Crown Timber Lands" (1993).
- The "Standard Erosion Mitigation Guidelines for Logging in New South Wales" (SEMGL 1993) issued by the then Soil Conservation Service of Department of Land & Water Conservation (LaWC).
- The conditions of **Pollution Control Licence No 4017** issued by the Environment Protection Authority under the Pollution Control Act 1970. Those general conditions which affect licensees are set out in Schedule "A" attached to every Timber, Contractors and Operators Licence.
- Conditions attached to licences issued by the National Parks and Wildlife Service under the Threatened Species Conservation Act 1995 and the National Parks and Wildlife Act 1974 (NPW Act).
- Conditions resulting from the production of the **Casino Management Area Environmental Impact Statement**.
- The silvicultural specifications as stated in the **Casino Management Area Environmental Impact Statement** (as amended by Operational Circular 95/14 of 30/10/95).
- The schedule of specifications for the harvesting and utilisation of timber applicable to this operation, in this case, the "Schedule of Compulsory Utilisation Limits for Casino District"

- The Code of Procedure for the measurement of timber and other products applicable to this operation, in this case the **Code of Procedure for the Measurement of Hardwood Logs and other Timber Products - Northern Region**.
- The "Standing Instructions for Fire Prevention and Control in State Forests - Casino District".

(d) Variations, Additions or Amendments

Variations, additions or amendments to the above documents may be made by the responsible authorities at any time, and must be implemented immediately by the State Forests Licensee, or consistent with variation 24A to the Pollution Control Licence.

(e) Environmental Planning & Assessment Act Requirements

In preparing this Harvesting Plan, the requirements of Part V of the EPA Act (as amended) and Section 92 of the NPW Act have been considered and the Casino Management Area Environmental Impact Statement (EIS) has been produced.

(f) Breaches and Infringements

Non-compliance with any condition or instruction set out in this Harvesting Plan will be dealt with in accordance with Section 4 of the **"Code of Logging Practice for Native Forests - State Forests and Crown Timber Lands"**. Serious breaches may lead to the issue of a penalty notice, licensee suspension or prosecution.

(g) Variations and Amendments to this Harvesting Plan

Conditions and requirements relating to the Pollution Control Licence cannot be varied in the field without the prior written approval of the EPA, other than those areas detailed in Condition 5.1 (c), or consistent with condition 24A of the Pollution Control Licence.

Variations and other specified approvals detailed Condition 5.1(c) or consistent with Condition 24A of the Pollution Control Licence, may be made by the Supervising Forest Officer to this Harvesting Plan, subject to the Regional Manager's counter approval.

Other approvals may only be made by the Supervising Forester and are also subject to the Regional Manager's counter approval. Major variations that relate to the conditions of the Pollution Control Licence, minor variations that would result in an increased risk of water pollution, or any variation relating to drainage feature protection conditions can only be made with the prior written approval of the EPA.

All approvals must be recorded on a variation advice, attached as Part 6 to all operational copies of this Harvesting Plan.

This Plan must not be amended by a licensee or contractor.

(h) Harvesting Plan Availability

Copies of this Harvesting Plan must be held available by the contractor or bush supervisor at the site of timber-harvesting operations at all times that felling, snigging or environmental work is being undertaken within the area covered by this Harvesting Plan.

3.2 CERTIFICATION**(a) Plan Preparation (by Forester/Forest Assistant)**

Prepared by M.J. O'Neill

Signature.....

M.J. O'Neill

Title Principal Consultant Forester, Norfor Pty (A.C.N. 071 356 860) trading as Northern NSW Forestry Services

Date 17th December, 1997

(b) Regional Approval

I approve the issue of this Harvesting Plan subject to any amendments, endorsements or approvals that may be made following submission to the National Parks and Wildlife Service, the Environment Protection Authority and/or the Regulatory and Public Information Committee (constituted under the Timber Industry (Interim Protection) Act, 1993 as amended).

The date that operations will need to commence is: 9 February, 1998

Signature..... Regional Planning Manager

Date: 3 February, 1998

(c) Receipt of External Authority Approvals

(To be completed by the Regional Manager or a person nominated by the Regional Manager who must attach the relevant amendments to the Plan.)

Table 11

External Authority Approvals

Name of Authority	Date Received	Attached to Plan by
NPWS	7.11.97	<i>Inf.</i> BROAD AREA LIC
EPA	20.2.98	<i>OK</i>
RaPIC	20.2.98	<i>OK</i>
Other Authority		

I note approval of this Harvesting Plan from the above-mentioned authorities, together with the amendments they have required to be included in the Plan.

These amendments have been included in the final Plan. This Harvesting Plan comprises pages 1 - , attachments and the Operational, Forest Types and Locality maps marked and referenced to this Harvesting Plan. This is Harvesting Plan CAS 604-608

Date for commencement of operations: 23.2.98

Signature.....

Date: 20.2.98

Regional Planning Manager

3.3 DISTRIBUTION

Recipient	Parts	Minimum Copies
Timber Licensee	1,3,4	1
Contractors	1,3,4	1
Operator(s) (where required)	1,3,4	
Supervising Forest Officer(s) [SFO(s)]	1,3-5, (2 optional)	1
Supervising Forester(s)	All	
Regional Manager	All	
Regional Office Register	All	
Compartment History File	All	1
Regional Office (optional)	All	
Community Groups		
Soil Conservationist (Forestry)	All	
Forest Planning Branch, Head Office, for distribution to:		
Regulatory and Public Information Committee	All	3
National Parks And Wildlife Service	All	2
Environment Protection Authority	All	2
Department of Lands and Water Conservation	All	1
(for harvesting in other Crown-timber lands)		

3.4 INDUSTRY ENDORSEMENT

I endorse the harvesting plan on behalf of industry.

Signature: Licence No.: Date:

Position: Company:

Signature: Licence No.: Date:

Position: Company:

Signature: Licence No.: Date:

Position: Company:

3.5 BUSH SUPERVISORS ACKNOWLEDGMENT

I acknowledge that I have received a copy of Harvesting Plan No CAS 604 - 608 and that I understand the conditions of the Plan as explained to me by a State Forests officer.

Signature: Licence No: Date:

Position.....

Signature: Licence No: Date:

Position.....

Signature: Licence No: Date:

Position.....

Part 4 OPERATIONAL CONDITIONS

- INDEX TO PART 4 - OPERATIONAL CONDITIONS		
4.1	HARVESTING ACTIVITY DESCRIPTION	35
4.2	TREE-MARKING CODE AND HARVEST REGULATION	35
4.3	ORDER OF WORKING	36
4.4	SILVICULTURE	36
4.5	FLORA AND FAUNA PROTECTION	37
(a)	Variation to NPWS Section 120 License TS006	37
(b)	Definitions	37
(c)	General Prescriptions	38
	Prescription 1: Rainforest Protocol	38
	Prescription 2: Old Growth Forest Protocol	38
	Prescription 3: Rare, Non-Commercial Forest Types Protocol	39
	Prescription 4: Tree Retention	39
	Prescription 5: Significant Food Resources	39
	Prescription 6: Riparian Buffers	40
	Prescription 7: Connection Corridors	40
	Prescription 8: Wetlands	40
	Prescription 9: Heath	40
	Prescription 10: Rocky Outcrops	40
	Prescription 11: Caves, tunnels and disused mineshafts	41
	Prescription 12: Burning	41
	Prescription 13: Pre-logging site inspections	41
	Prescription 14: Ground Habitat Protection	42
	Prescription 15: Other conditions	42
(d)	Species Specific Threatened Fauna Prescriptions (GIS and Pre-logging Fauna Survey Records)	42
(e)	Species Specific Threatened Fauna Prescriptions (Species likely to be present) Fauna Survey Records)	47
(f)	Wildlife Corridors	48
(g)	Reporting Procedures	48
4.6	SOIL EROSION AND WATER POLLUTION CONTROL CONDITIONS	49
(a)	Soil Erosion and Water Pollution Categories	49
(b)	Approved Timber Harvesting and Extraction Method	49
(c)	Marking and Location of Roads, Drainage Feature Crossings, Log Dumps and Soil and Water Pollution Control Measures	49
(d)	Wet Weather Controls	49
(e)	Dispersible Soils	50
(f)	Existing Roads	50
(g)	Road Construction	50
(h)	Slope Limits for the Area	50
(i)	Drainage Feature Protection	51
(j)	Tree Marking Rules for Riparian Buffers, Filter Strips and Buffer Strips	51
(k)	Felling and Extraction within Filter Strips	52
(l)	Felling and Extraction within Drainage Depression Buffer Strips	52
(m)	Extraction and Use of Snig Tracks	52
(n)	Downhill Snigging	53
(o)	Snig Track Drainage Line Crossings	54
(p)	Log Dumps	54
(q)	Prescribed Burning	54
4.7	RESEARCH AND INVENTORY PLOTS	55
4.8	MODIFIED HARVEST CONDITIONS	55
4.9	SPECIFICATION OF TYPE OF PRODUCTS TO BE REMOVED	56

Condition 4.1 HARVESTING ACTIVITY DESCRIPTION

The operation will be a low intensity selective harvesting operation in maturing and regrowth native hardwood forest. The products that will be harvested are quota and ex-quota sawlogs, poles, girchers and veneer logs.

Condition 4.2 TREE MARKING CODE AND HARVEST REGULATION

The tree-marking Code shown in this Plan must be used to apply other conditions of this plan as required. All necessary tree-marking in the field must be carried out before and during the harvesting operation by the Supervising Forest Officer. Unless otherwise stated in the Harvesting Plan, all tree marking will generally be for removal with all habitat trees and critical boundaries (including non harvest areas and filter strips) being marked within one tree length of a tree marked for removal. Red will be the preferred tree marking colour.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

TREE-MARKING CODE**RETAINED TREES**

Trees not to be removed or damaged
Boundary not to be crossed by harvesting equipment
Areas where disturbance by harvesting is allowed but machinery access is prohibited
Line not to be crossed or disturbed by fallers or harvesting machinery at any time
Private property boundary

National Park or Flora Reserve boundary
Riparian Buffers/Filter Strips
Drainage depression buffer strip
Wildlife refugia/wildlife corridor/connection corridor
Other no entry areas for current operation
Retained hollow-bearing tree
Retained recruitment tree

Single horizontal stripe
Two horizontal stripes

Two horizontal stripes
Three horizontal stripes

Three horizontal stripes or
Yellow blaze
Three horizontal stripes
Three horizontal stripes
Not marked
Three horizontal stripes
Three horizontal stripes
"H" underlined
"R" underlined

TREES TO BE REMOVED

Individual tree
Directional felling mark
Tree jacking mark
Tree to be removed at dump
Tree to be removed during road line/snig track alignment
Cancellation mark

Dot
Arrow in the direction of fall
"J" & arrow in direction of fall
"D" with a dot
Vertical stripe with a dot
"X"

TREES MARKED FOR INFORMATION

Compartment boundary
Perimeter of canopy gaps
Slope angle indication (for operators guidance)
Approved dump sites
Road line

"O"
Vertical stripe
A number in a circle
"D"
Vertical stripe

Condition 4.3 ORDER OF WORKING

(a) Wet Weather, Dry Weather and Intermediate Areas

There are 40 log dumps designated for the harvest area as indicated on the Operational Maps. Harvesting should commence at dump 1 and thereafter dumps must be worked in numerical sequence, unless otherwise authorised by the Supervising Forest Officer.

Log dumps 2 and 5 in compartment 608, 18 and 19 in compartment 607 and 36, 37, 38 and 40 in compartment 604 are suitable for use in wet weather if required.

(b) Wet weather controls -Roads

During wet weather, the wet-weather controls set out in Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular:

- Where runoff occurs from a road surface, haulage must not occur unless the road is a gravel or sealed road.

(c) Wet weather controls - Snigging

Snig tracks must not be used where there is runoff from the track surface or there is a likelihood of significant rutting leading to turbid runoff from the track surface.

Condition 4.4 SILVICULTURE

(a) General

The aim of the harvest is to promote growth on retained trees and to create conditions that will allow the establishment and growth of regeneration. Selective logging techniques, including the Australian Group Selection system where appropriate, shall be implemented.

A moratorium on gap and cluster silviculture techniques currently exists. For stands exhibiting mature trees with little or no advanced growth, application of the "Australian Group Selection" silviculture, as detailed in Jacob's (1955) is an acceptable logging technique during the period of review. It will include the "occasional formation of canopy gaps following the removal of small groups of trees by logging, provided that these gaps:"

- (i) be randomly distributed rather than more or less regularly spaced;
- (ii) be of a range of sizes that average about 40-50 metres diameter, rather than generally larger gaps averaging about 80 metres; and
- (iii) a small amount of site preparation is allowable to encourage development of new regeneration. Site preparation can include;
 - limited felling or tractor pushing of non-commercial trees;
 - creation of an acceptable seed bed and reduce fire hazard by some heaping and burning of tree heads and logging debris;
- (iv) full site preparation is not the aim, and preservation of some advanced growth and understorey vegetation is desirable.
- (v) if necessary some enrichment planting of commercial tree species naturally occurring in the stand will take place.

(b) Tree Marking

Tree marking must aim at:

Retaining trees capable of net merchantable timber value increment for cutting in future cutting cycles, except where:

- a) the removal would result in more valuable increment on preferred retained trees (redistribution).
- b) the tree has been or is likely to be significantly damaged during the course of harvesting operations.
- c) the removal of a small group of merchantable trees would create favourable conditions for the establishment and growth of regeneration.

In general tree marking and supervision must be directed towards:

1. Harvesting for the highest economic end use for which markets are available.
2. Ensuring maximum economic utilisation of all trees felled.
3. Minimising damage to the retained stand and minimising soil disturbance in excess of that required for successful regeneration establishment.

Tree marking for removal must be carried out by the SFO.

(c) Harvesting Debris

Debris from selective harvesting must be removed, or flattened, within 5 metres of the butts of marked hollow-bearing and recruitment trees, dead stags, feed trees and trees within exclusion areas.

Harvesting debris which is likely to impede the flow of water in road drainage structures must be removed from such structures every 2 days.

Bark and debris produced by the harvesting must be returned to the logging area and dispersed as far as practicable around the net harvest area and/or stacked in small heaps on log dumps.

(d) Directional Felling

Directional felling techniques must be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of the Riparian Habitat Zones, filter strips and buffer strips.

Condition 4.5 FLORA AND FAUNA PROTECTION

Note : A plant species located in compartment 608 has not been taxonomically clarified. A specimen sent to Queensland Museum was returned without being able to be determined and the specimen is currently being assessed by John Williams. The plant (1 specimen only) was located on compartment 608 near the boundary of compartment 607. This area has been reserved through owl habitat. However, further surveys should be conducted in compartment 607 following taxonomic verification. **Harvesting must not proceed in compartment 607 until further surveys have been completed.**

(a) Variation to NPWS Section 120 License TS006

The compartments within this harvest area are included in State Forests Plan of Operations for January-June 1998 and the prescriptions contained in the Section 120 license variation apply. The SFO must have a copy of the license variation at the operation site.

(b) Definitions

Specified Forestry Activities: Timber harvesting (including all forms of silviculture), construction and operation of log dumps, cutting of posts, collection of firewood, gravel extraction, harvesting of tea tree oil, road construction (including tracks, fire trails and snig tracks), prescribed burning that is not undertaken in accordance with the provisions of the *Rural Fires Act 1997*, grazing that is not undertaken with the provisions of the *Rural Fires Act 1997* (to the extent controlled by SFNSW) and military activities (to the extent controlled by SFNSW).

Critical Weight Range Vertebrates (CWRV): In this licence, CWRV refers to the following threatened species: Albert's Lyrebird, Bush Hen, Bush Thick-knee, Rufous Scrub-bird, Eastern Bristlebird, Black-striped Wallaby, Brush-tailed Phascogale, Common Planigale, Tiger Quoll, Southern Brown Bandicoot, Rufous Bettong, Long-nosed Potoroo, Long-footed Potoroo, Parma Wallaby, Red-legged Pademelon, Brush-tailed Rock Wallaby, Hastings River Mouse, Smoky Mouse and White-footed Dunnart.

Net logging area: The gross area less PMP exclusion areas, riparian buffers and connection corridors, rainforest protocol exclusions, old growth forest protocol exclusions and rare non-commercial forest type exclusions.

Prescribed burning: Any burning in state forests deliberately undertaken according to prescribed procedures pursuant to the *Bushfires Act 1949*.

SEPP 14: State Environment Planning Policy No. 14 - Wetlands

Streams: Streams as shown on the relevant topographic map as published by the Central Mapping Authority at a scale of 1:25:000. A first order stream is defined as that part of a stream between its point of origin and the first order junction with another stream, whereupon it becomes a second order or higher stream. A third order stream commences at the junction of two second order streams.

Conservation Protocols: The document titled "Conservation Protocols for Timber Harvesting on State Forests for the duration of the IFA decision" (NPWS and SFNSW 29 November 1996).

(c) General Prescriptions**Prescription 1: Rainforest Protocol**

No typed rainforest exists within the harvest area.

Prescription 2: Old Growth Protocol

See Description 8(b) and Table 1 in Description 3 (page 6).

A total of approximately 191 hectares of old growth forest has been identified within the harvest area from BOGMP maps and stump counts. It is shown on the Operational Maps and the areas by compartment and forest type are set out in Table 1, Description 3. The boundaries have been modified to make field identification easier.

The old-growth boundary should be marked by the SFO with two horizontal stripes (boundary not to be crossed by machinery). Harvesting machinery may cross the boundary along an existing road or snig track identified and shown on the Harvesting Plan to access areas on the other side of the old-growth.

Trees inside the marked old-growth boundary are not to be removed or damaged.

Trees may be felled into the old-growth however all trees inside the marked old-growth boundary are to be given the same protection as marked hollow bearing trees: harvesting and post logging burning must aim to minimise damage to hollow-bearing trees, recruitment trees and dead stags. The potential for damage should be minimised by techniques of directional felling. Felled heads should be flattened or removed from 5 metres of all trees inside the old-growth boundary.

Prescription 3: Rare, Non-Commercial Forest Types Protocol

No rare non-commercial forest type or IDFA forest types are present within the harvest area.

Prescription 4: Tree Retention

The harvest area is located within the "Non Regrowth Zone" as defined by the Conservation Protocols. The following prescriptions apply and their application must be recorded on the compartment history maps:

Hollow-bearing tree retention

- a) A minimum of ten hollow-bearing trees must be retained per two hectares. Where this density is not available, ten trees must be selected from trees with diameters within the largest 30% of the stand.
- b) Retained, hollow-bearing trees must be selected from trees with diameters within the largest 30% of the stand and be live trees with good crown development.
- c) Retained hollow-bearing trees should represent the range of species that occurs in the area.
- d) Trees retained outside the net logging area (see definition at end of licence) must not be counted as hollow-bearing trees.
- e) Hollow-bearing trees must be scattered throughout the net logging area.
- f) Hollow-bearing trees must be marked for retention.

Recruitment tree retention

- a) A minimum of ten recruitment trees must be retained per two hectares.
- b) Retained recruitment trees must show potential for developing into hollow-bearing trees with good crown development. Trees in the mature and intermediate growth stages should be retained as recruitment trees.
- c) Retained recruitment trees should represent the range of species that occurs in the area.
- d) Trees retained outside the net logging area must not be counted as recruitment trees.
- e) Recruitment trees must be scattered throughout the net logging area.
- f) Recruitment trees must be marked for retention.

Dead stag retention

- a) Dead stags must be retained in areas outside the net harvesting area, visual protection strips, and elsewhere where it is safe to do so.
- b) Dead stags must not be counted as hollow-bearing trees or recruitment trees.

Protection of hollow bearing trees, recruitment trees and dead stags

Specified forestry activities and post-logging burning must aim to minimise damage to hollow-bearing trees, recruitment trees and dead stags. The potential for damage should be minimised by techniques of directional felling. Felled heads must be flattened or removed from 5m of stems retained to meet this prescription.

Prescription 5: Significant Food Resources

- a) Stands where *Allocasuarina* species dominate the canopy should be protected from specified forestry activities. Where more than 30 crushed cones have been found beneath individuals of *Allocasuarina* species, indicating intensive use by the Glossy Black Cockatoo, the tree must be retained.
- b) At least 4 mature (>40cm dbh) winter flowering eucalypt species per two hectares must be retained where they occur. Where retained hollow-bearing or recruitment trees meet these requirements, the hollow-bearing and recruitment trees can be counted as food trees.
- c) Damage to mature banksias and *Xanthorrhoea* spp. should be avoided during forestry operations.
- d) All trees with "V-notch" incisions or other incisions made by the Yellow-bellied Glider must be retained. Where retained hollow-bearing or recruitment trees meet these requirements, the hollow-bearing and recruitment trees can be counted as food trees.
- e) Specified forestry activities and post-logging burning must aim to minimise damage to retained feed-trees. The potential for damage should be minimised by techniques of directional felling. Felled heads must be flattened or removed from within 5 metres of stems retained to meet this prescription.

Prescription 6: Riparian Buffers

- a) Riparian buffers must be at least 10 metres wide on each side of all first order streams, and at least 20 metres wide on each side of all second order streams. For at least 80% of third and higher order streams in a Management Area, riparian buffers must be at least 40 metres wide on each side of the stream. The remaining 20% will have a buffer of 20 metres or greater on each side.
- b) These buffers must be mapped on the Harvesting Plan Operational Map and clearly recorded in Harvesting Plans. The buffer widths must be clearly indicated on the Harvesting Plan Operational Map.
- c) Specified forestry activities, with the exception of road construction and road maintenance where there is no other practical means of access, must be excluded from Riparian Buffers. Road construction and road maintenance through riparian buffers should avoid sites where threatened species have been recorded.
- d) All practical precautions should be taken to avoid felling trees into Riparian Buffer zones.

Prescription 7: Connection Corridors

See Description 2(b).

There are three connection corridors 80m wide as shown on the Operational Maps. Specified forestry activities must be excluded from connection corridors, with the exception of road construction and road maintenance where there is no other practical means of access.

All practical precautions should be taken to avoid felling trees into these corridors.

Prescription 8: Wetlands

There are no wetlands within the harvest area.

Prescription 9: Heath

There are no areas of heath within the harvest area.

Prescription 10: Rocky Outcrops

There was no evidence of significant areas of rocky outcrops during field inspections of the harvest area. However there are areas of forest type 234 - Rock within the harvest area. If rocky outcrops are found by the SFO during pre-logging inspections or tree marking, the following prescriptions must be applied:

- Rocky outcrops are defined as areas characterised by a high proportion of exposed rock or boulders relative to the surrounding area, OR, areas with skeletal soils, supporting heath or shrub communities (sometimes with occasional emergent trees). These sites can occur where the geology varies from the surrounding area (eg. rhyolite outcrops).
- A buffer zone at least 20m wide must be established around all rocky outcrops more than 0.1ha and less than 0.5ha surface area.
- A buffer zone at least 40m wide must be established around all rocky outcrops greater than 0.5ha surface area.
- Specified forestry activities must be excluded from within the buffer. All precautions should be taken to avoid felling trees into this buffer zone.
- Rocky outcrops must be mapped and clearly recorded in Harvesting Plans. Where the scale of the Harvesting Plan Operational Map precludes accurate mapping of the boundary of rocky outcrops the location of the rocky outcrop must be clearly indicated on the Harvesting Plan Operational Map.

Prescription 11: Caves, Tunnels and Disused Mineshafts

No mineshafts or caves were detected during pre-logging flora and fauna surveys. If these features are detected by the SFO during pre-logging inspections or tree marking, the following prescription must be applied:

- a) All caves, tunnels and disused mineshafts (with the exclusion of open pits of less than 3m in depth) must be protected by a buffer zone at least 50m wide. Where the NPWS is satisfied that adequate surveys for threatened cave-dependent bats have been undertaken and no Schedule 1 or 2 cave-dependant bats or evidence of Schedule 1 or 2 cave-dependant bats have been recorded, these buffer zones may be reduced to 10m radius. Specified forestry activities must be excluded from these buffer zones.
- b) All known threatened microchiropteran bat maternity and hibernation sites must be protected by a 50m buffer zone. Specified forestry activities must not be conducted within this buffer zone. Within 50 to 100m of the site a maximum of 50% canopy reduction can occur.
- c) Caves, tunnels and disused mineshafts and their buffer zones must be mapped and clearly recorded in Harvesting Plans. Where the scale of the Harvesting Plan Operational Map precludes accurate mapping of these features, the location of the feature must be clearly indicated on the Harvesting Plan Operational Map.

Prescription 12: Burning

When fulfilling their responsibilities under the *Rural Fires Act 1997*, SFNSW should take account of the following principles

- a) Prescribed burning regimes should take account of wildlife history and reflect the ecological requirements of any threatened species, or their habitat, known or likely to occur in the area. Burning should be varied by season, intensity and interval.

- b) Prescribed burning should be conducted in a manner which promotes and maintains an understorey mosaic which includes significant areas of dense understorey vegetation, particularly within the habitat of CWRV.
- c) In areas where intervals between fires are less than five years, prescribed burning should be conducted in a manner that minimises the impact on understorey vegetation and large fallen logs (> 40 cm dbh and 5m in length).

Prescription 13: Pre-logging site inspections

- a) Persons conducting pre-logging and pre-roading site inspections must search for and record the following threatened species habitat features:
 - i) nest, den and roost sites (especially raptor and owl nest and roosts, and nests and dens of threatened hollow-dependent species);
 - ii) owl pellets, distinctive scats (eg. Tiger Quoll, Koala and Brush-tailed Rock Wallaby scats), a sample of predator scats and distinctive tracks (eg. Tiger Quoll);
 - iii) latrine and den sites of the Tiger Quoll;
 - iv) crushed cones beneath *Allocasuarina* spp;
 - v) yellow-bellied glider "v-notch" trees and trees with other incisions made by Yellow-bellied Gliders;
 - vi) skeletal remains;
 - vii) caves, tunnels and disused mineshafts;
 - viii) diggings made by potoroos and bandicoots.
- b) Records of these features must be provided to the relevant NPWS Zone Office within ten working days of the completion of the survey reports.

Prescription 14: Ground Habitat Protection

SFNSW should take reasonable measures to protect ground habitat (understorey, ground cover, large logs on the forest floor) from specified forestry activities.

Prescription 15: Other Conditions

- a) Rural Fires Act
Notwithstanding any of the above conditions, SFNSW may carry out activities necessary for its compliance with the provisions of the Rural Fires Act 1997
- b) Notification
Where any of the conditions of this licence requires a matter to be notified to the NPWS, approved by the NPWS or some other action by the NPWS, then NPWS means the Manager of the NPWS Northern Zone or his delegate.
- c) Cumulative Effect
In the event that the cumulative of the Prescriptions of this letter leads to more than a 20% reduction in the net logging area in, or significantly compromises the silvicultural objectives for this compartment, SFNSW may seek a review of the Prescriptions. The NPWS must consult with the relevant Harvesting Advisory Board as necessary prior to completion of any such review.
- (d) **Species-specific Threatened Fauna Prescriptions - GIS and Pre-logging Survey Records**

Based on GIS data and pre-logging surveys the following Schedule 1 and 2 Fauna (Threatened Species Act 1995) have been recorded within or within 5 kilometres of the harvest area.

MAMMALS

Brush-tailed Rock Wallaby
Squirrel Glider

BIRDS

Sooty Owl
Powerful Owl

REPTILES

Three-toed Snake-toothed Skink

Yellow-bellied Glider	Masked Owl
Koala	Glossy Black Cockatoo
Long-nosed Potoroo	
Rufous Bettong	
Tiger Quoll	
Parma Wallaby	
Little Bent-wing Bat	
Golden-tipped Bat	

The location of these records are set out in Table 2, Description 9.

Prescription TS1: Powerful Owl and Masked Owl

Where there is a Powerful Owl, or Masked Owl record, or both in the compartment or within 2km of the compartment boundary, the following must apply:

- Pre-logging surveys for roost and nest sites along gully lines and heads of gullies must be conducted within 50m of the net logging area.
- Specified forestry activities must be excluded from within 50m of a Powerful Owl or Masked Owl nest site, and from within 30m of a permanent roost site. (A permanent roost site is defined as a roost that shows evidence of more than one visit/use) unless specifically authorised by NPWS.
- The location of nest or roost sites must be indicated on Harvesting Plan Operational Maps.
- Northern Rivers Region has an agreed owl reservation protocol with NPWS for Ewingar State Forest.
- Potential habitat that has been retained to meet this protocol is shown on the Operational Maps by way of the Owl Landscape Map attached to this plan.
- Specified forestry activities must be excluded from the retained potential habitat.
- Where information indicates that an abundance of more than one Greater Glider per hectare exists within 2km of a Powerful Owl record, eight habitat trees per hectare should be retained within the net logging area.

Prescription TS2: Sooty Owl

Where a record of a Sooty Owl exists in the compartment or within 2km of the compartment boundary, the following must apply:

- Pre-logging surveys for roost and nest sites along gully lines and heads of gullies must be conducted within 50m of the net logging area.
- Specified forestry activities must be excluded from within 50m of a Sooty Owl nest site, and from within 30m of a permanent roost site. (A permanent roost site is defined as a roost that shows evidence of more than one visit/use) unless specifically authorised by NPWS.
- The location of nest or roost sites must be indicated on Harvesting Plan Operation Map.

Prescription TS3: Squirrel Glider

Where a record of a Squirrel Glider exists in a compartment or within 400m of the compartment boundary, the following must apply.

- Logging must be excluded from an 8ha area centred on Squirrel Glider records. This 8ha area should cover gully, midslope and ridgetop areas where possible.
- Areas of habitat retained to meet this prescription must be identified and mapped in the Harvesting Plan Operational Map as excluded from harvesting.
- When 10 of these areas, separated by 2km or more, are retained over a two year period in any one SFNSW Management Area, SFNSW may apply to the NPWS for a review of this prescription.

Prescription TS4: Yellow-bellied Glider

- a) Persons conducting pre-logging and pre-roading surveys and site inspections must search for Yellow-bellied Glider sap feed trees (ie. "v-notch" trees and trees with other incisions made by Yellow-bellied Glider).
- b) All Yellow-bellied Glider sap feed trees must be retained. Within a 100m radius of retained sap feed trees, and records of the Yellow-bellied Glider, 15 additional feed trees must be retained. The additional retained feed trees should be of the same species as the identified sap feed tree, or trees that shed their bark in long strips, eg species from Blue, Flooded, Grey, Red and White Gum groups, or both. The retained feed trees must be >30cm dbh where available.
- c) A 50m buffer must be established around all Yellow-bellied Glider den sites. Logging must be excluded from this buffer. The location of known den site and den sites located during harvesting operations must be indicated on the Harvesting Plan operational Maps.

Prescription TS5: Critical Weight Range Vertebrates (CWRV) - Tiger Quoll, Parma Wallaby, Long-nosed Potoroo and Brush-tailed Rock Wallaby

For the purposes of this prescription, the following habitat is thought to be critical for these species:

- Parma Wallaby - rainforest, rainforest ecotones and wet sclerophyll forest with an understorey containing rainforest species;
- Tiger Quoll - moist gullies, wet sclerophyll forest, rainforest and fallen logs with a diameter greater than 40cm;
- Brush-tailed Rock Wallaby - rocky scarps with wet and dry eucalypt forests adjacent to grassland and steep rocky terrain.
- Long-nosed Potoroo - Diverse habitat utilising open areas for foraging and dense ground cover/understorey for shelter and protection. Often associated with gullies and forest ecotones.

The following **general prescriptions** will apply:

Where a record exists of a CWRV, as defined in Condition 4.5(b) of this plan, in the compartment or within 2km of the compartment boundary (or a Tiger Quoll record within 5km), the following must apply.

- a) A 20m buffer must be established around all areas of rainforest Category A and Category B (as defined in the Rainforest Protocol) within the compartment. Machinery must not enter this buffer. Trees may be felled out of and into the buffer. Trees must not be felled out of or into the rainforest. (NOTE: There is no rainforest within the harvest area).
- b) Commercial and private firewood licences should specify that fallen hollow logs over 40cm diameter should not be removed.
- c) Feral predator surveys should be conducted after harvesting operations using day light or nocturnal techniques or both. Species specific control measures should be undertaken to remove feral predators as required and reasonable, using the results of the surveys to justify the action taken.
- d) Results of feral predator surveys must be provided to the NPWS Northern Zone office.
- e) The area covered by fuel reduction burns should not exceed 75% of the net logging area in any one compartment.
- f) Grazing regimes should aim to minimise adverse impacts on CWRV species.

In addition to the above, the following species-specific conditions must be applied.

Brushed-tailed Rock Wallaby

In order to preserve potential feed areas for this species, all effort must be made to minimise disturbance to grass cover within 200 metres of the bulldog rock area adjacent to compartment 608. This will be achieved by reducing snig tracks and maximising walk over techniques within this zone. A connection corridor 80 metres wide forms a path connecting known habitat to potential habitat combined in the owl reserve in the southern parts of the harvesting area.

Tiger Quoll

- a) Where there is a record (observation, latrine, den site, hair analysis) of Tiger Quoll in the compartment or within five kilometres of the compartment boundary the exclusion zones listed below must be established. Placement of these exclusion zones should take into account the location of Tiger Quoll records.
 - i) maternal den sites exclusion zone: 12ha exclusion with link to riparian buffers
 - ii) permanent den sites exclusion zone: 3.5ha exclusion with link to riparian buffers.
 - iii) latrine sites exclusion zone: 12ha exclusion.

The location of these exclusion zones must be mapped on the Harvesting Plan Operational Map.

Long-nosed Potoroo

- a) Where there is a record of a Long-nosed Potoroo in the compartment or within two kilometres of the compartment boundary harvesting and burning must be excluded from a five metre buffer around six trees per hectare. These six trees can include trees retained under General Prescriptions 4 and 5.

Prescription TS6: Threatened Bats

Where there is a record of a threatened bat in the compartment or within 5km of the compartment boundary the following must apply:

- a) If threatened fruit-bats are detected during pre-harvest inspections, the full extent of the roosting camp must be identified on the Harvesting Plan Operational Map.
- b) Likely microchiropteran bat roost trees should be inspected prior to operations commencing within 100m of such trees. Likely roost trees are dead stags greater than 100cm dbh; or large trees with accessible base hollows.
- c) Post-logging burning should plan for no more than 75% coverage of the gross harvesting area in areas where threatened bats have been detected.
- d) In addition to the above the following species specific prescriptions must be applied where the species has been recorded in the compartment or within 50 metres of the compartment, or in the case of *Kerivoula papuensis* within 200 metres of the compartment. If these species have been recorded within 5 kilometres of the compartment boundary an appropriate survey for the species must be conducted within the compartment:

Golden-tipped Bat

- a) A 40 metre wide buffer must be established on both sides for 200 metres upstream and 200 metres downstream of the stream closest to the record of the species. Specified forestry activities must be excluded from these buffers.
- b) These buffers must be marked on the Harvesting Plan Operational Map.

Little Bent-wing Bat

- a) Where there is a record of this species in the compartment or within five kilometres of the compartment, SFNSW and NPWS must develop a management strategy for forests around known maternity and hibernation sites of the species.

Prescription TS7: Glossy Black Cockatoo

- a) A 50 metre radius buffer must be established around all Glossy Black Cockatoo nest sites. Specified forestry activities must be excluded from this buffer. The buffer must be mapped on the Harvesting Plan Operational Map.

- b) When ten Glossy Black Cockatoo nest buffers are retained over a two year period in any one SFNSW Management Area, SFNSW may apply to the NPWS for a review of this prescription.

Prescription TS8: Koala

A pre-logging Koala survey was undertaken in August 1997 according to the methodology prescribed in the Conservation Protocols. Transect location maps and data sheets are stored in the Compartment History Files. A summary of the results of the transects are attached to this plan as Appendix 2.

The pre-logging Koala survey has indicated that for the purposes of this plan:

- compartments 604, 605 and 607 are low use compartments;
- **compartments 606 and 608 are intermediate use compartments;** and
- there are no high use areas.

The following prescriptions apply to this harvest area:

(a) Dialogue with Contractors

The SFO must ensure continued dialogue with contractors at both the tree marking and operational phase to ensure knowledge and attitude is compatible with compliance with this prescription on all compartments. The SFO must ensure that contractors are aware of any exclusion zones, including tree marking rules, for the protection of individual Koalas or Koala habitat.

(b) Detection of a Koala or Koalas during tree marking or logging operations

Individual Koalas will be protected from tree felling operations wherever detected. A tree containing a Koala will not be felled or damaged while the Koala is known to be in the tree.

If a Koala is observed during marking or logging (in an area that has not previously been found to be a high use area), numerous dung pellets (more than twenty below a tree) are found, or where less than twenty pellets of two markedly disparate sizes (medium plus about half sized) are found the following procedure will be followed:

- The SFO must clearly mark a 50 metre exclusion area around the detection site.
- Walk transects will be initiated consisting of eight transects in the cardinal and sub-cardinal directions, and centred on the observation, to determine the extent of any high use area that may occur. The sampling will be at the same rate as the transect method described in the Koala Prescription for North Coast Forests, with primary and then secondary browse species as targets for dung searches. **For this harvest area primary browse species include Tallowwood, Grey Gum, Forest Red Gum. Secondary browse species include White Mahogany & Blackbutt.**
- These transects shall be carried out for at least 100 metres beyond any delineation of a high use area. Where the person undertaking the transects is satisfied that Koala habitat is present they may choose to forego the interior parts of the transects and commence survey near what they consider to be the edge of the high use area.

- Any high use area boundary found will be checked by inspection around the perimeter defined by the transects. The results of this inspection will be recorded as a concise narrative on the data sheet and mapped to an Amendment to the Harvesting Plan.
- The results and maps will be promptly forwarded to NPWS (see Reporting Section).
- All tree felling will be modified within intermediate use areas (see (c) below).

(c) **Intermediate Use - Compartments 606 and 608**

Within these compartments the following prescriptions will apply:

- Ten primary browse species (For this harvest area primary browse species include Tallowwood, Grey Gum, Forest Red Gum). (or secondary browse species if primary species are unavailable- Secondary browse species include White Mahogany & Blackbutt) will be retained per hectare.
- Retained trees may include hollow-bearing or recruitment trees if they meet the browse requirements. (Koala food trees shall be leafy, with broad crowns and represent the range of sizes greater than 40 cms dbh).
- Retained trees must be clearly marked for retention by the SFO.
- Gap creation for silvicultural purposes will not occur in preferred forest types.
- (d) **Other General Prescriptions**
- Isolated individual trees with more than 20 dung pellets beneath shall be marked for retention and logging debris shall be removed at least 10 metres from their base.
- During tree marking, primary browse trees should be briefly scanned for Koalas and Koala pellets (see next section for description of required action if a koala is detected).
- Post-logging burning - As far as practicable post logging fire is to be kept out of the area reserved from logging for the protection of Koala habitat.

Prescription TS9: Three-toed Snake-toothed Skink

The general prescription contained within Condition 4.5(c) will adequately protect this species should it occur in the harvest area.

(e) **Species-specific Threatened Fauna Prescriptions - Fauna likely to be present**

The following species have not been recorded within or within 5 kilometres of the harvest area. However pre-logging surveys indicated that habitat suitable for these species could be expected to occur within the harvest area:

MAMMALS

Black-striped Wallaby
Brush tailed Phascogale
Red-legged Pademelon
Eastern Little Mastiff Bat
Common Bent-wing Bat

BIRDS

Square tailed Kite
Red Goshawk
Bush Thick-knee
Regent Honeyeater
Swift Parrot

Sightings during pre-logging inspections, tree marking or logging will trigger the following prescriptions.

Prescription TS10: Black-striped Wallaby

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS11: Red-legged Pademelon

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS12: Brush-tailed Phascogale

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS13: Bush Thick-knee

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied. In addition the following species specific prescriptions must be implemented:

- a) A 20m buffer must be established around all Bush Thick-knee nest sites.
- b) Specified forestry activities must be excluded from this buffer. The location of these nest sites must be indicated on the Harvesting Plan Operational Map.

Prescription TS14: Square-tailed Kite

Prescriptions for this species have not been agreed upon. Any sightings must be immediately reported to Regional Office.

Prescription TS15: Red Goshawk

Prescriptions for this species have not been agreed upon. Any sightings must be immediately reported to Northern Rivers Regional Office.

Prescription TS16: Regent Honeyeater

The application of the general prescriptions in Condition 4.5(c) of this plan should adequately protect this species

Prescription TS17: Swift Parrot

Where this species is detected, harvesting must be temporarily excluded from flowering eucalypts.

Prescription TS18: Common Bent-wing Bat

See Prescription TS6.

Prescription TS19: Eastern Little Mastiff Bat

See the general prescription for threatened bats under Prescription TS6. In addition, the following species specific prescription must be applied:

- a) Should this species be recorded a provision of a 50 metre exclusion zone around any known roost sites harbouring more than 3 individuals of the species. Specified forestry activities must be excluded from these buffers.
- b) These buffers must be mapped on the Harvesting Plan Operational Map.

(f) Wildlife Corridor

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

(g) Reporting Procedures

Contractors and supervisory staff must immediately report any sightings of threatened species to the Regional Planning Manager. Such confirmed sightings or findings will generate the application of the appropriate prescriptions under the conservation protocols to reduce the impact on the species. This plan must be amended to include the prescriptions if necessary.

Condition 4.6 SOIL EROSION AND WATER POLLUTION CONTROL CONDITIONS
(a) Soil Erosion and Water Pollution Categories

The calculated Soil Erosion and Water Pollution Categories for compartments 604, 605, 606, 607 and 608 are detailed in Table 12.

Table 12

Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Hazard Category	Indicative % of Harvest Area				
		cpt 604	cpt 605	cpt 606	cpt 607	cpt 608
$0 \leq 3^\circ$	1	10%	10%	5%	5%	5%
$>3^\circ \leq 13^\circ$	2	35%	35%	30%	30%	30%
$>13^\circ \leq 30^\circ$	3	50%	53%	60%	60%	60%
$>30^\circ$	4	5%	2%	5%	5%	10%
Roads	3					

(b) Approved Timber Harvesting and Extraction Method

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

(c) Marking and Location of Roads, Drainage Feature Crossings, Log Dumps and Soil and Water Pollution Control Measures

The marking and field location of roads, log dumps and drainage feature crossings in the field must be in accordance with Conditions 4.2 and 4.6 of this plan. The location of roads, drainage feature crossings and log dumps are indicated on the Operational Maps.

The marking of soil protection and water pollution control measures in the field must be in accordance with Conditions 4.2 and 4.6. Their location is indicated on the Operational Map. The final and precise location of such features must only be determined by the Supervising Forest Officer.

(d) Wet Weather Controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) and PCL condition 96.

During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular, extraction tracks, snig tracks and roads must not be used where:

- there is run off from a track, road surface surface ;
- where there is a likelihood of significant rutting (greater than 10 cm) leading to turbid runoff from a track surface;
- when it is raining operations must cease.

There are no log dumps allocated for use in wet weather in this harvest area.

(e) Dispersible Soils - General Prescription

The subsoil for one soil sample (SS6 - Compartment 607) was determined as being dispersible and this has been applied for all soils within the harvest area.

The following measures must be undertaken to ensure the protection of dispersible soils:

- road construction and crossbank construction must avoid exposing the subsoil wherever practicable;
- no more than 30% of the dispersible subsoil, measured over any 20 metre length of track, must be exposed on extraction tracks or snig tracks. This must be achieved by:
 - i) maintaining topsoil cover, and
 - ii) using wherever possible logging slash and walkover extraction techniques.

Site Specific measures for the protection of dispersible subsoils in road maintenance, road construction, snig track construction, road and track drainage, log dumps and replacement and repair of drainage feature crossings are specified in Conditions 4.6(f), (g), (m), (o) and (p).

(f) Existing Roads

Responsibility for Road Maintenance

All road maintenance or gravelling will be undertaken by State Forests or its contractors and not as part of the harvesting contractor's requirements.

Conditions relating to the opening and/or maintenance of existing roads are contained in Attachment 2 page 63.

(g) Road Construction

Responsibility for Road Maintenance

Conditions relating to road construction are contained in Attachment 2 page 63.

(h) Slope limits for the area

Table 13 sets out the slope limits for the harvest area:

Table 13

Slope Limits for Compartments 604 to 608

Activity	Maximum Slope
Maximum slope for ground based harvesting	30 degrees

Maximum grade of snig tracks	25 degrees
Maximum side slope for snig track construction	30 degrees
Maximum road grade permitted	10 degrees
Maximum side slope for road construction	30 degrees without design

The SFO is responsible for identifying and marking slopes over 30° in the field. The SFO must advise the operator where these slopes occur.

(i) **Drainage Feature Protection**

Wildlife Corridors

See Condition 4.5(f).

Riparian Buffers and Connection Corridors - Conservation Protocols

For riparian buffers see Prescription 6, Condition 4.5(c).

For connection corridors see Prescription 7, Condition 4.5(c).

Filter and Drainage Depression Buffer Strips - Pollution Control Licence

Filter strips are shown on the Operational Maps. Where they are not embedded in wildlife corridors, connection corridors or riparian buffers, filter strips must be retained along all drainage lines within the harvest area at minimum widths as set out in Table 14.

Table 14

Minimum Widths of Filter Strips where they are not embedded in wildlife corridors, connection corridors or riparian buffers

Protection	Water Pollution Hazard category							
	1 (0° ≤ 3°)		2 (>3° ≤ 13°)		3 (>13° ≤ 30°)			
					< 18 degrees *		> 18 degrees *	
	< 40 ha	> 40 ha	< 40 ha	> 40 ha	< 40 ha	> 40 ha	< 40 ha	> 40 ha
Filter Strip Width	5m	10m	10m	15m	15m	20m	20m	30m

* Refers to the ground slope within the filter strip.

Where a riparian buffer is wider than the filter strip width specified above, the filter strip width will be extended to the width of the riparian buffer.

In addition drainage depression buffer strips of 5 metres width either side of the drainage depression must be retained on both sides of all drainage depressions.

The width of filter strips and drainage depression buffer strips must be measured on the horizontal plane.

(j) **Tree Marking Rules for Riparian Buffers, Filter Strips and Buffer Strips**

The SFO must mark the riparian buffers and filter strips in the compartment progressively ahead of harvesting operations. Riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the riparian buffer or filter strip.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

Contractors and operators are responsible for identifying drainage depression buffer strips encountered in the field and taking appropriate action whilst operating within the buffer strip or crossing the drainage depression. (See also Condition 5.2).

(k) Felling and Extraction from Filter Strips

Trees located in a filter strip must not be felled, except for the purposes of constructing an approved road, extraction or snig track crossing.

Trees must not be felled into filter strips.

Crowns, logs and substantial debris accidentally felled into filter strips must be removed with minimal disturbance to the groundcover and soil in the filter strip. Any disturbance caused must be remedied by reshaping of furrows and replacement of cover, so that concentrated water flow does not occur. Instances of trees being accidentally felled into filter strips must be documented on the Supervising Forest Officer's copy of the harvesting plan, including the reasons for the accident and the remedial action taken.

Machinery must not enter a filter strip except for the construction and use of road, extraction track or snig track crossings.

(l) Felling and Extraction within Drainage Depression Buffer Strips

Machinery must not operate in buffer strips when the soil is saturated.

Soil exposure must be minimised and channelised flow must be prevented by use of the following techniques:

- the use of walkover extraction techniques wherever possible; and
- no snigging along drainage depressions; and
- operating with the blade up at all times; and
- preventing skewing of machinery tracks (by approaching logs in reverse gear, and minimal changes in direction while snigging logs out of the buffer strip).

No earthworks can be undertaken within buffer strips except for the construction of road, extraction tracks or snig track crossings.

(m) Extraction and the Use of Snig Tracks

Wherever practicable, walkover extraction techniques must be used in preference to snig track construction.

Wherever practicable, snig tracks must be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SFO. Effective road drainage must be re-instated by the contractor/operator immediately at the completion of the snigging operation.

Snig tracks must be drained to minimise the flow of water along them and the flow of water directly into watercourses, drainage lines or onto roads and dumps. Drainage must be effected within 2 days of the completion of use, or where operations are to be temporarily suspended in accordance with Table 15.

Table 15

Drainage of Snig Tracks at Temporary Cessation of Operations

Slope boundaries	WPH Category	No. Days
$0^{\circ} \leq 3^{\circ}$	1	10
$>3^{\circ} \leq 13^{\circ}$	2	8
$>13^{\circ} \leq 30^{\circ}$	3	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 35 cm, with spacing in accordance with Table 16. Cross-banks must be constructed at right angles to the direction of the snig track.

Table 16

Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 ($0^{\circ} \leq 3^{\circ}$)	2 ($>3^{\circ} \leq 13^{\circ}$)	3 ($>13^{\circ} \leq 30^{\circ}$)
$0 \leq 5$	200 m	150m	100m
$>5 \leq 10$		100m	60m
$>10 \leq 15$		60m	40m
$>15 \leq 20$			25m
$>20 \leq 25$			20m
$>25 \leq 30$			15m

The above spacings are the maximums and should be varied to utilise the most suitable outlet point.

Crossbanks must be discharged into undisturbed vegetation or logging debris. Snig tracks leading directly into watercourses and drainage lines, or onto roads and log dumps, must be drained to minimise the catchment area immediately above the drainage feature, road or dump.

Blading off of snig tracks is not permitted.

Dispersible Soil Protection - Construction and Use of Snig Tracks

Where more than 30% of subsoil is exposed on any 20 metres length of snig track the exposed subsoil must be covered with logging debris or windrowed topsoil. If this is not practical the exposed subsoil must be immediately seeded with rye grass or other suitable species (by the SFO) at a rate of 20kg per hectare or no more than 5 days following completion of extraction.

(n) Downhill Snigging

Limited downhill snigging is required to dumps 3, 4 and 7 in compartment 608, dumps 8 to 11, 13 to 17 and 19 in compartment 607, dumps 20, 21 and 23 in compartment 606, dumps 24 to 26, 29 and 31 in compartment 605 and dumps 30, 32 to 35 and 39 in compartment 604.

The following techniques must be adopted where downhill snigging is used:

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern must be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).

- Where possible, tracks must enter the log dump from the side or below. Where this is not possible, a crossbank must be in place immediately before a snig track enters the log dump at the end of each day's operation.

(o) Snig Track Drainage Line Crossings

- All snig track watercourse and drainage line crossings must be approved by the SFO before construction and must be open causeways utilising the natural surface at the site.
- Crossings must be rehabilitated after use, and any harvesting debris inadvertently deposited during use must be removed from the channel.
- Stabilisation work at crossing approaches must be completed within five (5) days of crossing construction. As far as practicable the crossing point must be reshaped to its original condition and seeded with rye grass or another suitable species (by the SFO) at the rate of 20 Kg/ha.

(p) Log Dumps

Field location of log dumps must utilise the most level site available, consistent with the location marked in the field and indicated on the Operational Maps.

To protect dispersible subsoils topsoil must not be stripped from the log dump site.

Dumps must be constructed with outfall drainage and must be kept drained during use and at the completion of operations. Runoff must be dispersed onto stable surfaces, and not discharged directly onto watercourses or drainage lines or onto snig tracks.

At the completion of operations any debris at or near the edge of a dump must be moved away from standing vegetation into the dump area. The topsoil must be respread uniformly over at least 70% of the dump area to a depth of at least 5 cm. The dump must be left in a neat and stable condition.

Dispersible Soil protection - Log Dumps

Where dispersible soils are exposed during dump use they must be immediately seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or within 5 days of completion of log dump use.

(q) Prescribed Burning

Pre-logging burning

There must be no pre-logging burning associated with the harvesting of compartments 604 to 608.

Post-logging burning

Post-logging burning of Compartments 604 to 608 must be carried out in accordance with provisions and specifications of the Casino District Fuel Management Plan and consistent with the requirements of the Conservation Protocols.

Objectives

Post-logging burning objectives for the compartment are:

- to meet State Forests' obligations under the Rural Fires Act.
- to decrease fine fuel loads and logging debris under prescribed conditions to decrease the intensity of any wildfire that might occur in the compartment and hence, decrease associated damage to regeneration and retained stems.
- to reduce the possibility of wildfire burning through the compartment and entering and damaging adjacent forests and private property areas.
- to simplify and increase the efficiency and the safety of any wildfire control activity.

- to promote good seedbed conditions for regeneration.

Ignition

The Casino Operations Foreman is responsible for ignition, subject to the requirements of the Casino District Fuel Management Plan.

Preferred season to burn

February to August.

Condition 4.7 RESEARCH AND INVENTORY PLOTS

There are no research or inventory plots located within the harvest area.

Condition 4.8 MODIFIED HARVEST CONDITIONS

(a) Riparian Buffers and Connection Corridors

See Prescriptions 6 and 7, Condition 4.5(c).

(b) Wildlife Corridor

See Condition 4.5(f).

(c) Old Growth Forest

See Prescription 2, Condition 4.5(c).

(d) Sites of Cultural and Heritage Significance

The artefact site at Bulldog Rock (AMG 445400E, 6785850N) is on the northern side of Bulldog Road and outside the harvest area. It will not be impacted on by the operation and no special conditions are proposed. There are no other records or evidence of any cultural or heritage sites within the harvest area.

Further inspections will be undertaken by the Casino Aboriginal Cultural Heritage Officer on commencement of harvesting. In the event that further sites are located the local Aboriginal Land Council must be consulted and appropriate measures taken to protect the sites.

(e) Other (eg boundary fences)

There are a number of permanently maintained fences around the boundary of the harvest area. In addition the erection of temporary fences by the lessee may occur from time to time. Damage to fences must be avoided. Any damage caused by harvesting must be repaired by the contractor as soon as practicable.

Condition 4.9 SPECIFICATION OF TYPE OF PRODUCTS TO BE REMOVED

Product 1	Quota sawlogs	See "Casino District schedule of compulsory utilisation: limits for sawlogs"
Product 2	Ex-quota sawlogs	See "Casino District schedule of compulsory utilisation: limits for sawlogs"
Product 3	Veneer Logs	- Approved State Forests specification for eucalypt veneer logs - Minimum log length 4.2m and minimum utilisable length 2.1m
Product 4	Poles and Girders	- Minimum small end diameter under bark 30cm - Conforming with AS 2209 for poles and suitable for current orders

Yield Information for Compartments 604 to 608

Estimated Yields are based on field inspections:

Compulsory Sawlogs 40 cm +	1,000 cubic metres gross
Compulsory Sawlogs <40 cm	800 cubic metres gross
Salvage Sawlog	800 cubic metres gross
Poles	100 cubic metres gross
Veneer Logs	Nil

No analysis of volumes by species or size classes is available.

Part 5

CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFOs)

Condition 5.1 SFO'S AUTHORITY TO SUPERVISE HARVESTING OPERATIONS

(a) General

The Supervising Forest Officer (Planning) is responsible for the direct field supervision of this harvesting operation, including tree-marking, safety, implementation of wet weather controls, monitoring & compliance, and approving minor variations to the harvesting plan. The Supervising Forest Officer (Marketing) is responsible for log measuring, check measurement, delivery docket checks, utilisation, log specification and reporting generally is respectively ;

The Supervising Forest Officer (Planning), Northern Rivers Region.
The Supervising Forest Officer (Marketing), Northern Rivers Region.

(b) Relieving SFOs

Relieving SFOs, if required, are:

The Forest Assistant (Planning), Northern Rivers Region ,
The Forest Planner, Northern Rivers Region,

(c) SFO's authority

The SFO has authority to approve:

- the blading off of natural surface roads provided that damage will be minimal and the removed material is recoverable for respreading;
- downhill snigging routes where provided for in the Harvest Plan;
- use of natural surface roads for snig track crossings or as snig tracks to dumps provided restoration of the road for wheeled traffic is undertaken as necessary and use of the road significantly reduces soil disturbance;
- the exact location and type of drainage line crossing for snig tracks - for this plan area all crossings must be open causeways;
- the sowing of roads, snig tracks, drainage line crossings and relief culverts where dispersible subsoils are exposed or where seeding is otherwise required; and
- the closure of natural surface causeways when excessive rutting or excessive powdering has occurred.

All approvals must be noted on a Harvesting Plan Variation Form and copies attached to the relevant master copies of the Harvesting Plan.

Condition 5.2 TREE MARKING AND OTHER HARVESTING CONTROL REQUIREMENTS

(a) Tree Marking for Forest Management and Silviculture

Normal Regional practices for tree-marking, as detailed in condition 4.2 (page 35), must apply.

Flora and Fauna Protection

See Conditions 4.2 and 4.5.

Marking of hollow-bearing and recruitment trees

Hollow-bearing and recruitment trees must be marked for retention by the SFO according to Prescription 4 in Condition 4.5(c).

Marking of Roost/Den trees and Feed Trees

Den, Roost and feed trees must be marked for retention by the SFO according to Condition 4.5.

Non-harvest areas and modified harvest areas

The boundaries of old growth forest, wildlife corridors, connection corridors, riparian buffers and filter strips must be marked ahead of harvesting operations.

Old Growth, wildlife corridors, connection corridors, riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the corridor, buffer or filter strip.

(b) Soil Erosion and Water Pollution Control

Road Construction/maintenance

The SFO is responsible for identifying those sections of permanently maintained road within the harvest area and described in Description 10(h) and Attachment 2 that require routine road maintenance.

The Casino Operations Foreman in consultation with the SFO (Planning) is responsible for supervision of road construction/maintenance operations and construction or repair of drainage feature crossings, and must ensure that such operations are in accordance with conditions specified in Attachment 2.

Marking of filter strips and drainage depression buffer strips

All drainage features must be inspected by the SFO during the harvesting operation in conjunction with tree marking and protected in accordance with the Pollution Control Licence. Where practicable, any variation between the actual drainage feature found in the field and that shown on the harvest plan Operational Map should be marked on the SFO's copy of the map for future reference.

Filter strips, connection corridors and riparian buffer strips must be retained along all drainage features at the minimum widths as specified on the Operational Maps.

The SFO must mark the riparian buffers and filter strips in the compartment progressively ahead of harvesting operations. **Riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the riparian buffer or filter strip.**

Similarly, where filter strip requirements exceed riparian buffers there is no need to mark riparian buffers.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

Drainage depression buffer strips

Drainage depression buffer strips will not be marked. **Contractors and operators are responsible for detecting drainage depressions encountered in the field.**

The SFO is responsible for ensuring that contractors and operators are taking appropriate protective precautions within the buffer strip area whilst operating or traversing the drainage depression (See also Condition 4.6(l)).

Slope limits

Water pollution hazard categories will be identified in the field using a clinometer.

The SFO is responsible for identifying and marking in the field areas with slopes greater than 30° where harvesting is not permitted.

Condition 5.3 MONITORING AND REPORTING

(a) Daily and Fortnightly Reporting

The standard Regional procedures for daily and fortnightly reporting on the conduct of operations must be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Reports of sightings of any Threatened fauna must be made to the Regional Planning Manager within 24 hours of the sighting being made, as required in Condition 4.5(g). For any of the animal species listed in Condition 4.5 the stated mitigation prescriptions shall be immediately applied.

(c) Soil Erosion and Water Pollution Control Conditions

The SFO must report the following matters and record their location if necessary on the SFC's copy of the Harvesting Plan Operational Map, or the recording map attached to the Plan for that purpose:

- any accidental felling into filter strips and remedial action taken;
- any approval to leave soil from road and track construction in drainage lines or watercourses where attempts at removal would have resulted in excessive damage;
- any approval to defer stabilisation works at a drainage feature crossing beyond five days;
- any approval to leave a snig track drainage feature crossing structure in place and the reason for it to be left in place;
- any instances where effective cross bank drainage of a snig track is not effected within two days of completion of snigging from the area served by the track; and
- any instance where harvesting activity has entered non-harvest areas and the remedial action taken.

(d) Dispersible Soils - roads, snig tracks, road and track batters and drainage feature crossings and approaches

The SFO must evaluate the stability of the following:

- all existing and constructed roads and snig tracks used in the operation;
- disturbed road edges and batters;
- all road drainage structures, including table drains, mitre drains, rollover and spoon drains; and
- all road and snig track drainage line crossings and their approaches.

If dispersible subsoil has been exposed, or stabilisation of any of these features is required, they must be immediately seeded by the SFO with rye grass or other suitable species at the rate of 20kg per hectare or within 5 days of construction, maintenance or completion of the operation in that part of the harvest area.

The satisfactory completion of sowing operations must be recorded in the fortnightly report.

(e) Post Harvest Rehabilitation

The Supervising Forest Officer must evaluate newly constructed roads, snig tracks, road batters, drainage structures, drainage line crossing and relief culvert approaches for stability. If required crossing or culvert approaches must be seeded by the contractor with rye grass at the rate of 20kg per hectare within 5 days of the completion of construction. Sowing is required where the SFO does not consider that groundcover will attain 70% within 12 months. The satisfactory completion of sowing operations must be recorded in the fortnightly report.

The SFO must ensure that minor roads are bedded down and closed in accordance with Condition 4.6 (f).

Condition 5.4 PRE- AND POST-LOGGING BURNING

(a) Pre-logging Burning

There must be **no pre-logging burning** associated with the harvesting of Compartments 604 to 608.

(b) Post-logging Burning

Post-logging burning of Compartments 604, 605, 606, 607 and 608 must be carried out in accordance with provisions and specifications of the Casino District Fuel Management Plan.

Ignition

The Operations Manager is responsible for ignition, subject to the requirements of the Casino District Fuel Management Plan.

Burning must be undertaken by restricting ignition to top disposal burning in weather conditions that minimise running fire. Burning must be done by ground lighting of individual tree heads or heaps of harvesting slash and debris.

Slope Limits for burning.

There are no slope limits for burning in these compartments.

Other considerations

Wherever practical the requirements for the protection of threatened flora and fauna as outlined in Condition 4.5 must be taken into account during the planning and carrying out of post harvest burning.

Recording of burning activities

All post-logging burning activities must be recorded on the Day of the Burn Checklist on a daily basis and reported on the Post-Burning Checklist.

Where a post-logging burn has intruded into a filter strip or non harvest area, caused significant cambial damage to retained trees or exposed more than 15% of soil on undisturbed areas, the SFO must assess the potential for increased water pollution and if necessary put in place additional control measures.

The EPA must be notified within 7 days of the lighting of the burn, with details of location, remedial measures instituted and a copy of the post-burn checklist.

Condition 5.5 OTHER INSTRUCTIONS

There are no other instructions.

**Condition 5.6 SUPERVISING FOREST OFFICER'S
ACKNOWLEDGMENT**

I acknowledge that I have received a copy of Harvesting Plan No CAS 604 - 608 and that I have been briefed on the conditions of the Plan and understand the supervision and operational control requirements as explained to me by the Regional Planning Manager.

Signature: Date:

Position:
Supervising Forest Officer

Signature: Date:

Position:
Relieving Supervising Forest Officer

ATTACHMENT 1 CLEARANCE CERTIFICATE

HARVESTING PLAN No. CAS604-608

Compartments 604 to 608

EWINGAR STATE FOREST

NORTHERN RIVERS REGION

To M.....Supervising Forest Officer

I request approval for me to move my logging crew and all associated machinery from the above mentioned area to the next Compartment in accordance with Section 3.5 of the Code of Logging Practice.

I certify that:

- (a) all permanent roads, trails and mitre drains have been cleared of harvesting debris;
- (b) butt damage to retained trees has been kept to acceptable limits;
- (c) all trees marked for removal have been felled;
- (d) utilisation limits have been satisfactorily met;
- (e) stump heights conform to requirements;
- (f) all hanging trees have been felled and brought down;
- (g) all log dump sites have been satisfactorily restored as required;
- (h) harvesting debris is not accumulated around retained trees;
- (i) all accumulated litter has been disposed of properly;
- (j) all filter, protection and buffer strip requirements have been complied with;
- (k) all snig track, extraction track and temporary logging road drainage has been installed satisfactorily and other required rehabilitation work has been completed;
- (l) all necessary repairs to damaged roads, signs, fences and other structures have been carried out.

I believe that I have met all my obligations under the conditions of the Timber Licence, the Pollution Control Licence, and/or any licence issued under Section 120 of the National Parks and Wildlife Act, which apply to the Compartment just completed, as stated in this Harvesting Plan.

Signature.....Licence No.....Date
Contractor/licensee

As a result of inspections of the logging operations made in accordance with this Harvesting Plan, I am satisfied that, to the best of my knowledge, the licensee/contractor responsible for this harvesting operation has satisfactorily completed all work and approval is given for her/him to remove her/his machinery and equipment and leave the area/commence operations in another Compartment. (Compartment).

This clearance does not release the licensee/contractor from any obligation to undertake any remedial work if subsequent deficiencies are shown to result from inadequate practices during the harvesting operation, which are found during any inspections of the area made within 12 months of the date of this post-harvesting inspection.

Last inspection was made on(Date)

Signed:(Date).....
Supervising Forest Officer

ATTACHMENT 2 CONDITIONS FOR OPERATIONS SFO'S

(a) Existing Roads

Responsibility for Road Maintenance

All road maintenance or gravelling will be undertaken by State Forests or its contractors or by harvesting contractor's as requested by the SFO or Forest Planner.

Permanently maintained roads to be used in the operation

Bulldog Road is the only permanently maintained road in the harvest area. Operational grading may be carried out prior to, during and following harvesting to:

- restore the road surface so that drainage is functioning;
- clean and restore table drains and mitre drains and ensure that drainage spacing is consistent with spacings shown in Table 17; and
- in consultation with the Operations Foreman Casino ensure that any table drain scour is repaired through the use of silt barrier techniques (hay bales or sediment trap fencing).
- any dispersible subsoil exposed on the pavement or in table or mitre drains must immediately be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following grading.

Drainage feature crossings on permanently maintained roads to be used in the operation

There are no drainage feature crossings on the permanently maintained roads to be used within the harvest area.

Existing Un-maintained Roads to be used in this operation

None of the existing un-maintained roads are likely to cause significant water pollution. They are partly overgrown and must be re-opened using either a grader, skidder or tractor up to D7 size.

Re-opening will involve the removal of fallen trees and small regrowth trees from the road pavement and edges (batter trees greater than 15cms dbh must only be removed by cutting them rather than blading). This work must be kept to the minimum required to allow use of existing roads.

In addition operational grading may be undertaken prior to, during and following harvesting if required to reinstate the road pavement and drainage to the following roads:

- 604/605 Road;
- 604/2 Road;
- 605/606 Road;
- 607/2 Road;
- 607/3 Road; and
- 607/4 Road.

Operational grading must be carried out consistently with the instructions for maintained roads.

Debris from re-opening roads

Tree Debris resulting from the re-opening of roads must be disposed of:

- outside drainage features and clear of drainage structures; and
- outside of filter strips; and
- where burning will cause only minimal damage to adjacent vegetation; and
- outside the toe of fill batters.

Clearing

Maximum clearing beyond the pavement must not exceed 3 metres. Edge clearing must aim at retaining at least 70% top cover of at least 5 centimetres of topsoil to facilitate natural establishment of groundcover. Where this cannot be achieved debris must be used as a groundcover.

Road Batters

Existing road batters have revegetated and must not be disturbed other than over very short distances to improve sight distance for safety reasons. Any regrowth trees in batters with a dbh greater than 15 centimetres must be hand fallen rather than removed by blade.

Road surface drainage

Rollover crossbanks must be used to drain roads on those sections where outfall drainage has not been established. Where required rollover crossbanks must be spaced as per Table 17 below. Rollover banks must have a minimum design consolidated vertical height from spillway to bank top of 25 cm.

Table 17

Spacing of Rollover Crossbank Drainage

Road Grade (degrees)	Maximum spacing
0 - \leq 5	100m
>5 - \leq 10	60m
>10 - \leq 15	40m

Rollover crossbanks must drain onto undisturbed vegetation or logging slash. Where it is necessary to convey runoff water over a fill batter greater than 1 metre high that has been disturbed by the operation or on which the soil is exposed, drop down structures constructed of rock or prefabricated fluming must be installed. Dissipaters must be installed at the bottom of drop down structures.

Road drainage must minimise the flow of unchecked water onto extraction tracks, snig tracks or log dumps. Where this cannot be achieved by outfall drainage, a rollover crossbank must be placed as close as possible to the track or dump, consistent with haulage practicalities, to minimise the catchment area above it.

During the conduct of the operation, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of the operation.

Road drainage work must be undertaken with minimal soil disturbance.

Crossing of drainage features

There are three drainage feature crossings on un-maintained roads within the harvest area.

The crossings at locations "A" and "B" on 604/605 Road (see Operational Maps) are stable and do not require maintenance.

The section of 604/2 Road east of log dump 32 and the crossing at location "C" could not be located during field inspections. However previous harvesting plans indicate that this road and crossing were used. The SFO must undertake a thorough inspection of the area around the crossing location and mark the exact location of the crossing site on the Operational map. If the original crossing cannot be located, or is located and requires maintenance or replacement, the SFO must consult with the Forest Planner to determine the most appropriate structure (a causeway with sill log or a concrete pipe culvert).

The SFO must have approved by the EPA a request for variation of the harvesting plan, detailing the work to be carried out at crossing (c). Once the variation has been approved by the EPA, the maintenance, upgrade work can commence.

Following approval, the work must be undertaken as follows:

1. Excavation of the road surface must be minimised consistent with the requirement to provide a stable surface onto which a concrete pipe culvert or rock and gravel for a causeway will be placed. Where excavation is required it must be carried out using an excavator, grader or skidder.
2. Consistent with the requirement to ensure that the culvert or causeway is properly installed, there must be minimal disturbance to the bank and bed of the drainage line on either side of the crossing. Where disturbance has occurred, reshaping of the bank and bed must be undertaken and the disturbed site immediately seeded with rye grass or other suitable species (by the SFO) at a rate of 20kg per hectare or no more than 5 days following construction.
3. Material removed during excavation must be placed on the road side at least 20 metres away from the drainage line crossing for removal by truck at the completion of work. Spoil from the excavation must not be placed in riparian buffers or filter strips.
4. **If a concrete pipe culvert is to be installed:**
 - excavated fill that is to be used to cover the culvert must be stockpiled on the approaches to the crossing for subsequent spreading over the structure; and
 - topsoil, where possible, must be stockpiled separately for use in covering the crossing approaches.
5. **If a causeway is to be constructed:**
 - loose rock and gravel must be spread over the causeway site using dump trucks and an excavator, grader or skidder to a depth that ensures that truck traffic will not break through to the pre-existing natural surface;
 - a sill log must be placed on the outlet side of the causeway and parallel to the road to contain the rock and gravel;
 - a rock mattress must be placed on the bottom side of the sill log to dissipate water; and
 - the gravel and rock on the road surface within the causeway must be compacted using the grader or skidder to a standard suitable for truck traffic.
6. If the works are likely to take more than one (1) day, temporary rollover drains must be constructed across the road each side of the crossing site and as close as practicable to the crossing site at the completion of each days work. Outlets of the temporary structures must drain onto vegetated surfaces and not directly into the drainage lines.
7. The approaches to the crossing must be reformed using a grader. Table drains must be repaired and mitre drains must be installed at the closest practical point to the crossing, with water diverted onto stable, vegetated surfaces. Where this is not possible a structure (sediment fence) must be installed across the mitre drain outlet to inhibit turbid runoff.

8. Where **dispersible subsoil** has been exposed in the table and mitre drains the exposed surfaces must immediately be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following construction.
9. Any exposed **dispersible subsoil** on the road approaches to the crossing must be gravelled immediately or no more than 5 days following construction.
10. The stability of the crossing must be assessed at weekly intervals during the logging operation and again within one month of the completion of operations.

Operational maintenance of natural surface causeways

The SFO must monitor the condition of natural surface causeways during and upon completion of the operation to ensure that stability is maintained. The pavement of natural surface causeways must be maintained by grading or back blading where the pavement commences to deform. The SFO must determine and advise the contractor of causeway closure for haulage when excessive rutting or excessive powdering occurs.

Revegetation and rehabilitation

Batters on existing roads that have been disturbed to improve site distance for safety reasons must be evaluated by the SFO to determine if they will revegetate adequately through natural regeneration or if sowing is required. If sowing is required batters must be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare within 5 days.

Otherwise revegetation of these roads following harvesting will be through natural regeneration. The roads are to be closed and must be bedded down, all spoon drains converted to rollover banks consistent with the spacings in Table 17, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Where rollover drains do not drain onto stable vegetated surfaces, sediment trap fences must be installed across the outlet.

Patch gravelling

Patch gravelling to improve all weather access may be carried out where necessary as determined by the SFO in response to exposure of the road sub-grade or inclement weather conditions during the operation.

Borrow pits and gravel pits

No borrow pits or gravel pits within this planning unit are required for this operation.

Dispersible soils

Where dispersible subsoil is exposed during the re-opening of these roads or during construction of rollover banks or mitre drains, exposed subsoil must be sown immediately with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following re-opening.

(b) Road Construction

There are two (2) short sections of road that must be constructed for this operation. They are as follows:

1. 606/2 Road - approximately 400 metres of road, sidecut at first and then ridgetop, from 605/606 Road to access log dump 20; and

2. 608/2 Road - approximately 800 metres of road, sidecut at first and then ridgetop, from Bulldog Road to access log dumps 3 and 4.

In addition the section of 604/2 Road east of log dump 32 was very difficult to locate during field inspections. Previous harvesting plans indicate its location as shown on the Operational Map. The SFO must conduct a thorough search of the area on which the road is marked on the map. **If the road cannot be located or requires re-construction, or a new road is to be constructed, the SFO must inform the Planning Forester. An application for variation of the harvesting plan must be submitted to and approved by the EPA, prior to any amendment of the harvesting plan or work proceeding on a new road in this location.**

Road construction (including re-construction of the section of 604/2 Road east of log dump 32 if required) must be undertaken according to the following specifications:

Design

The maximum width of the running surface must be 4 metres and the maximum clearing width either side of the running surface must be 2 metres.

Grade

The roads must be constructed with a maximum grade of 10°.

Survey

The centre lines of the roads must be surveyed to grade line standard and marked in the field. Clearing and earthworks must not deviate from the marked lines.

Clearing

The total clearing width for construction of the roads must not exceed 8 metres. Edge clearing must aim for maximum retention of groundcover with retention of at least 70% topsoil. Debris must be used as a groundcover on sites where these targets are not met.

Tree Debris resulting from road construction must be disposed of:

- outside drainage features and clear of drainage structures; and
- outside of filter strips; and
- where burning will cause only minimal damage to adjacent vegetation; and
- outside the toe of fill batters.

Batters

Batters must be laid back at a 1:1 ratio for this operation, and be no more than 1.5 m deep. The maximum length of cut batter must be 350 m.

Where water diverted by a drainage structure discharges onto a batter greater than 1 metre in height, a drop down structure and dissipater must be used.

Road Surface Drainage

Drainage must be outfall drainage and must be constructed before the operations commence. Rollover crossbanks must be used on those sections of road where outfall drainage is impracticable. Where required the maximum spacing of crossbanks must be in accordance with Table 17.

Rollover crossbanks must drain onto undisturbed vegetation or where not immediately accessible to the outfall, sediment trap fences must be installed across the outlet. Rollover banks must be retained in situ after the road has been closed.

Where a table drain or concentrated water flow continues directly into a drainage feature, areas of bare soil on the banks of the feature must be stabilised. Stabilisation techniques can include the sowing of grass seed to increase ground cover; installation of drop down structures and dissipater; re-design of outlets to reduce water velocity; and installation of sediment catching devices.

During the conduct of the operation, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of the operation.

Drainage Line Crossings

If the drainage line crossing at location "C" is located by the SFO and requires maintenance or replacement, or if a new crossing has to be constructed, the works must be undertaken consistent with the guidelines in Attachment 2 (a) for drainage line crossings on un-maintained roads.

Patch gravelling

Patch gravelling to improve all weather access may be carried out where necessary as determined by the SFO in response to exposure of the road sub-grade or inclement weather conditions during the operation.

Borrow pits and gravel pits

No borrow pits or gravel pits within this planning unit are required for this operation.

Revegetation and Rehabilitation of constructed roads

Revegetation of constructed roads following harvesting will be through natural regeneration.

These roads are to be closed and must be bedded down, all spoon drains converted to rollover banks at spacings consistent with Table 17, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Where rollover drains do not drain onto stable vegetated surfaces, sediment trap fences must be installed across the outlet.

Dispersible Soil Protection - Road Construction

Where dispersible subsoil is exposed during road construction, including the installation of road drainage and construction of cut batters, exposed subsoil must be sown immediately with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following re-opening.

ATTACHMENT 3

Log Dump Usage Record - Compartments 604 to 608, Ewingar State Forest

Cp:	Dump No.	Date Started	Date Ceased	Date Started	Date Ceased	Date Started	Date Ceased
604	30						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
605	24						
	25						
	26						
	27						
	29						
	31						
606	20						
	21						
	22						
	23						
	28						
607	6						
	8						
	9						
	10						
	11						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
608	1						
	2						
	3						
	4						
	5						
	7						
	12						

The SFO should record each log dump start/cease date for each contractor operation. An operation is considered to have ceased when no activity occurs on a log dump in three working days.

USE A NEW SHEET FOR EACH CONTRACTOR

Notes

APPENDIX 1**EROSION HAZARD ASSESSMENT****Compartments 604 to 608, Ewingar State Forest**

Soil Erosion Hazard Ratings have been assessed using SOILOSS HIGH. The rating has then been used to assess Soil Erosion Hazard (SEH) Classes for the net harvest area.

SEHR = $R \times K \times L^S \times C \times P$ where:

$R = 2500$ for the whole of the harvest area;
 $K = 0.060$ the default K value;
 S as factored in SLHIGH;
 $L = 10$ metres;
 $C = 0.45$ derived from 0.45 SEMGL standard;
 $P = 1$.

The Soil Erosion Hazard Classes for compartments 604 to 608 are as follows:

Table 1

SEHC's - Compartments 604 to 608


Slope Range (degrees)	Erosion Hazard Class	Where SEHR is:	Indicative % of Net Harvest Area
$0^\circ \leq 4^\circ$	Low	less than 40	10%
$> 4^\circ \leq 19^\circ$	Moderate	40 - 400	40%
$> 19^\circ \leq 30^\circ$	High	400 - 800	45%
$> 30^\circ$	Extreme	greater than 800	5%

No special conditions are required as the conditions for use with Harvesting Plans in Schedule 4 of the EPA Pollution Control Licence (PCL) are adequate to address the erosion and pollution risk.

1. Harvesting is not permitted on slopes in excess of 30° .
2. In areas of high erosion hazard the grade of snig and extraction tracks must not exceed 25° .

Preparation

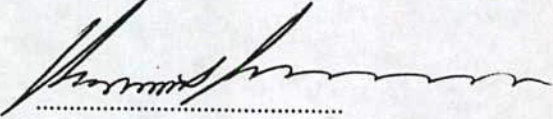
Prepared by: M.J. O'Neill

Signature: 

Title: Contract Forester
 Norfor Pty Ltd (A.C.N. 071 356 860)
 T/as Northern NSW Forestry Services

Date: 17th December 1997

Regional Approval

Approved by: Signature: 

Title: Regional Planning Manager

Date: 3/2/98

APPENDIX 2

APPLICATION OF KOALA PROTOCOL

Pre-logging Koala transects were undertaken by four Northern Rivers Region staff from 18th to 28th August 1997. Actual transect location maps and data sheets are stored in the Compartment History Files and summarised below. 55 koala scats were located under a total of 11 trees over a total transect length of 8.25 kilometres and 825 trees searched. Despite low numbers of scats compartment 606 was an **intermediate use** compartment as 2 trees in a 100 metre segment had scats. In compartment 608 a travelling koala was located during a spot light survey. This triggered an asterisk survey but no scats were found. State Forests will treat compartment 608 as an **intermediate use** compartment. Other compartments are **low use** despite the presence of preferred feed trees.

<u>Transect</u>	<u>Length</u>	<u>Bearing</u>	<u>Tree Species</u>	<u>Trees searched</u>	<u>Scats</u>	<u>Comments (tree species by scat number)</u>
608/1	650m	180°	TWD, WM, RG	65	0	
607/2	1100m	115°	BWD, WM, BBT	110	8	WM 40-60 (3) TWD 40-60 (2) IBK 20-40 (2)
607/3	900m	90°	TWD, IBK, RG	90	5 old	RG 20-40 (2) TWD 20-40 (3)
606/4	450m	160°	IBK, WM, RG	45	22	RG 20-40 (8) - 6 old TWD 20-40 (1) - 2 very old
606/5	450m	50°	WM, TWD, RG	45	7	TWD 20-40 (7)
605/6	1000m	25°	IBK, GG, WM	100	1	WM 40-60 (1)
605/7	600m	150°	IBK, WM, GG	60	0	
605/8	400m	240°	IBK, WM, GG	40	0	
604/9	1500m	180°	WM, TWD, IBK	150	12	TWD 20-40 (8) SG 10-20 (4)
604/10	400m	290°	WM, IBK, GG	40	0	
608/star transect	800m		GG, TWD, WM	80	0	
Total	8250m			826	55	11 trees

Koala usage of the compartments within the harvest area based on the results of the transects is summarised below:

Compartment	Koala Use
604	Low use
605	Low use
606	Intermediate use
607	Low use
608	Intermediate use

AMENDMENTS TO PLAN AS REQUIRED BY

Environmental Impact Statement Compartment Level Check

Harvesting Plan No. CAS 604 - 608, 17 December 1997 Compartments 604 to 608, Ewingar State Forest, Northern Rivers Region

An environmental impact statement (EIS) describing activities proposed by State Forests in the Casino Management Area was obtained by State Forests in November 1995.

The EIS was obtained in recognition that some of those activities may have a significant effect on the environment. Chapter 4 of the EIS details the proposed activities. Measures to mitigate the impacts, such as harvesting prescriptions, are included in the proposed activities and are described in Chapter 19 of the EIS.

The proposed harvesting operations described in the harvesting plan, including conditions to mitigate the effects of the operations on the environment, are part of the activities generally described in the EIS. In addition to the information contained in the EIS, site specific information concerning the environment of the area covered by this harvesting plan have been gathered as follows:

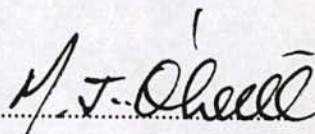
- Soils information from soil sampling and laboratory analysis. Information on the process is contained in section 2.5 of the harvesting plan and soil test results are attached to the plan as an appendix. Included in this process and documented in the harvesting plan is an evaluation of the soils in the field and descriptions of the relevant erosion evident in the compartments.
- Flora and Fauna information from records held in State Forests and National Parks and Wildlife Service data bases, supplemented by pre-logging flora and fauna surveys and incidental observations. This is covered in sections 2.3 and 2.4 of the harvesting plan.
- Based on pre logging surveys and GIS information appropriate mitigative prescriptions based on the *Conservation Protocols for timber harvesting on State Forests for the duration of the IFA decision, November 1996* have been incorporated into the plan in Condition 4.5.
- Maps of Aboriginal sites in the vicinity and NPWS data were checked.
- The history of silviculture and stand information from compartment history records and information gathered during harvest planning field trips. This is covered in section 2.2 of the harvesting plan.

On review of the EIS and further site specific information obtained, it is concluded that the harvesting operations described in this plan will not have, nor are likely to have a significant effect on the environment which has not already been taken into account in the EIS itself.

Preparation

Prepared by M.J. O'Neill

Signature.....



Title Principal Consultant Forester,

Norfor Pty Ltd (A.C.N. 071 356 860) trading
as Northern NSW Forestry Services

Date 17th December, 1997.

Regional Approval

Signature.....
Regional Planning Manager

Date..... 3/2/98

VENESS & ASSOCIATES

ACN 003 419 958

Pty Limited

10 Dutton Crescent
COFFS HARBOUR NSW 2450
Telephone: (066) 52 7692
Facsimile: (066) 52 8232

24th August, 1997
Attn: Peter St Clair
State Forests of NSW
P.O. Box 688
CASINO NSW 2470

Dear Peter,

Re: Soil sampling of compartments 604, 605, 606, 607, 608 (Ewingar SF)

You would be aware that Veness & Associates undertook the soil survey work associated with the Casino / Murwillumbah EIS. In respect of the current Harvesting Plan for compartments 604, 605, 606, 607 and 608 (Ewingar SF), Jim and Ruth Veness of Veness & Associates, further examined these compartments in August, 1997. Soil samples were collected for laboratory testing at this time.

Two Soil Mapping Units (as described in the EIS) occur throughout these compartments. These are: Soil Unit D (soils developed on granitoids) and Soil Unit I (soils developed on the Drake Volcanics). The granitoids comprise of biotite adamellite of the Stanthorpe Adamellite and the volcanics comprise of acid to intermediate eruptives with minor interbedded sediments.

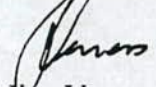
Prior to the field visit, the landforms occurring within these compartments were examined from the 1:15,000 topographic map and checked in the field.

Each landform element was sampled within the 733 hectare net harvesting area covered by these compartments, resulting in eight sampling sites. This is compatible with the EPA requirement to have a minimum sampling of one site approximately per 100 hectares. The landform elements throughout the study area consist of the Ridge/crest and Simple slope situations which occur within each soil type.

The location of the landform elements, the Soil Mapping Units and the location of the soil sampling sites are shown on the attached maps.

Both the A and B horizons were sampled at each site. Each of the resulting 16 soil samples had EAT values calculated. According to the EPA interpretation, soils are considered to be dispersible if the EAT values are either Class 1, 2, 3(3) or 3(4). Using this criteria, PSA and D% values were determined on four samples. Soil textures, after Northcote (1979), were determined for each soil sample. The soil descriptions were based on data generated from all of these compartments. The results of these soil sample analyses are presented in the attached report VA2097C. A copy of this documentation has been forwarded directly to Mr O'Neill.

Yours faithfully,


Jim Veness

EWINGAR STATE FOREST

Compartment	Soil Type	P A R A M E T E R Description & Profile	Texture	Depth to Subsoil & Bedrock
part 608	Soils of part of this c o m p a r t m e n t belongs to Soil Mapping Unit D as described in the Casino EIS soils study. They are Chocolate soils	Soils are derived from the Stanthorpe Adamellite which comprise of biotite adamellite. They are generally characterised by a thin organic layer or O horizon over a brownish black to very dark brown, strongly structured, water repellent to porous, bioturbated, light sandy clay loam or sandy clay loam topsoil layer or A,A1 horizon, sometimes over a dull reddish brown, unbleached, moderately structured, porous, light sandy clay loam lower topsoil or A2 horizon, always over a dark reddish brown to reddish brown, moderately structured, porous, stony, light clay main subsoil or B2 horizon. Weathered parent material or C horizon was not reached at depth	<u>Topsoil</u> : light sandy clay loam, sandy clay loam <u>Subsoil</u> : light clay	Topsoil depth varies from 23 - 26 cm and subsoil depth is 70+ cm to weathered bedrock

EWINGAR STATE FOREST

Compartment	Soil Type	P A R A M E T E R Description & Profile	Texture	Depth to Subsoil & Bedrock
604, 605, 606, 607 and part 608	Soils of all or parts o f t h e s e c o m p a r t m e n t s b e l o n g t o S o i l M a p p i n g U n i t I a s d e s c r i b e d i n t h e C a s i n o E I S s o i l s s t u d y . T h e y a r e K r a s n o z e m s , Y e l l o w p o d z o l i c s o i l s a n d L i t h o s o l s	Soils are derived from the Drake Volcanics comprising of acid to intermediate eruptives with minor interbedded sediments. They are generally characterised by a thin organic layer or O horizon over a brownish black to dark brown, moderately structured, water repellent to porous, stony, loam fine sandy, clay loam or fine sandy clay loam topsoil layer or A horizon, over a dark reddish brown, brown to dull yellow orange, weakly to strongly structured, porous to dense, often very stony, clay loam, fine sandy clay loam or light medium clay main subsoil or B2 horizon often over strongly weathered parent material or C horizon	<u>Topsoil:</u> loam fine sandy, clay loam, fine sandy clay loam <u>Subsoil:</u> clay loam, fine sandy clay loam, light medium clay	Topsoil depth varies from 9 – 24 cm and subsoil depth is 29 – 70+ cm to weathered bedrock

Sample	Sample Type	Sample Depth (cm)	Horizon Depth (cm)	Soil Unit	Landform Element	EAT	Particle Size Analysis (%)					D%	Texture#	% dispersible soil D% x clay%
							clay	silt	fine sand	coarse sand	gravel			
604/1/A	Topsoil	3-12	24	I	Ridge/	8	-----	-----	not required	-----	-----		FSCL	not required
604/1/B	Subsoil	30-45	52*		crest	5	-----	-----	not required	-----	-----		LMC	not required
605/1/A	Topsoil	3-10	11	I	Simple	8	-----	-----	not required	-----	-----		FSCL	not required
605/1/B	Subsoil	35-50	70+		slope	5	-----	-----	not required	-----	-----		LMC	not required
605/2/A	Topsoil	3-11	13	I	Ridge/	8	-----	-----	not required	-----	-----		L,fsy	not required
605/2/B	Subsoil	25-50	51*		crest	2(1)	10(11)	19(21)	33(37)	27(31)	11	75	FSCL	7.50
606/1/A	Topsoil	2- 7	9	I	Simple	8	-----	-----	not required	-----	-----		L,fsy	not required
606/1/B	Subsoil	15-28	29*		slope	2(1)	5 (9)	15(27)	20(36)	16(28)	44	55	FSCL	2.75
607/1/A	Topsoil	2- 9	11	I	Simple	8	-----	-----	not required	-----	-----		CL	not required
607/1/B	Subsoil	17-28	39*		slope	2(1)	9(14)	22(34)	24(37)	10(15)	35	46	CL	4.14
607/2/A	Topsoil	5-12	21	I	Ridge/	8	-----	-----	not required	-----	-----		CL	not required
607/2/B	Subsoil	30-40	67*		crest	2(1)	42(43)	24(24)	29(29)	4 (4)	1	27	LMC	11.34
608/1/A	Topsoil	3-15	45	D	Ridge/	8	-----	-----	not required	-----	-----		SCL-	not required
608/1/B	Subsoil	50-65	70+		crest	5	-----	-----	not required	-----	-----		LC	not required
608/2/A	Topsoil	4-16	25	D	Simple	8	-----	-----	not required	-----	-----		SCL	not required
608/2/B	Subsoil	29-45	70+		slope	5	-----	-----	not required	-----	-----		LC	not required

NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
 # textures determined after Northcote (1979)
 * C horizon reached at this depth

These data have been determined on soil samples collected by Veness & Associates.

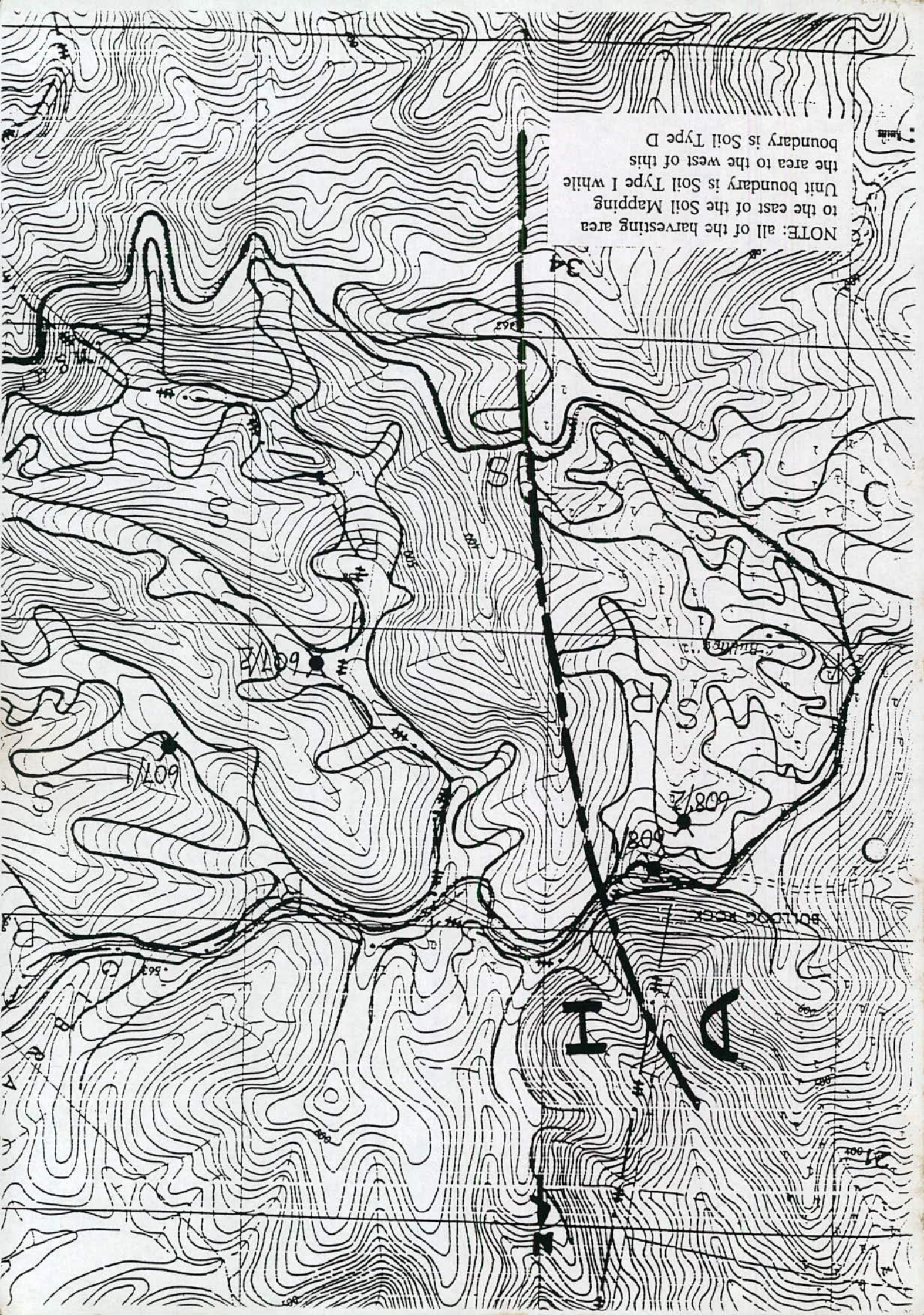
The laboratory methods used are those required by EPA in its documentation relating to Harvesting Plans.

The data presented on this page have been calculated and determined by me.

Jim Veness
 (Managing Director)
 VENESS & ASSOCIATES Pty Limited
 24th August, 1997



NOTE: all of the harvesting area
to the east of the Soil Mapping
Unit boundary is Soil Type I while
the area to the west of this
boundary is Soil Type D



I Soil Type I

D Soil Type D

--- Soil unit boundary

Soil Mapping Units:

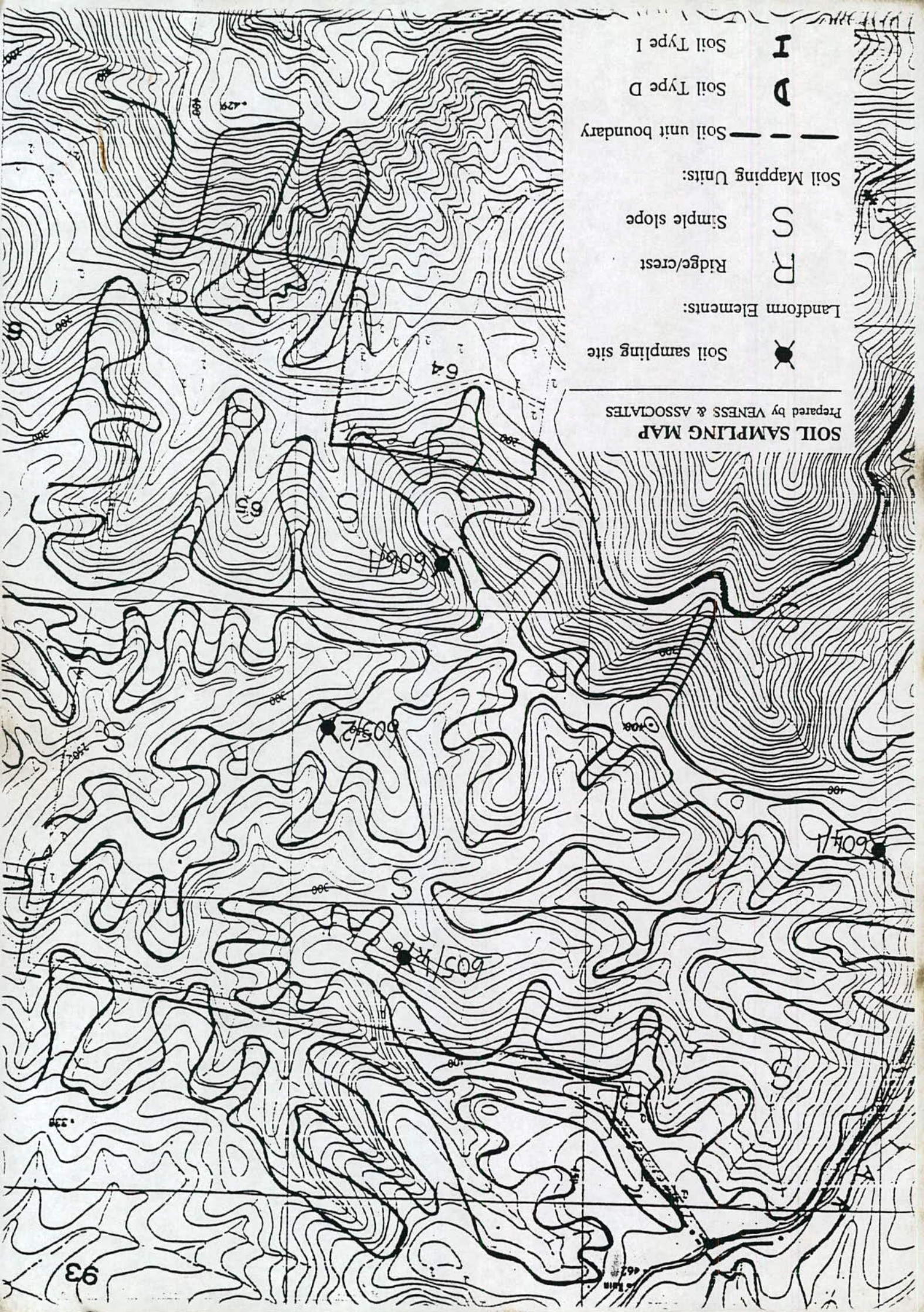
S Simple slope

R Ridge/crest

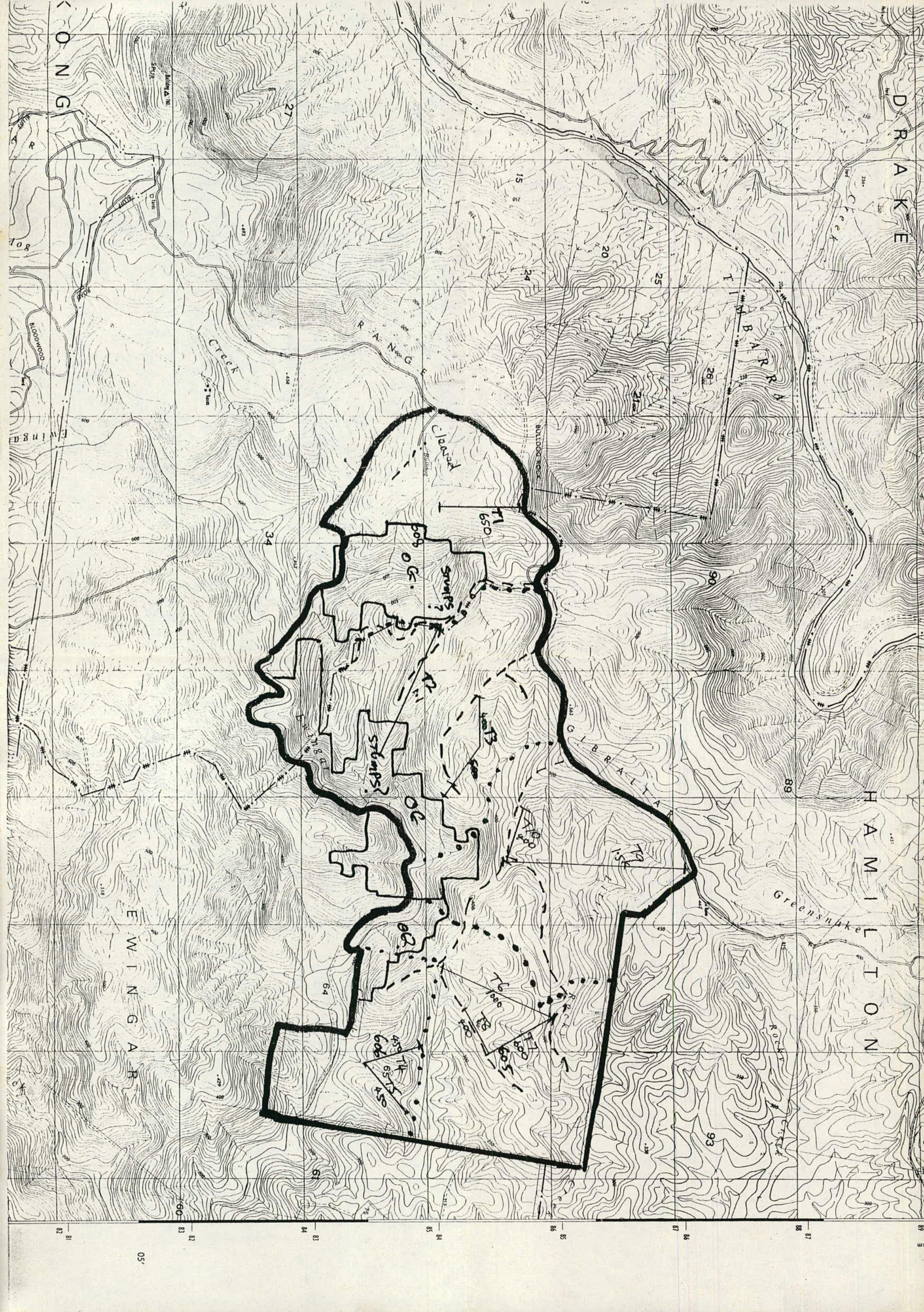
Landform Elements:

⊗ Soil sampling site

SOIL SAMPLING MAP
Prepared by VENESS & ASSOCIATES







Your reference
Our reference

March 2, 1998

North East Forest Alliance
C/- Big Scrub Environment Centre
123 Keen Street
Lismore 2480 NSW

Georgia Beyer,

State Forests of NSW has reviewed the proposals put forward by NEFA regarding enlarging the logging exclusion zone for protection of the Brush-tailed Rock Wallaby (BtRW) foraging areas.

An onsite inspection was carried out on the 23/98 by Brett Cann (Planning Forester) and Jim Rankin (Planning Forest Assistant) to review the options available to State Forests and any possible impacts associated with the implementation of proposal put forward by NEFA on the 20/2/98.

State Forests has enlarged the Wildlife Connection Corridor within compartment 608 to cater for BtRW foraging areas from a minimum 80 metres upto 120 metres in some sections. Also the soft edges of the corridor will lead to an effective connection corridor in excess of the marked Corridor.

A 200 metre modified logging zone has been established which runs from the Connection Corridor in compartment 608 East to log dump 2. The area contained within the modified logging zone will be subject to minimal disturbance of ground cover by the use of Walkover Technique to retain foraging attributes for the BtRW.

Two sections of the Net logging area previously indicated as available for logging will be reserved and retained to increase the width of the exclusion zone. These sections are South of road 607/608 between log dumps 6 and 7, and a section to the North West of the indicated Owl Habitat in compartment 608.

Substantial areas of the Net harvest area will be subject to minimal disturbance by logging due to the scattered nature of sawlogs in these low yielding compartments. The harvesting operation planned for this area will be low intensity retaining sections of the overall canopy untouched and utilising walkover techniques where possible to minimise disturbance to ground cover. Also foraging area's to the north of cpts 608 and 607 in the timber reserve will not be subject to disturbance providing foraging resource for the Bulldog Rock population.



**State Forests of
New South Wales**

Casino District

PO Box 688

Casino

NSW 2470

Phone (066) 62 4499

Fax (066) 62 5826

Sincerely,

A handwritten signature in dark ink, appearing to read 'Brett Cann', with a stylized, flowing script.

Brett Cann

For: Robert Williams

Planning Manager

NEFA SUBMISSION TO STATE FORESTS AND NATIONAL PARKS AND WILDLIFE SERVICE ON **PROPOSED SYSTEMS OF RETAINED HABITAT FOR THREATENED SPECIES IN THE EWINGAR PLANNING AREA**

DRAFT 1

1. INTRODUCTION

State Forests and National Parks and Wildlife Service have moved from record based conservation measures for Powerful and Masked Owls to a landscape approach based upon systems of retained habitat. In the process species localities may be avoided, with total reliance put upon regional habitat models of variable quality and limited suitability for localised planning.

In typical fashion State Forests and NPWS have come up with a simplistic rule based approach to be used throughout NSW to protect sufficient habitat for endangered species so that virtually no other measures then need to be implemented for their conservation. The aim is to meet timber commitments not ecological requirements. There is no real scientific basis. At their desks the bureaucrats agree on a form of decision rules, these are then simplified and watered down until State Forests are satisfied that they will have minimal economic impact. They are then implemented with no monitoring or review.

The agencies are undertaking gigantic experiments with the survival of endangered species. The very survival of entire species is at stake. Extinction is forever. Though as long as the written rules are complied with no one feels the need to know whether their rules work. What you don't know won't hurt you.

The methodology used, and the outcomes attained, for the identification of a system of retained habitat for Masked and Powerful Owls in Ewingar State Forest, in the old Casino District of State Forests' new Northern Rivers Region was considered. This is one of many such plans currently being implemented throughout NSW. In this report an alternative planning process is proposed and implemented to identify a system of retained habitat for the Ewingar Planning Area (PA).

Simplistic and flawed criteria are utilised to enable State Forests to maximise their use of steep and "useless" lands, as well as recently logged areas, to meet ecologically invalid percentage targets. The target area is based upon regional habitat models which have not been adapted for localised planning. No account is made of actual locations, even where this is a roost or nest tree. Limited and simplistic percentage reserve targets are used by NPWS, which ignore population dynamics, regional habitat requirements, and conservation status.

X In effect the current paradigm of the NPWS is based upon subjugating the requirements of endangered species to the goal of maximising timber volumes. Thus the highest imperative is to change the paradigm to one of giving the requirements of endangered species higher, or at least equal, priority. The lack of an ecological or conservation approach on behalf of the agencies is undoubtedly the basic

1

North Coast DTEC Regional Consultation

Fig 1: 1997 NSW State VET Priorities

1997 NSW STATE VET Priorities

Expanded provision of flexibly delivered vocational education and training, including increased on-the-job provision, distance learning and mixed mode delivery.

Development and implementation of a new vocational education and training resource allocation model to better meet the needs of industry and the community.

Increased development of new entry-level training arrangements in schools and work places, including traineeships and apprenticeships.

Provision of appropriate and timely industry training to meet the needs of the Sydney 2000 Olympics.

Establishment of equity accountabilities and ensuring equity implications are addressed in the development of strategies and plans for all major vocational education and training reform priorities.

Establishment of a vocational education and training quality framework focusing on quality management practices.

reason for the abject failure of the current planning process to meet the requirements of endangered species.

→ The precautionary approach

The approach adopted herein has been to firstly better refine the habitat requirements of both Powerful and Masked Owls in the Ewingar PA, utilising forest types and growth stages as well as modelled habitat to identify those areas most likely to be of highest habitat value, for the intent of this process ^{17 15} ~~that~~ such areas are to be considered critical habitat for the species. Secondly the aim has been to take into account a variety of other species and values to maximise the representation of all compatible values within the areas identified for systems of retained habitat for owls in the Ewingar PA.

Decision rules based upon the data layers used in the Interim Assessment Process (IAP) were developed and applied to identify core areas of the highest conservation value. Reserve design principles (including home range requirements) and field inspections were then used to manually identify a proposed system of retained habitat for the Ewingar PA.

This approach is considered to provide an explicit and repeatable first stage which ^{initially} directs selection of core areas on the requirements of endangered species. It is presented as a superior planning process to that utilised by the agencies. It is a process that requires further development, which should be based upon scientific review, faithful application, monitoring and review.

Courtesy

1.1 SUMMARY

→

2. SYSTEMS OF RETAINED HABITAT

A regional system of retained habitat should be comprised of adequate areas reserved from exploitation as legislated reserves, habitat patches (including sites of significance, rainforest, oldgrowth forest, rare forest types, special habitats, key species' habitat) and wildlife corridors (encompassing riparian habitat and ridge and slope systems). Such a system can be complemented by enhanced retention of habitat components and specific fauna prescriptions in unreserved areas.

To complement national parks and nature reserves, systems of retained habitat need to be maintained throughout the forest estate to provide refuges for species sensitive to forestry operations and to allow for dispersal of species. There are two principle components to such systems; habitat patches and linking corridors.

The system of habitat being considered for retention by State Forests for Masked and Powerful Owls in the Ewingar Planning Area (PA) is based upon ad hoc decision making with the principle design criteria being to minimise impacts on productive areas. The design process was simplistic and biased.

North Coast DTEC Regional Consultation

Annual National Priorities

The 1998 NSW Strategic VET Plan will detail the NSW commitment to meeting the Annual National Priorities, as listed below at fig 2.

Fig 2: 1998 Annual National Priorities and (draft) National Key Result Areas

Implementation of New Apprenticeships, including User Choice;

- Employment based training expanded
- Regulatory arrangements streamlined
- Clients informed of training options and able to negotiate training delivery to suit their needs with funds flowing to provider of choice
- One-stop-shop for apprenticeship and traineeship services implemented to ensure every employer has access to a single point for transacting apprenticeship and traineeship business

Expansion of Market Mechanisms; Client access to a broader range of providers, training services and training information improved

- Provider flexibility and responsiveness to clients needs enhanced

Implementation of the National Training Framework;

- Training products and services responsive to industry training requirements
- Points of regulation reduced and arrangements in place through the Australian Recognition Framework to raise the quality of training products and services
- National portability of skills and qualifications ensured

Provision of greater opportunities and improved outcomes for under-represented clients;

Value for public expenditure maximised;

- Planning systems and resource allocation models improved to ensure relevance to industry and occupational demand

Achieving training outcomes which meet the needs of small business;

- Small business participation in training maximised
- Responsiveness of the system to the needs of small business improved
- Training culture in small business stimulated

Encouragement of a training culture within industry, including to enhance training of the existing workforce;

- Benefits of training to industry, especially in terms of increased productivity will be promoted
- Industry investment and involvement in training enhanced.

Training is to facilitate State training development.

2.1 State Forests' Owl Plan

Intro.

2.1.1 Process and decision rules

Recommended improvements ...

2.1.2 Ewingar Planning Area

Critique owl plan, benefits (if any) and deficiencies ...

Steep slopes (generally over 30°) are excluded from logging on the grounds of inaccessibility. While such areas form part of a system of retained habitat it needs to be recognised that steep unloggable slopes do not represent optimal habitat for most species sensitive to forestry operations and thus they need to be assessed on their merits and consideration of their actual contribution to both habitat and dispersal.

2.2 Proposed process for determining Systems of Retained habitat in the Ewingar Planning Area.

Aims
Criteria

3. DESIGN PRINCIPLES

The nationally agreed forest reserve criteria (JANIS 1997) gives four principle objectives for biodiversity conservation at the species level, including:

- *to maintain viable populations of native forest species throughout their natural ranges; and*
- *to maintain the genetic diversity of native forest species.*

Areas need to be retained throughout the forest landscape for a variety of reasons, including provision of:

- (i) habitat and resources for species sensitive to forestry practices,
- (ii) protection for key refugia,
- (iii) protection for rainforest,
- (iv) protection for oldgrowth forest,

North Coast DTEC Regional Consultation

Development of the 1998 NSW Strategic VET Plan, and emerging State priorities

Each year, NSW develops State priorities for VET which are derived from extensive consultation with industry, equity groups, and major stake holders in the VET system, and inputs from key participants, and research. Industry Training Advisory Bodies constitute the principal source of industry advice through their Industry VET Plans and consultations.

Regional advice for the 1998 NSW Strategic VET Plan will be generated from two main sources:

1. Pilot Regional Consultations jointly coordinated between the local DTEC Centre and Strategic Planning and Resource Management Branch; and
2. Written advice from the DTEC Centres based on local consultation and analysis of available information for inclusion in the 1998 NSW Strategic VET Plan.

Consultation with public, community and private training providers, and detailed internal advice will also play a key role in informing the development of the 1998 NSW Strategic VET Plan.

Industry priorities emerging from this process so far include:

- ☐ the need to address the training needs of the existing workforce;
- ☐ flexibly delivered vocational education and training;
- ☐ training to improve management skills (partly derived from move towards out sourcing) and workplace communication skills;
- ☐ establishment of on-the-job training and assessment structures;
- ☐ curriculum/qualification frameworks to facilitate career paths, and retention of a skilled workforce;
- ☐ consistency between the VET quality assurance mechanisms (registration and accreditation) and licencing requirements of other statutory bodies; and,
- ☐ assistance to establish or maintain entry level training positions where industries are moving to outsourcing.

For further detail on these issues, please see the paper at Attachment 1.

- (v) protection for inadequately reserved plant associations,
- (vi) stepping stones to assist the dispersal of species between populations, and
- (vii) protection of cultural and recreational values.

Sites of particular botanical and zoological significance outside major legislated reserves need to be identified and given appropriate protection. Sites of significance should be those with outstanding habitat values, refugia and sites with significant populations of threatened, vulnerable, rare and regionally significant species (ie. Kavanagh and Webb 1989, Davey and Norton 1990).

To maintain populations of sensitive fauna throughout the landscape there is a need to reserve sufficient areas of suitable habitat in appropriate configurations throughout the landscape and to link these with corridors suitable for the dispersal of such species (Bennett 1990a, Recher *et al.* 1991).

For Leadbeater's Possum Lindenmayer and Possingham (1994) identified a range of important reserve design principles for conservation strategies, including:

- *"Ensure that reserves are positioned to minimise the risks that all of them would be destroyed in a single major wildfire, but sufficiently connected to facilitate the movement of animals between areas that are set aside."*
- *Maintain connections between areas that are set aside to facilitate the recolonisation of patches where local extinctions have occurred.*
- *Attempt to set aside areas that are 50-100 ha each to avoid extinction processes that characterise very small populations such as demographic stochasticity and environmental variability."*

Thomas *et. al.* (1990) identified five management principles as a basis for determining the amount and distribution of habitat needed to ensure the long term survival of the Northern Spotted Owl:

1. Species that are well distributed across their ranges are less prone to extinction than species confined to small portions of their ranges;
2. Large blocks of habitat containing many individuals of a given species are more likely to sustain that species than are small blocks of habitat with only a few individuals;
3. Habitat patches in close proximity are preferable to widely dispersed habitat patches;
4. Continuous, unfragmented blocks of habitat are superior to highly fragmented blocks of habitat; and
5. Habitat between protected areas is more easily traversed by dispersing individuals if it resembles suitable habitat for the species.

Such basic principles should be the foundation for the development of strategies to ensure the adequate reservation of species in the CRAs. Currently there is apparently no such intent and aside for determining a population target for each region and using some ad hoc and subjective process to determine how to distribute this across a region and between tenures.

As recognised by JANIS it is at the population or metapopulation level that species conservation is required to be directed. It is essential that populations and metapopulations become the basic planning units for priority species in the CRA. This is not currently the case, with targets set for arbitrarily defined regions with no consideration of populations or metapopulations. It is recommended that metapopulations and subregions be identified and termed Population Management Zones (areas within which populations need to be managed as distinct entities).

North Coast DTEC Regional Consultation

Workshops at the Consultation

On the day of the consultation, your input will be sought regarding the emerging key issues for vocational education and training in NSW. Input will be through workshops where groups will focus on a range of different issues. Each workshop will be asked to address

- A. Key Shifts in Training demand; and
- B. Apprenticeships and Traineeships and User Choice

as these are key issues on the VET agenda. Further to that, each workshop group will be requested to address at least one of the topics listed below:

- C. Training for the current workforce
- D. Flexible Delivery
- E. Opportunities and Outcomes for disadvantaged groups
- F. Cross Sectoral Initiatives
- G. Quality in VET

The following pages provide a background to each of the issues, and a suggested approach.

Within a metapopulation the principle structural units for populations of territorial species are the home ranges of breeding individuals or pairs ('breeding units'). Clusters of these form populations. To allow for social interaction and minimise the risk of extinction these clusters preferably need to comprise above a minimum number of breeding units ('core populations'), though the larger they are the better. For species which don't have breeding home ranges (or only seasonally) there is a need to aim reservation at habitat patches, including sites of breeding aggregation and areas of foraging habitat. It is possible to reserve blocks of critical habitat sufficient to maintain viable core populations as a basis for reserve implementation.

To account for genetic variability and minimise the risks associated with local extinction due to stochastic events core populations need to be spread throughout the geographic and environmental range of a species. To allow for genetic exchange and population renewal (i.e. following localised extinction) it is essential that core populations be spatially distributed and the intervening habitat suitable to ensure dispersal between them.

targets
population
The basic strategy should be to develop reservation targets based upon replication of core populations throughout a Population Management Zone (metapopulation or part thereof) and in a spatial arrangement and forest matrix designed to maximise successful dispersal between the core populations. With this approach there is a need to establish a minimum target for a whole population, a minimum target for each core population and a maximum spacing for core populations. In applying the species reservation targets the emphasis should be to protect core populations of a species, within dispersal range of each other, spread throughout the identified range of a species, and secondarily to ensure at least a minimum overall population target is achieved within each metapopulation.

When applying species reservation targets it is essential to recognise that the breeding unit area being used is adjusted to account for the probability of any part of that modelled habitat actually being occupied, that reservation targets are preferentially met from the highest quality habitat identified, and that refugia, centres of endemism and areas of high biodiversity are given preference in reservation decisions.

When identifying the required spatial distribution of core populations particular consideration needs to be given to assessing the likely dispersal and persistence of species in the intervening matrix. With increasing isolation there is a need for corresponding increases in the size of the population that needs to be reserved to guard against inbreeding and population loss due to threatening processes. For fauna, individuals need to move between localities and successfully mate for genetic exchange to occur or habitat to be recolonised. For flora, genetic exchange can also occur through transfer of pollen, though transfer of propagules is still required for recolonisation.

*** The application of reservation targets for populations in the CRA process should not be confused with the need of ecologically sustainable forest management to maintain ecologically functional populations throughout the forest estate. The loss of species from an ecosystem can cause imbalances with significant ramifications for a forest ecosystem's functioning and ultimately health and vitality. The intent must be to maintain species throughout their range, with reserves providing the framework needed to do so.

North Coast DTEC Regional Consultation Issues for discussion

A. Key Shifts in Training demand

Demand for training is affected by a broad range of factors, for example: growth in employment, productivity, and output; changes to technologies and work place structure; and changes in the population base. While industry employment and economic trends often play a key role in determining training demand, it is important to consider other key determinants of training demand, for example, the need to ensure that the education and training needs of target groups and of rural and remote communities are met.

Even where an industry sector is subject to low or declining levels of employment, there may be major training needs due to other factors. Indeed, industries or industry sectors with relatively low or declining employment levels, that have had little or no access to VET provision can often represent areas of high priority training demand in order to increase productivity and reduce the overall decline in the industry.

We need this consultation to identify key industry and community developments likely to impact on the North Coast economy over the next 3-5 years, and what the consequent requirements in shifts in training activity might be.

In developing a response, participants should consider:

- a. industries of key strategic importance the region (eg. based on employment, contribution to local economy);
- b. key industry developments and training implications (eg. emerging/declining industries, new technology, skills shortages, restructuring, out sourcing structural changes within industry such as franchising, out sourcing and specialisation);
- c. whether identified skills gaps can be met with a training solution; and,
- d. estimate key shifts required in publicly funded training activity.

The current Conservation Protocols in effect exclude larger patches of 'identified' oldgrowth forests, rainforest, some mostly non-commercial rare forest types, wetlands, rock outcrops and heathlands from logging.

3.1 Viability of Habitat

JANIS (1997) gives as one of the four principle objectives of biodiversity as

"to maintain viable populations of native forest species throughout their natural ranges", noting that *"Where data on the viability of populations are available, they should be incorporated in determining the adequacy of a reserve system."* and requiring that:

"(6) Reserves should be large enough to sustain the viability, quality and integrity of populations".

A biological population is a cluster of individuals with a high probability of mating with one another as compared with the probability of mating with members of other populations (Pianka, cited by Ruggiero et. al. 1994). Some species exist as only one population, though usually a species exists as multiple populations throughout its range. Where populations regularly interact with other populations they form metapopulations. Beyond this level of ecological organisation interaction becomes infrequent or unlikely.

As recognised by JANIS it is at the population or metapopulation level that species conservation is required to be directed. As noted by Ruggiero et. al. (1994) *"Biological populations represent a real level of ecological organisation that occurs in nature ... Although the geographic or physiographic boundaries that demarcate different populations are often difficult to define, it is nonetheless important to attempt a biologically meaningful delineation."*

Caughley (1994) notes metapopulation structure *"forms the conceptual framework for designing a reserve system and for managing populations whose habitat is fragmented."* A metapopulation constitutes the number of populations, their size distribution, spatial arrangement and genetic heterogeneity (Schemske et. al. 1994). As noted by Schemske et. al. (1994) *"For a species to spread or persist, plants must colonise unoccupied patches at least as frequently as populations become extinct. As a result, there will be a threshold density of patches below which populations cannot persist due to inadequate dispersal ... Even slight changes in the number, density or quality of patches can have an enormous effect on rates of colonisation and extinction, and may be sufficient to tip the balance in favor of regional extinction ..."* The parameters of interpopulation dispersal, recruitment rates, patch turnover and gene flow ~~need~~ need to be accounted for in reserve design (Kesseli 1992).

For the IAP an attempt was made to account for the need to use populations as the basic planning unit by identifying species specific sub-regions within each region. The expert panels examined each species distribution against evident dispersal barriers, known genetic variation and broad environmental gradients to identify sub-regions for all species under consideration (RACAC 1996b).

**North Coast DTEC Regional Consultation
Issues for discussion**

B. Apprenticeships and Traineeships and a Competitive VET Framework

New arrangements for apprenticeships and traineeships are to be introduced progressively throughout 1997 and 1998. All of the current traineeships and apprenticeships will continue to be available, and NSW will build on current arrangements to provide greater flexibility in the type of structured training arrangements available, and the way in which they are delivered. Under the new arrangements, employers and trainees/apprentices will be able to negotiate training programs with a registered training provider that may involve substantial delivery of the training on-the-job.

The Commonwealth anticipates a substantial increase in demand for traineeships and apprenticeships as a result of the new arrangements, and would seek that a higher proportion of public funds be directed towards meeting this training demand.

As a means of expanding the diversity of the training market and enhancing its efficiency, flexibility and responsiveness, NSW has increased access to public funds to a wider range of training providers.

In developing a response, participants could consider:

- a. what the likely demand for traineeships and apprenticeships will be (including areas not currently covered by traineeship and apprenticeship arrangements);
- b. the level of knowledge regarding the New Apprenticeships and User Choice agenda;
- c. whether a sufficient number of training providers exist to provide employers and trainees/apprentices with a choice of provider;
- d. whether training currently delivered to trainees and apprentices is of adequate quality, currency, and quantity;
- e. whether alternative delivery modes are required;
- f. whether local Industry can or would support on-the-job training and assessment;
- g. how demand for training for trainees and apprentices compares with training for the current workforce; and
- h. cross border issues including access of NSW trainees and apprentices to training in Queensland, and vice versa, cross border recognition of training,

The need to reserve viable populations of species as a basis for conservation planning has long been recognised, ie Tyndale-Biscoe and Calaby (1975), Dunning and Smith (1986), Mackowski (1986, 1987), Soule and Simberloff (1986), Davey (1989) Possingham (1990), Davey and Norton (1990), Clark, Backhouse and Lacy (1991), Johnson et. al. (1991), RAC (1992a p210), Lindenmayer and Possingham (1994), Ruggiero et. al. (1994), Goldingay and Possingham (1995).

DASET (1993, p111) note:

"Where adequate knowledge is available, PVA can provide predictions for survival probabilities given various population levels of a particular taxon. These probabilities can then be used to guide consideration of adequate numbers of individuals (or reproductive units) reserved, and hence reserve sizes and boundaries

A viable population size is one that is able to be maintained in perpetuity and provide the genetic variability for continued ability to adapt to environmental changes and pressures (Tyndale-Biscoe and Calaby 1975, Franklin 1980, Gilpin and Soule 1986, Ledig 1986, Soule and Simberloff 1986, Mackowski 1986, Dunning and Smith 1986, Davey 1989, Hopper and Coates 1990, Davey and Norton 1990, Possingham 1990, 1991, Reed 1991, Archer, Hand and Godhelp 1991, Goldingay and Kavanagh 1991, Kavanagh 1991, RAC 1992a, Possingham and Noble 1992, Kesseli 1992, Lindenmayer, Norton and Possingham 1993, Lindenmayer and Possingham 1994). Natural population fluctuations, catastrophes such as fire, drought and disease, along with global warming, need to be accounted for in assessing the population size of a species needed for it to survive into our uncertain future (e.g. Tyndale-Biscoe and Calaby 1975, Soule and Simberloff 1986, Davey 1989, Possingham 1990, 1991, Possingham and Noble 1992, Lindenmayer, Norton and Possingham 1993, Lindenmayer and Possingham 1994).

As noted by Ruggerio et. al. (1994) *"PVA is about birth, death, immigration, and emigration rates and how environmental and ecological factors affect these rates over time."* Ledig (1996) states *"large populations are necessary to keep the level of inbreeding low and maintain high levels of heterozygosity for deleterious alleles. Many populations maintained as a few individuals over several generations would collapse, and most of the others would be fixed for mildly deleterious genes that would impair their reproductive capacity. Furthermore, populations with low diversity are vulnerable to new stresses such as pathogens and climate change. And, finally, without variability, evolution is impossible."*

Franklin (1980) proposed that, in the long term, the minimum effective wildlife population size should be about 500, and that, below this population size, genetic variation for complex traits would be lost at a faster rate than variation could be renewed by mutation. Evolutionary sifting, population constrictions (bottlenecks) and expansions, prehistorical and historical population fragmentation and other factors have all affected the genetic variability observed today and thus confuse basic principles.

Based upon basic principles various viable population sizes for Greater Glider have been suggested, from 2375 (Davey 1989) to 5,000 individuals (Tyndale-Biscoe and Calaby 1975). Dunning and Smith (1986) proposed the management goal of 521 Greater Gliders within each block of suitable habitat effectively isolated by dispersal barriers (ie rainforest). Tyndale-Biscoe and Calaby (1975) adopt an effective population of 1,000 individuals as near to the minimum to ensure the continuance of genetic variability and took 5,000 as an effective population size above the minimum for dependent residents

North Coast DTEC Regional Consultation Issues for discussion

pathways, and opportunities for co-operation between the NSW and QLD training administrations.

C. Training for the current workforce

Advice from NSW Industry Training Advisory Bodies has emphasised the need to develop education and training arrangements to meet the needs of the established workforces of enterprises.

All industries have stated a need for skills upgrading and retraining to enable the workforce to address various industry characteristics including:

- a. advancing technology;
- b. changed work practices and restructuring;
- c. environmental requirements and concerns;
- d. export and regulatory requirements such as quality and occupational health and safety standards;
- e. language, literacy and workplace communication; and,
- f. industry operations (eg. shift work, remote areas).

In considering this issue, participants could debate whether the above listed issues are increasing demand for training for current employees, whether the training needs of current employees are adequately met, and what the barriers are to accessing training for current employees.

of Tall Open forest. Using this they calculated that the area required to support an effective population of Greater Gliders in the area (near Tumut) they studied to be 6,656 - 10,870 hectares.

For the Yellow-bellied Glider Mackowski (1986) adopted a minimum population size of 500 individuals or 250 territories. Goldingay and Possingham (1995) conducted a preliminary Population Viability Analysis (PVA) which predicted that areas containing at least 150 contiguous Yellow-bellied Glider territories were needed to support viable populations. For the Victorian Leadbeater's Possum Lindenmayer and Possingham (1994) used PVA to determine that the minimum size of reserved areas should be 50-100 ha, with 15-20 50 ha reserves or 6-10 100 ha reserves in each forest block of 3,500 to 13,000 ha. They based this on an average of 1.5 reproductively active females per 10 ha of oldgrowth.

The strategy adopted for the north American Northern Spotted Owl (Johnson et. al. 1991) was based upon ideally reserving blocks of habitat suitable to maintain 20 or more pairs of spotted owls, with smaller habitat blocks acceptable when the ideal size can not be found. To account for dispersal it was determined that generally, the 20-pair blocks should be not more than 12 miles apart and the smaller habitat blocks not more than 7 miles apart (Johnson et. al. 1991).

The use of the home range sizes, and core and overall population reserve targets adopted in the IAP, and reinforced in the Eden CRA, would be consistent with practical application of PVA principles and representative of best practice. This would be far more defensible and credible basis for planning than the blinkered target setting process currently utilised by State Forests and NPWS.

The overriding aim should, in theory, be to meet those targets established in the IAP by reservation (protection from logging) of habitat. This is needed if the requirements of the precautionary principle are to be met. In the subregion encompassing the Ewingar PA the Powerful Owl only achieved 8% of its reservation target within reserves and IDFAs together, and Masked Owl only achieved 21% of its reservation target within reserves and IDFAs. It is clear that a precautionary approach would require a cessation of all logging within habitat of these species in the Ewingar PA.

Caughley (1994) warns "*All threatened species known to me share one characteristic: little is known about their age-specific rates of fecundity and mortality upon which PVA must necessarily operate. Consequently, the PVAs on them are essentially games played with guesses.*" At this point in time informed guesses are required, though the fact that they are guesses should never be lost sight of. An identified minimum viable population may in fact only be a fraction of what is actually required. As Caughley (1994) concludes "*... where a faulty recommendation may kill off a species, it must be guarded against with vigilance.*"

State Forests and NPWS have increased the extinction stakes by playing games with the guesses that clearly ignore the precautionary principle by continuing to allow logging of owl habitat when they are so poorly reserved. Given this reckless approach there can be no doubt that it is essential to maximise the protection afforded to the highest quality, and thus most critical, habitat. Such habitat must be the core of any conservation strategy that falls so far short of the precautionary approach.

→ habitat patches

It always needs to be remembered that the larger a block of habitat is, the more individuals of a given species it can support, and thus the higher is that population's probability of persistence. Once blocks

North Coast DTEC Regional Consultation Issues for discussion

D. Flexible delivery

Training demand is continually changing reflecting new industries, new technologies, new ways of working and new student groups. Similarly, the delivery modes and technologies available to training providers are continually developing, making a whole range of approaches possible including self paced learning, telecommunications link ups, computer packages, and on-the-job learning.

What are the issues for flexible delivery in the North Coast region?

In developing a response, participants could consider:

- a. what flexibilities would improve access to VET;
- b. adequacy of current building and equipment facilities;
- c. access to mobile training capital facilities;
- d. equipage of current building stock to meet a range of training needs;
- e. training that requires access to current and modernising technology;
- f. levels of industry support and demand for skills centres; and
- g. any requirement for capital funding to support Vocational Education and Training in schools.

of habitat fall below threshold sizes or are too widely separated there is an exponential increase in the probability of the extinction of species within them and ultimately the population for which they are the building blocks. A precautionary approach is thus essential when determining both the size and distribution of 'habitat patches'.

It is the number and spatial arrangement of 'habitat patches' required to maintain a species throughout suitable habitat within the metapopulation that should be the primary determinant in establishing systems of retained habitat.

Conner (1988) argues against the concept of managing certain species to provide for only the smallest population necessary for a species to remain viable on the basis that this ignores their functional importance (i.e. seed or mycorrhizal spore dispersal, insect control). He argues that bottom line constraints for wildlife species management "*should be set to higher, ecologically functional levels rather than minimally viable levels*" to maintain the health, complexity, balance and thus long-term stability of an ecosystem.

It is essential that species be retained throughout their ranges, with reserves aimed at incorporating the best estimate of what constitutes a viable population of a species. This must be complemented by maintenance of the species throughout all suitable habitat to act as a buffer should the estimates be wrong and to ensure the maintenance of ecological functioning of all the forest.

Most species occupy habitats that vary in quality or productivity across their range. The availability and abundance of key resources affects the sizes of a species' territory and their breeding success. Areas where successful breeding outstrips mortality and thus provide a source of dispersing juveniles are termed "sources", while areas in which mortality outstrips breeding are termed "sinks". Sink populations can persist due to an influx of dispersing individuals from source populations. Any reservation strategy for species must focus on ensuring sufficient reservation of source habitat (or areas with the potential to become such) to maintain viable populations throughout the forest. A reservation strategy based upon sinks is a dead end.

Davey and Norton (1990) consider that significance of areas can be determined in a number of ways, including

- "(i) high value of optimal habitat reflecting high population density of a select species;
- (ii) high habitat-unit value (habitat-unit equates with a high diversity of habitats in a geographic area...); and/or
- (iii) high diversity or population density of select species. Select species are those that are rare, endangered or sensitive (detrimentally) to forest operations."

The definition of critical habitat in the American Endangered Species Act, is "(i) the specific areas within the geographic area occupied by a species on which are found those physical and biological features (I) essential to the conservation of the species, and (II) that may require special management considerations or protection"

To meet the requirements of JANIS and threatened species legislation it is imperative that reservation targets are preferentially met from the highest quality habitat identified. Gilpin and Soule (1986) note

North Coast DTEC Regional Consultation Issues for discussion

E. Opportunities and Outcomes for disadvantaged groups

Social justice is a top priority for the NSW Government, and the NSW Charter for Equity in VET has been developed to promote principles for achieving social justice across the total education and training sector. The current changing agenda for vocational education and training raises many equity issues. Pathways for development must be developed to ensure that the current emphasis on an industry-led, demand driven system operating within a competitive market framework does not exclude equity objectives.

It is important that VET planning is informed by the potential impact of emerging priorities on community, general education and equity interests. Therefore, in providing input to this consultation, participant should advise on;

- a. the implications of New Apprenticeships for disadvantaged groups;
- b. adequacy of training provided;
- c. adequacy of delivery modes;
- d. the potential benefits and drawbacks of on-the-job training and assessment;
- e. adequacy of quality assurance/ monitoring requirements;
- f. the impact of reduced funding to labour market programs; and,
- g. language, literacy and communications training requirements.

"it is useful to examine the environment field from two perspectives - quality and quantity, because a deterioration of either can extinguish a population."

3.2 Spatial distribution

JANIS (1997) emphasises the need to conserve *"all species of Australia's indigenous forest flora and fauna throughout their range"*. This is required to maintain viable metapopulations, maximise conservation of genetic diversity and to maintain the components that regulate ecosystem functioning.

When identifying the required spatial distribution of core populations particular consideration needs to be given to assessing the likely dispersal and persistence of species in the intervening matrix. As noted by Kesseli (1992) *"the key parameter for species persistence, along with the asynchronous responses of populations to environmental stochasticity, is dispersal among populations."*

Habitat fragmentation has been recognised both internationally and nationally as one of the major threats to maintenance of fauna populations (Bennett 1990, Jarman 1986, Andrews 1990, Neave and Norton 1990, Possingham 1990, Saunders 1990, Milledge, Palmer and Nelson 1991). Documented examples of species' extinctions have frequently shown an initial pattern of major range reduction and fragmentation followed by successive extinctions of local populations (Bennett 1990). Fragmentation of populations of a species by clearings or unsuitable habitats can disrupt or stop gene flow between remnant populations (Andrews 1990, Barnett, How and Humphreys 1978, Bennett 1990).

For the design of systems of retained habitat it is essential to identify likely barriers to dispersal of species when determining the management boundaries for metapopulations. Within a defined population management area the degree of isolation of an individual population still influences its persistence as immigrations from other populations help maintain genetic diversity and population stability (particularly following major population declines). The distance between Core Populations and the suitability of the intervening habitat matrix for species dispersal therefore are essential considerations when planning for the reservation of viable populations.

Lindenmayer and Possingham (1994) note that dispersing Leadbeater's Possum are likely to experience high rates of mortality, with the probability that a migrating animal reaches another suitable habitat patch a function of inter-patch distance as well as the size of the patch (while they had observed maximum dispersal distances of 1 km, they assumed an ability to disperse for 2 km before dying). Chepko-Sade and Halpin (cited by Ruggiero et. al. 1994) found that mammals typically disperse less than five home-range diameters.

To account for dispersal of the Northern Spotted Owl it was determined that generally, the 20-pair blocks should be not more than 12 miles apart and the smaller habitat blocks not more than 7 miles apart (Johnson et. al. 1991). Modelling indicated that this design was likely to be unsuccessful due to high predation of dispersing juveniles so it was combined with making the landscape matrix more conducive to dispersal by conserving 40% of the canopy cover of trees greater than 28 cm dbh in at least 50% of the loggable areas (Thomas et. al. 1990).

➤ For plants different approaches are required to assess the distance over which cross-pollination or seed dispersal can occur. In many ways it is simpler to identify potentially discrete populations and obtain

North Coast DTEC Regional Consultation Issues for discussion

F. Cross Sectoral Initiatives

DTEC has a key role in ensuring a high level of cross-sectoral co-ordination and stakeholder involvement in relation to policy, planning and resource allocation in education and training. Regional, Community and Industry input is required to guide planning for the resource requirements for cross-sectoral activities including initiatives within schooling, higher education and the adult and community education sector.

Examples of cross sectoral activity include the establishment of joint facilities and joint delivery arrangements, and the establishment and development of credit transfer arrangements.

In considering this issue, you may find it useful to focus on the following:

- a. whether credit transfer arrangements between sectors are adequate (including recognition of on-the-job assessments);
- b. what opportunities there may be to expand cross sectoral delivery and capital arrangements;
- c. the level of local knowledge and interest in pursuing cross sectoral initiatives; and
- d. what initiatives have been developed in the region, what needs they are servicing, whether they are working well, and whether there is room for improvement.

an estimate of the likely limits over which vectors can transport pollen or propagules for sedentary species.

For many species corridors of forest need to be retained or established to provide multiple pathways for the dispersal of fauna between legislated reserves and habitat patches to allow:

- (i) genetic exchange between isolated populations (Soule and Simberloff 1986, Dunning and Smith 1986, Bennett 1990a, 1990b, Saunders 1990, Winter 1991, Hopper and Coates 1990, Goldingay and Kavanagh 1991),
- (ii) dispersal to required resources (Saunders 1990, Moon 1990, Goldingay and Kavanagh 1991),
- (iii) founding of new populations,
- (iv) maintenance of populations of some species in otherwise unsuitable habitat (Kavanagh 1985a, 1985b, Dunning and Smith 1986, Kavanagh and Webb 1989, Bennett 1990), and
- (v) for migration of species in response to predicted global warming (Busby 1988, Arnold 1988, Main 1988, Page 1989).

→ *refugia*
When designing wildlife corridors it is essential to consider:

- (i) the species being targeted, their ecology, habitat requirements, and dispersal ability (Bennett 1990a),
- (ii) the edge effect and its impact on suitability of the corridor for target species (Bennett 1990a, Saunders 1990, Recher *et al.* 1991),
- (iii) the pathways actually utilized by species for movement (Davey 1989),
- (iv) seasonal migrations (Smith 1991b), and
- (v) the necessity of species to migrate in response to global warming (Busby 1988, Arnold 1988, Main 1988, Page 1989, Smith 1991b).

An adequate wildlife corridor system should encompass:

- (i) multiple pathways linking retained habitat (Bennett 1990a),
- (ii) reservation of larger areas of suitable habitat at periodic intervals along corridors (Bennett 1990a, Recher *et al.* 1991),
- (iii) linked riparian and ridge corridors sampling suitable habitat for a full range of target species (Recher, Rhonan-Jones and Smith 1980, Dunning and Smith 1986, Conservation, Forests and Lands 1989, Bennett 1990a, Recher *et al.* 1991) and
- (iv) a hierarchy of corridors comprised of broad regional corridors established to restore links between isolated forests, major wildlife corridors within production forests to link important reserved areas and a network of smaller wildlife corridors forming common linkages in the system of retained habitat (Bennett 1990a).

Dunning and Smith (1986) state "Results of this study suggest that two corridor systems are necessary for the conservation of arboreal mammals. One continuous gully system should incorporate the unlogged rainforest gullies throughout the study region. This corridor system would preserve rainforest inhabiting species, principally [Rufous Ringtail Possum, Mountain Brushtail Possum and Fawn-footed Melomys]. A second interconnected ridgetop corridor system of unlogged or lightly logged moist hardwood forest will be necessary for conservation of mature hardwood dependent species such as [Greater Glider]. [Greater Glider] cannot be conserved within a rainforest gully corridor system ... The ridgetop corridors may only need to be relatively narrow (approximately 100

North Coast DTEC Regional Consultation Issues for discussion

G. Quality in VET

Quality in VET is a very important issue. NSW has participated strongly in programs designed to improve the quality of vocational education and training such as

- ☐ the National Professional Development Program
- ☐ Best Practice and Quality Assurance national projects

DTEC has also invested considerable resources in establishing an accreditation, registration and declaration system aimed to promote consistency of standards in VET, support providers in developing quality programs and guarantee the quality of qualifications awarded in NSW. Further work is currently being undertaken to develop a quality framework and develop support materials to facilitate consistency and maintain quality of vocational education and training courses.

In considering DTEC's quality framework and quality mechanisms, participants could focus on:

- a. local levels of knowledge about quality assurance mechanisms;
- b. access to information regarding quality assurance;
- c. changes that could be introduced;
- d. examples of high quality delivery and what may have led to this outcome; and,
- e. examples of poor quality delivery and what may have led to this outcome.

m) if they are sited adjacent to or continuous with ...low intensity logging and tree hollow retention zones”.

Dunning and Smith (1986) consider *“The unlogged ridgetop moist hardwood corridor system should have side branches that link up with the rainforest corridors to provide an avenue for movement of species that utilise both habitat types, and to increase the area of contact between logged forest and unlogged source areas for species that can recolonise after logging.”*, and *“The proposed corridor system may possibly prevent the isolation of [Greater Glider] populations and allow genetic exchange through juvenile dispersal.”*

In general the State Forests relies upon modified streamside retention strips (implemented for erosion mitigation purposes) for wildlife corridors. These may be strips of vegetation 20 metres each side of streams with catchments in excess of 15, 30 or 100 hectares, which may or may not be subject to logging (but not entered by machinery), or “wildlife corridors” comprised of strips 40 metres wide with the outer 20 m subject to modified harvesting. In some instances (e.g. Eden region) 100 m + strips may be retained.

Claridge *et al.* (1991) note *“Currently the New South Wales Forestry Commission does not normally include a contiguous ridge or slope system of unlogged vegetation in logging areas. Instead, in the current logging system, extensive networks of wildlife corridors, with a minimum width of 100 m, are left linking unlogged forest habitats ... These are further increased by streamside filter strips. Unfortunately there are no data available to suggest that these buffer strips will be sufficient for bandicoots to survive in while adjacent logged forest regenerates. Until more data are available it is probably best to be conservative and assume that unlogged habitat from ridge to gully is essential for bandicoots.”*

Narrow riparian strips do not provide habitat suitable or adequate for a variety of species (Mackowski 1984, Kavanagh 1985b, Shields and Kavanagh 1985, Dunning and Smith 1986, Bennett 1990a, Gilmore 1990, Recher *et al.* 1991, Scotts 1991). Even where suitable habitat is encompassed corridors with a total width of 200 m have been found inadequate for some species (Kavanagh 1985b).

Shepherd *et al.* (1992) consider the minimum width of major corridors *“must be sufficient to meet at least the habitat requirements of key central place foragers ... and to minimise edge effects such as the invasion of intact forest by exotic plants and animals, and changes in microclimate which can lead to the windthrow of trees, increased flammability of vegetation, etc.”* For high quality habitat they recommend that only in very exceptional circumstances should sections of a corridor be less than one kilometre wide and that no areas should be less than 700m.

Davey (1989) recommends not stipulating constant corridor width and enabling boundaries to maximise the structural and species diversity. Recher, Rohan-Jones and Smith (1980) recommend that the riparian environment should be retained intact. Where rainforest occurs in riparian situations the incorporation of their buffer zones into the corridor system will greatly enhance the corridors value for non-rainforest species.

In designing wildlife corridors it is essential to consider the effects of barriers to movement and strategies to facilitate movement across potential barriers (Andrews 1990, Bennett 1990, Saunders 1990, Goldingay and Kavanagh 1991). For example it is essential that movement of fauna be taken into

ADDENDUM

At the consultation, all workshop groups will be asked to consider issues relating to key shifts in training demand in the North Coast Area, New Apprenticeships and User Choice. In addition, participants are asked to nominate other specific issues for discussion (see attached).

account in highway and railway design by the provision of fauna underpasses (Andrews 1990). Forest roads should have fauna underpasses incorporated as well as ensuring that at strategic locations tree crowns can touch across roads to facilitate movement of arboreal species. Measures need to be identified to ensure that underpasses don't act as funnels to concentrate prey for predators (Andrews 1990). Where possible corridors should not be situated along a road or railway, when they are they should be on one side to maximise effectiveness and minimise fatalities (Saunders 1990).

Wildlife corridors should be as wide as possible and where possible established in natural forest which has preferably not been subject to severe perturbation. Wildlife corridors should not be subject to logging (Recher, Rhonan-Jones and Smith 1980, Conservation, Forests and Lands 1989, Bennett 1990, Scotts 1991, A.H.C. and C.A.L.M. 1992). Where not existent corridors should be established by plantings (e.g. Shea 1992).

It needs to be recognised that corridors are basically an ecological concept, the success of which has not been effectively assessed over time. It is evident that for many species it is their habitat which needs to be encompassed if corridors are to be effective. To move through corridors they must be able to find sufficient food, avoid predators, rest safely and meet all their daily needs. While some species can traverse extensive areas of unsuitable or marginal habitat others have such specific habitat requirements that dispersal through marginal habitat may be infrequent and dispersal measured in generations rather than hours.

In designing corridors for the dispersal of species consideration needs to be given to the species being targeted and their likely habitat and dispersal requirements. With the best will in the world corridor design is still theoretical and thus corridor systems require monitoring, evaluation and revision over time.

4. ACCOUNTING FOR EWINGAR'S ENVIRONMENTAL VALUES

The species models being used to apply the PVA targets in the IAP and CRAs are based upon broad variables capable of being mapped at a regional scale and thus do not adequately account for micro-habitat variables and other factors affecting a species distribution at a finer scale.

There is poor correspondence between the Powerful Owl habitat models and records in the Ewingar PA, it appears that the model under-estimates potential habitat, thus there is a need to supplement the identification of potential high quality habitat with locally based decision rules. Conversely the Masked Owl model appears to significantly over-estimate potential habitat and thus needs to be refined to identify potential high quality habitat.

Whatever the qualifications, spatial targets for species are required to drive reserve selection processes and provide a benchmark from which to gauge reserve adequacy. Of necessity the methodology for determining spatial targets needs to be easily applied and simplistic given the extremely limited data available for most species. Most importantly, whatever methodology is used needs to apply the best information available, and adopt a precautionary approach, when determining the best spatial

CLEAR REPORT

13-MAY-97 12:40

FOR: BIG SCRUB ENV CENTRE FAX 066 222 676

NO.	DATE	START	SENDER	PAGES	TYPE
1	12-MAY	17:11	6162507543	12	RECEIVE
2	12-MAY	21:00		4	SUBSTITUTE RX

arrangement of a species' habitat to provide some certainty of that species persisting for the next thousand years.

The establishment of a reserve system must only be seen as establishing a hedge against extinction, it is equally important to maintain species and ecosystem processes throughout the forest estate. It is contrary to the concept of ecological sustainability to assume that once a population target has been achieved within a reserve system then that species can be eliminated from the rest of the forest. It is also folly to assume that once such an arbitrarily and conservatively determined reserve target has been met that the species will indeed survive if it is lost from the surrounding matrix.

Being high order predators, forming stable breeding pairs, having large home ranges and being relatively well studied make the Sooty Owl, Powerful Owl and Masked Owl key species for guiding reserve design. The more intensively studied American Northern Spotted Owl has similar ecological requirements and thus provides a good model for development of reservation and management systems.

The strategy adopted for the north American Northern Spotted Owl (Johnson et. al. 1991) was based upon ideally reserving blocks of habitat suitable to maintain 20 or more pairs of spotted owls, with smaller habitat blocks acceptable when the ideal size can not be found. To account for dispersal it was determined that generally, the 20-pair blocks should be not more than 12 miles apart and the smaller habitat blocks not more than 7 miles apart (Johnson et. al. 1991).

4.1 Ewingar PA

↘ Description of location, Gibraltar Range,

Ewingar State Forest Washpool Wilderness, ...

topography,

vegetation, forest types

fauna

The Ewingar forests provide a staging area for many species making the perilous journey across the biogeographic barrier of the Clarence River valley. The Ewingar forests provide a vital link for forest species crossing between the Border Ranges and coastal forests and the escarpment forests. Prehistorically and currently it provides the nearest links for rainforest species crossing between the extensive escarpment forests to the south and, via the Richmond Range, the Border Ranges. This role has been made more significant due to the extensive clearing in the Clarence valley enhancing Ewingar's value as a refuge and staging post for dry forest species as well.

SUGGESTED AGENDA FOR CHWG 14/5/97 10:30 am - 4:30 pm RACAC

Location: Level 22 Governor Macquarie Tower, Office of Housing Policy Board Room

Chair: Helen Grinbergs, EFT

- | | |
|------------------|---|
| 10:30 am | 1. Brief review of actions arising from last meeting - SM |
| 10:45 am | 2. Feedback from E&H Technical Committee - SB |
| 11:00 - 11:30am | 3. Update on current projects:
Eden Forest History and Heritage - SM & SB
Non-indigenous cultural heritage data audit - SM
Protecting cultural heritage values and places - HG |
| 11:30 - 12:30 pm | 4. Update on Aboriginal Management Committees /Indigenous cultural heritage projects:
Information package for communities - TM, SD
Appointment of project officers - TM, SD
Other - TM, SD |
| 12:30 - 1:30 am | 5. LUNCH |
| 1:30 - 2:00 pm | 6. Data Management Workshop - SB |
| 2:00 - 2:30 pm. | 7. Aesthetics - SB |
| 2:30 - 3:00 pm | 8. Community Heritage Workshops - SB |
| 3:00 - 3:30 pm | 9. Projects for upper northeast - all |
| 3:30 - 4:00 | 10. Other business |
| 4:00 - 4:30 pm | 11. Next meeting |
| 4:30 pm | GO HOME |

4.2 Fauna Considerations

Perhaps the most significant fauna species known to occur on the Gibraltar Range are the nationally endangered Hastings River Mouse and the nationally vulnerable Brush-tailed Rock Wallaby.

4.2.1 Masked Owl

For Masked Owl the current Conservation Protocols require

The Masked Owl populations within the Ewingar PA fall within the Masked Owl subregion 2 utilised in the Interim Assessment Process. Within this subregion Masked Owl only achieved 21% of its reservation target within reserves and IDFAs, exemplifying the extremely poor reservation of this species. The CRA Eden Expert Workshop (14-20 August 1997) identified the mean Minimum Viable Habitat Area for Masked Owl as 308,322 ha, compared to the 150,000 ha target used in the IAP, indicating the conservative nature of the IAP target.

The Masked Owl has been identified as requiring a large home-range of 500 - 1000 ha per pair in coastal forested areas, with neighbouring pairs well separated (Debus and Rose 1994). For the IAP the home range of a breeding pair was identified as 500ha. For the Eden CRA a minimum patch size of 3,000 ha was identified as required.

The CRA Eden Expert Workshop (14-20 August 1997) identified that Masked Owls prefer forest types with "big old hollow trees", have an "aversion to dense logging regrowth" and recommended the "retention of habitat in saddles connected by buffer strips, select for areas with big old trees" in logging areas. In their submission to the workshop State Forests noted "The association of the Masked Owl with unlogged forest may be due to its apparent preference for hunting in open forests with a low, sparse understorey." At the second workshop (15-18 September 1997) the experts recommended that for off-reserve management the conservation protocols be applied, with the additions that "balance of 300 ha to be found in unlogged forest saddles, connect these areas to reserve systems with buffers containing big old trees, place a 200m buffer around nests and a 50m buffer around roosts."

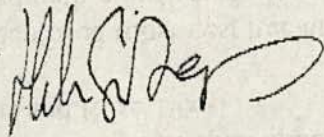
The Masked Owl's diet consists of a range of arboreal and terrestrial mammals, mainly small terrestrial species <600g (Debus and Rose 1994). The Masked Owl may have preferences for particular forest types with a dry and open understorey and which provide a mosaic of dense and sparse ground cover (Debus and Rose 1994).

The identified roost/nest tree and concentrated scatter of records in the north-east of the Ewingar PA is situated within disturbed oldgrowth Spotted Gum forest (principally focused on FT 74/2 and secondarily also within 74/1). These cluster of sightings are certainly indicative of falling within a single home range. As this is currently the most definitive evidence which exists of an actual home range of a Masked Owl within the Ewingar PA it should be the core of any reservation system for Masked Owl in the Ewingar PA. It is essential that as the bare minimum a 500 ha patch of the highest quality habitat (in this instance disturbed oldgrowth Spotted Gum on moderate topography and encompassing all known MO records in the vicinity) be reserved from logging to provide a core area of

- Two minutes from Sandy in relation to the community heritage workshops, and aesthetics project proposal. the accompanying papers will be circulated at the meeting.

Please note meeting is on level 22 Governor Macquarie Tower in the Office of Housing Policy Board Room. 10:30 - 4:30

Regards



Helen Grinbergs

critical habitat for this poorly reserved species. Preferably further reservation of suitable habitat should be clustered around this core "home range" to encompass all contiguous Masked Owl habitat in a manner which maximises the block of habitat reserved (the patch size target for Eden was 3,000ha).

It is astounding that the owl reserves agreed to by NPWS and SF excludes all the MO locality records and the roost/nest tree (and thus most, if not all, of this species' critical habitat) in this vicinity. This exemplifies the lack of scientific or ecological principles underlying the agencies' political approach to owl conservation in the Ewingar PA.

Proposed preferential selection rules for Masked Owl habitat for Systems of Retained Habitat in the Ewingar PA are:

1. **Masked Owl Roost and nest sites**
2. **FT 74/2 and 74/1 oldgrowth, disturbed oldgrowth,**
3. **Intersect of class 1⁺⁺ modelled habitat for both Masked and Powerful Owls.**
4. **FT 62 and oldgrowth, disturbed oldgrowth,**
5. **Intersect of class 1 modelled habitat for both Masked Owl and Yellow-bellied Glider.**
6. **Modelled Masked Owl habitat class 2, and oldgrowth or disturbed oldgrowth**

Areas to be selected should be the larger and least fragmented, with habitat preferential reserved in multiples of 500 ha territory sized areas

4.2.2 Powerful Owl

For the Powerful Owl the current Conservation Protocols require

The Powerful Owl populations within the Ewingar PA fall within the Powerful Owl subregion 2 utilised in the Interim Assessment Process. Within this subregion Powerful Owl only achieved 8% of its reservation target within reserves and IDFAs, exemplifying the extremely poor reservation of this species. The CRA Eden Expert Workshop (14-20 August 1997) identified the mean Minimum Viable Habitat Area for Powerful Owl as 302,452 ha of low quality habitat and 267,913 ha of high quality habitat, compared to the 240,000 ha target used in the IAP, indicating the conservative nature of the IAP target.

Norton (1990) notes that in optimum habitat in northern New South Wales, neighbouring pairs of Powerful Owls have been recorded three to six kilometers apart, with home ranges estimated at 800-1,000 + ha per pair and with the density of birds proportional to the density for their principal prey. For the IAP the home range of a breeding pair was identified as 800ha. For the Eden CRA a minimum patch size of 5,000 ha was identified as required.

The CRA Eden Expert Workshop (14-20 August 1997) identified that Powerful Owls have a preference for "wet and dry forests on undulating topography" and "unlogged in low land areas", and recommended protection of 100-200m around nest trees, protection of 300ha per record, "retention of high quality prey habitat", with the 'ha' deficit made up in stream buffers, in logging areas. In their



ENVIRONMENT AUSTRALIA
ENVIRONMENT PRIORITIES & COORDINATION GROUP

Environment Forest Task Force
NSW/QLD Section

FAX COVER SHEET

DATE: 12 MAY 1997 TIME: 3:53 PM

TO:	FAX:
Cultural Heritage Working Group	
Kathy Lyons SFNSW	066 512 326
Peter Fisher NAFI	02 9748 6131
Brian Brooker FPA	02 9361 0374
Tony McAvoy DAA	02 9262 2690
Kass Fenton SEFCC	064 923 266
Anthony Mitchell RACAC	02 9228 4967
Sean Docker NSWALC	02 9687 1238
Susan McIntyre NPWS	02 9585 6466
Mark Greenhill CFMEU	02 9555 1563
Catherine Snelgrove HO	02 9391 2336
Jim Morrison NEFA	066 222 676

FROM: Helen Grinbergs

PHONE: 06 274 1822

FAX: 06 274 1977

Pages (including cover sheet): 15

MESSAGE: CHWG Meeting 14/5/97

Dear all,

Attached is the agenda for Wednesday's meeting. Apologies for delay in circulating this to you. I will be in Sydney tomorrow so if you have any additions / changes to the agenda please let Sue McIntyre know and we will make the changes tomorrow.

Attached for discussion at the meeting are:

- Terms of reference / briefs for project officers / consultants for Stage 1 and Stage 2/3. Stage 2/3 has been combined into one consultancy to reduce the number of reports that were being generated and to ensure project would be completed within the timeframe originally set for the project. I have also tried to incorporate in this brief the additional comments / requirements people had in relation to the project.

submission to the workshop State Forests considered that *"optimal habitat includes a mosaic of wet and dry forests on flat to undulating terrain with a low incidence of intensive logging in the landscape"*, with their home ranges *"centred upon significant areas of unlogged or less disturbed forest"*. At the second workshop (15-18 September 1997) the experts recommended that for off-reserve management the conservation protocols be applied, with the requirement that *"the 300 ha of high quality habitat should be found by increasing the riparian buffers on 1st order streams, headwaters, surrounding rainforest and other minor drainage features"*, and *"increase buffers around nests to 200m and roosts to 50m"*.

The Powerful Owl feeds primarily on small to medium sized mammals, especially the Greater Glider, the Common Ringtail Possum and to a lesser extent immature Brushtail Possums (Debus and Chafer 1994b, Tilley 1982, Lavazanian, Wallis and Webster 1994). In the Ewingar PA Ringtail Possums are most common in rainforests, including where there is a brushbox (FT53) or eucalypt overstorey over a developing rainforest understorey (FT47) (Osborne 1982, Watts 1989, Smith et. al. 1994), with densities of 1.16 per hectare in Moist Hardwood and 3.44 per hectare in Rainforest being estimated on the Gibraltar Range (Watts 1989).

Mountain Brushtail Possums are most common in rainforests, including where there is a brushbox (FT53) or eucalypt overstorey over a developing rainforest understorey (FT47, 53) (Watts 1989, Osborne 1982, Smith et. al. 1994), with the highest densities of 0.66 per hectare being estimated for rainforest on the Gibraltar Range (Watts 1989). Common Brushtail Possums are expected to be relatively rare in the Ewingar PA (Watts 1989, Smith et.al. 1994).

Greater gliders have been found to be most common in New England hardwoods (FT 163) and secondarily Moist Hardwoods (FT 47, 53), with exceptional Greater Glider densities of 3.77 per hectare being estimated for oldgrowth Moist Hardwood and 6.54 per hectare for oldgrowth New England Blackbutt on the Gibraltar Range (Watts 1989). Greater gliders are most abundant in infrequently burnt tall oldgrowth forests at higher elevations (Smith et. al. 1994).

Given the relative density of its preferred food resources and its known habitat requirements it is reasonable to hypothesise that Powerful Owls are largely restricted from foraging within rainforests by its structure, and therefore appear to be limited to successfully hunting for Ringtail Possums and Mountain Brushtail Possums in those wet forests with a relatively open understorey and a rainforest understorey at earlier development stages (though not so young as to be unable to adequately support them). It is also reasonable to assume that resources are most abundant when there is a well developed hollow-bearing eucalypt and Brush Box overstorey also supporting good populations of Greater Gliders.

In the drier forests the Powerful Owl would be primarily reliant for successful foraging upon Greater Gliders and thus more dependent upon tall oldgrowth forest, most significantly the better developed New England Blackbutt forests with their numerous hollows.

The highest quality foraging habitat for the Powerful Owl in the Ewingar PA could thus be broadly be categorised as mature and oldgrowth New England Blackbutt (FT 163, oldgrowth, disturbed oldgrowth, mature, disturbed mature), Moist Hardwoods (FT 47, 53, oldgrowth, disturbed oldgrowth, mature, disturbed mature) and oldgrowth or disturbed oldgrowth of higher quality drier forests (FT 60, 62).

Senator Meg Lees

Australian Democrats

Deputy Leader and Environment Spokesperson

May 12, 1997

MEDIA RELEASE

97/311

ENVIRONMENT SHOULD REMAIN FOCUS OF NATURAL HERITAGE TRUST: DEMOCRATS

THE Australian Democrats will be using debate on the Natural Heritage Trust Fund to seek Federal Government assurances that there is no truth in today's media reports that spending under the fund will be dictated by Cabinet's employment committee.

"We are concerned by the reports and simply want to make sure that we are not about to pass a \$1.25 billion cheque for this Government to buy jobs - and votes - in rural Australia," Democrats Environment Spokesperson Senator Meg Lees said.

"The Democrats are concerned that we may pass a piece of legislation today that could backfire on the environment tomorrow."

Senator Lees is meeting with the Environment Minister this afternoon and will seek a guarantee from him that the Natural Heritage Trust Fund legislation will stay focussed on the environment.

Today's media reports follow an article in Saturday's *Sydney Morning Herald* which said the Government had ordered the Environment Department to conduct its policies in harmony with the nation's economic goals.

"There is nothing 'visionary' about putting short-term profit ahead of long-term protection of our natural heritage," Senator Lees said.

The Natural Heritage Trust Fund legislation is to be debated tonight.

To arrange comment contact Kelly Westell on (06) 277 3765.

**AUSTRALIAN
DEMOCRATS**

Where these overlap with predicted habitat should represent the highest priority for reservation as such areas are most likely to represent critical habitat for the Powerful Owl.

Proposed preferential selection rules for Powerful Owl habitat for Systems of Retained Habitat in the Ewingar PA are:

1. Roost and nest sites
2. FT 47, 53, 163, and oldgrowth, disturbed oldgrowth, mature, or disturbed mature
3. Powerful Owl modelled habitat classes 1 and 2.
4. FT 60, 62, oldgrowth or disturbed oldgrowth
5. Powerful Owl modelled habitat class 3, and oldgrowth, disturbed oldgrowth, mature, or disturbed mature.

Areas to be selected should be the larger and least fragmented, with habitat preferential reserved in multiples of 800 ha territory sized areas

4.2.3 Sooty Owl

4.2.4 Hastings River Mouse:

There are significant areas of predicted and suitable Hastings River Mouse (HRM) habitat within the Ewingar PA (most notably on the western fall into Timbarra River). The most significant remaining population known in NSW is located in the Malara Creek valley adjacent to the Ewingar PA. It is beholden upon State Forests to identify medium to high predicted habitat for HRM within the Ewingar PA, undertake surveys and adequately protect any individuals and populations which are found.

The Draft HRM Recovery Plan notes that Hastings River mouse populations are confined to open forests and woodlands with a grass, sedge, rush or heath understorey in close proximity to rock piles or alternative shelter sites such as hollow logs, yabby burrows or cavities in the base of large old trees (Smith and Quin 1997). The largest populations of Hastings River Mouse are centred around areas of permanent shelter such as rock outcrops and scree slopes, adjacent to feeding areas with a dense cover of grass, sedge, rush or heath which has not been burnt for approximately 5-10 years. These areas tend to be located in minor drainage lines, swamps, seepages and grassy flats with good soil moisture (at least seasonally) and some refuge from fire.

The Draft HRM Recovery Plan requires that prior to timber harvesting, vegetation clearing, fuel reduction burns, predator control and any other activity that is likely to adversely impact upon Hastings River Mouse, being carried out in areas that fall within the predicted range of the Hastings River Mouse an assessment (Appendix 1) should be undertaken to determine the occurrence of predicted HRM habitat. If medium to high predicted habitat occurs on site then trapping for Hastings River Mouse is required to be conducted in accordance with the trapping protocols (Appendix 1).

WHAT TO DO IF INTERESTED

1. **Contact** Greening Australia – write or phone our office or your regional organiser.
2. **Register** your school and project on the Registration Forms we will send you. These forms are designed so that in filling them out you think through your project carefully – our organisers can help you plan your project and complete the Registration Form if needed.
3. **Request** whatever assistance you need to bring your project about – this is done on the Registration Form.

The *One Billion Trees* Program is a ten year government commitment. The *Schools Greening Program* will last for the next five years, so there's plenty of time to work out what you want to do.

There is no fixed closing date – Greening Australia will attempt to help you as and when required.

Longer term projects can allow for local seed collection to allow planting back of local native species, involve children in more aspects of the revegetation process and be more successful.

A longer lead time will allow you to plan your project more thoroughly, give adequate thought to maintenance of the planting, allow time for good ground preparation, and increase the chances that your trees and shrubs will survive.

WHERE TO BEGIN

If you wish to green your playground, contact the Forestry Commission and the Soil Conservation service to have a soil test and arrange up to 30 trees for your playground. Contact the Teachers Federation about funds for playground trees.

If you want to construct a shadehouse and help grow trees for inland areas contact your local Rotary Club.

If you want to construct a shadehouse to provide trees for local projects your local Lions Club may be able to assist.

Identify a local area which needs revegetation, and involve a class in developing a revegetation plan for it. This can entail investigating species which would have grown here originally, finding out about soil types, remnant vegetation, weed invasion etc.

Register this site with Greening Australia as a potential site for revegetation even if you can't do the project yourself.

Contact Greening Australia for information about activities in your region, for advice and financial assistance with a revegetation project extending beyond the school grounds which you wish to undertake.

Contact Greening Australia to let us know about training or other support you need to participate in the Schools Greening Program, and we will do our best to find the help you need even if we can't provide it directly ourselves.

CONTACTS

Trish Menzies Greening Australia (NSW) Inc G.P.O Box 9868 Sydney, 2001 Phone 550 0593
Gus Sharpe

REGIONAL CONTACTS Contact the Regional Organizer closest to you.

Sydney Michael Adams or Ken Godfrey Phone 5500 720 or 622 6071

North Coast Mark Jackson PO Box 184, Lismore, 2480 Phone 066 220076

North West David Curtis PO Box 1467 Armidale, 2350 Phone 067 72 3248

Central West Tim Wilkinson 125 Lord Place, Orange, 2800 Phone 063 62 6879

South West Plains Martin Driver PO Box 1010, Deniliquin, 2710 Phone 058 82 3338

South West Slopes Dick Green PO Box 350, Wagga Wagga, 2650 Phone 069 21 8202

Southern Tableland and South Coast Greening Australia ACT Meg Bishop PO Box E216 Queen Victoria Terrace, Parkes ACT Phone 062 823214

To date there has been no satisfactory attempt to identify medium and high predicted habitat for HRM within the Ewingar PA. This must be done prior to any logging occurring within the predicted range of HRM and suitable habitat incorporated into the systems of retained habitat. It is recognised that suitable habitat for HRM may also be suitable for Masked and/or Powerful Owls and thus the proposed habitat configuration identified herein could be modified to incorporate HRM habitat. It would be wise to locate reserved owl habitat as far as possible to also encompass HRM habitat to minimise the size of the total reserve system.

Proposed preferential selection rules for Systems of Retained Habitat to better account for Hastings River Mouse habitat in the Ewingar PA are:

1. All significant localities of Hastings River Mouse,
2. Preferentially select likely Hastings River Mouse habitat when selecting areas for owl reserves

4.2.5 Threatened Macropods

Brush-tailed Rock Wallaby
Rufous Bettong
Parma Wallaby

4.2.6 Arboreal Mammals

Yellow-bellied Glider
Squirrel Glider
Greater Glider

4.3 Floral considerations

Rainforest

Reserve achievement of forest types 37, 47, 53, 60, 62, 65/1, 65/2, 74/1, 74/2, 92/1
Threatened and regionally significant plants

Reservation of the habitat of endangered and vulnerable plants is required to:

- provide protection from human activities, including machinery, tree felling and post-logging burning,
- retain the integrity of the habitat and protect species from microclimate and biological change,
- retain natural levels of heterogeneity and stratification of surrounding vegetation,
- maintain the physical structure of the soil and its water-regulating capacity,
- retain the capacity of the ecosystem to retain and recycle soil nutrients as far as possible.
- provide protection from storm damage,
- reduce edge effect,
- retain potential habitat and thus allow for species recovery/population expansion, and

Types of Projects

The *Schools Greening Program* offers an opportunity for schools to integrate environmental educational activities with projects addressing the greening of their surrounding community or of a local degraded area. In general, projects should go beyond the greening of the school grounds.

Types of projects which can receive assistance can be :
Projects done by the school community itself, eg.

- * larger scale revegetation projects
1000 trees or more can be planted by a group of about 20 people in a good days effort!
- * a demonstration project which will provide an educational benefit
An arboretum of local or endangered species, or a well designed windbreak of mixed species can have an educational benefit for the whole community
- * projects in which school children learn to propagate, pot on and care for seedlings in preparation for a local planting,
- * the establishment of a community nursery or holding area to grow trees for local projects
- * the identification of local sites for revegetation

Projects carried out by community tree groups or landcare groups which will involve schools. Greening Australia's staff will encourage community groups to involve local schools in their projects.

Projects done by teachers or parents which involve a "hands on" learning experience in some aspect of revegetation such as assessing a site, preparing a local vegetation list, collecting local seed, propagating, potting on and caring for seedlings, preparing a site for planting or natural regeneration, caring for a planted or regenerated area, trying out a direct seeding experiment, bush regeneration....

In 1990, the first year of a five-year program, we are looking to schools and their related community organisations to come up with useful and interesting projects.

All Schools Greening projects around Australia are be required to meet the following guidelines :

Students are to receive "hands on" learning experience in some aspect of revegetation

Plants are to be grown for a specific project

Plants must not be produced for commercial sale, although sales to participants are allowed

Where possible plants grown or planted should be of local provenance (ie from a local seed source)

Maintenance must be incorporated into any revegetation project

Funds must be acquitted and appropriate accounting standards met

Priorities and Preferences

The Schools Greening Program can fund any project within the national project requirements, but our preference is for projects which involve one or more schools working with local community groups on a project which results in trees in the ground.

Community involvement provides a means of maintaining trees when schools are closed, and encourages establishment of trees which are beneficial to the local community.

In general, priority for funds will be for projects which have a low average cost per tree established.

Priority for Greening Australia's regional organiser's time in assisting projects would be for those which establish or protect at least 1000 trees (equivalent to approximately one hectare of bushland). Planting this number of trees as seedlings might take about one day for a team of volunteers.

Projects may be direct tree plantings (say in parks, roadsides, public lands, nature reserves, privately owned farmland etc), conservation measures to protect important local trees or forests, direct seeding projects, or bushland regeneration.

Preference is towards projects which re establish locally indigenous species.

Over 1990, Greening Australia (NSW) would like to assist a variety of interesting projects to occur, in order to see how schools and community groups can most effectively work together for the greening of NSW.

Factors we would favour include

- * multiple benefits from the project - (such as providing a nature reserve which preserves indigenous species, provides natural habitat and an educational environment);
- * projects which demonstrate imaginative student and community participation techniques, and which can be copied elsewhere
- * projects that are simple to do well, because they are well designed.

- retain habitat that will facilitate the movements of animal species that may be essential to some plants (ie pollinators, seed dispersers).

EIS, Binns, forest type 207??,

4.4 Cultural Heritage

EIS, Historical sites

5. PROPOSED SYSTEM OF RETAINED HABITAT FOR THE EWINGAR PLANNING AREA

Outcomes and description of plan, maps attached

6. REFERENCES

- Anon (1994) Final Supplemental Environmental Impact Statement on Management of Habitat for Late-successional and Old-growth Forest Related Species Within the Range of the Northern Spotted Owl. Vol. I and II. U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior, Bureau of Land Management.
- Benwell, A.S. (1992) Species Recovery Plan, *Allocasuarina defungens*. Draft by NPWS.
- Caughley, G. (1994) Directions in conservation biology. *J. of Animal Ecology* 63: 215-244.
- Conner, R.N. (1988) Wildlife populations: minimally viable or ecologically functional? *Wildl. Soc. Bull.* 16:80-84.
- Cromer, R. and Eldridge, K. (1991), The potential for improving the productivity of hardwood species in Australia. Appendix B3 of Integrating Forestry and Farming: Commercial Wood Production on Cleared Agricultural Land. Report of the National Plantations Advisory Committee. Dept. of Primary Industries and Energy.
- Franklin, I.R. (1980) Evolutionary change in small populations. Pp. 135-149 in M.E. Soule and B.A. Wilcox, eds. *Conservation biology, an evolutionary-ecological perspective*. Sinauer Assoc., Sunderland, Mass.
- Gilpin, M.E., and Soule, M.E., (1986) Minimum viable populations: processes of species extinction. In Soule, M. E., (ed.) *Conservation biology, the science of scarcity and diversity*. Sinauer Associates, Massachusetts.
- Goldingay, R.L. and Possingham, H (1995) Area requirements for viable populations of the Australian gliding marsupial *Petaurus australis*. *Biol. Con.* 73: 161-167.
- Hopper, S.D. and Coates, D.J. (1990), Conservation of genetic resources in Australia's flora and fauna, *Proc. Ecol. Soc. Aust.*, 16: 567-77.
- Kesseli, R. V. (1992) Population biology and conservation of rare plants. In Jain S.K., and Botsford, L. W. (eds), *Applied Population Biology*, pp 69-90. Kluwer Academic Publishers, Netherlands.

WHAT TO DO IF INTERESTED

1. **Contact** Greening Australia - write or phone our office or your regional organiser.
2. **Register** your school and project on the Registration Forms we will send you. These forms are designed so that in filling them out you think through your project carefully - our organisers can help you plan your project and complete the Registration Form if needed.
3. **Request** whatever assistance you need to bring your project about - this is done on the Registration Form.

The *One Billion Trees* Program is a ten year government commitment. The *Schools Greening Program* will last for the next five years, so there's plenty of time to work out what you want to do.

There is no fixed closing date - Greening Australia will attempt to help you as and when required.

Longer term projects can allow for local seed collection to allow planting back of local native species, involve children in more aspects of the revegetation process and be more successful.

A longer lead time will allow you to plan your project more thoroughly, give adequate thought to maintenance of the planting, allow time for good ground preparation, and increase the chances that your trees and shrubs will survive.

WHERE TO BEGIN

If you wish to green your playground, contact the Forestry Commission and the Soil Conservation service to have a soil test and arrange up to 30 trees for your playground. Contact the Teachers Federation about funds for playground trees.

If you want to construct a shadehouse and help grow trees for inland areas contact your local Rotary Club.

If you want to construct a shadehouse to provide trees for local projects your local Lions Club may be able to assist.

Identify a local area which needs revegetation, and involve a class in developing a revegetation plan for it. This can entail investigating species which would have grown here originally, finding out about soil types, remnant vegetation, weed invasion etc.

Register this site with Greening Australia as a potential site for revegetation even if you can't do the project yourself.

Contact Greening Australia for information about activities in your region, for advice and financial assistance with a revegetation project extending beyond the school grounds which you wish to undertake.

Contact Greening Australia to let us know about training or other support you need to participate in the Schools Greening Program, and we will do our best to find the help you need even if we can't provide it directly ourselves.

CONTACTS

Trish Menzies Greening Australia (NSW) Inc G.P.O Box 9868 Sydney, 2001 Phone 550 0593
Gus Sharpe

REGIONAL CONTACTS Contact the Regional Organizer closest to you.

Sydney Michael Adams or Ken Godfrey Phone 5500 720 or 622 6071

North Coast Mark Jackson PO Box 184, Lismore, 2480 Phone 066 220076

North West David Curtis PO Box 1467 Armidale, 2350 Phone 067 72 3248

Central West Tim Wilkinson 125 Lord Place, Orange, 2800 Phone 063 62 6879

South West Plains Martin Driver PO Box 1010, Deniliquin, 2710 Phone 058 82 3338

South West Slopes Dick Green PO Box 350, Wagga Wagga, 2650 Phone 069 21 8202

Southern Tableland and South Coast Greening Australia ACT Meg Bishop PO Box E216 Queen Victoria Terrace, Parkes ACT Phone 062 823214

- Knowles, R. (1994) The systematics of the endangered montane rainforest frogs of the genus *Philoria* (Anura: Myobatrachidae), and implications for conservation management. Unpublished thesis, Department of Biological Sciences, University of Newcastle.
- Ledig, F. T. (1986) Heterozygosity, heterosis, and fitness in outbreeding plants. In Soule, M. E., (ed.) *Conservation biology, the science of scarcity and diversity*. Sinauer Associates, Massachusetts.
- Mahoney, M. and Knowles, R. (1994) A taxonomic review of selected frogs of north-east NSW forests. North East Forests Biodiversity Study Report No. 3g, NPWS internal report.
- Prober, S.M. and Brown, A.H.D. (1994) Conservation of the grassy White Box woodlands: population genetics and fragmentation of *Eucalyptus albens*. *Con. Biol.*, Vol.8, No.4, pp 1003-1013.
- Resource and Conservation Assessment Council (1996a) *Regional Report of Upper North East New South Wales, Volume 4, Biodiversity attributes*. New South Wales Government, Sydney.
- Resource and Conservation Assessment Council (1996b) *Draft Interim Forestry Assessment Report*. RACAC, Sydney.
- Ruggiero, L.F., Harward, G.D. and Squires, J.R. (1994) Viability analysis in biological evaluations: concepts of population viability analysis, biological population and ecological scale. *Cons. Biol.* 8, 2:364-372.
- Robin, J.M. (1991), Potential ecogenetic effects of silvicultural domestication upon indigenous populations in the eucalyptus (l'her.). Appendix 1 of Appendix B4 of *Integrating Forestry and Farming: Commercial Wood Production on Cleared Agricultural Land*. Report of the National Plantations Advisory Committee. Dept. of Primary Industries and Energy.
- Schemske, D.W., Husband, B. C., Ruckelshaus, M. H., Goodwillie, C., Parker, I. M., and Bishop, J. G., (1994) Evaluating approaches to the conservation of rare and endangered plants. *Ecology* 75(3): 584-606
- Thomas, J. W., Forsman, E. D., Lint, J. B., Meslow, E. C., Noon, B. R. and Verner, J., (1990) *A Conservation Strategy for the Northern Spotted Owl*. U.S. Government Printing Office, Portland.

WHAT TO DO IF INTERESTED

1. **Contact** Greening Australia - write or phone our office or your regional organiser.
2. **Register** your school and project on the Registration Forms we will send you. These forms are designed so that in filling them out you think through your project carefully - our organisers can help you plan your project and complete the Registration Form if needed.
3. **Request** whatever assistance you need to bring your project about - this is done on the Registration Form.

The *One Billion Trees* Program is a ten year government commitment. The *Schools Greening Program* will last for the next five years, so there's plenty of time to work out what you want to do.

There is no fixed closing date - Greening Australia will attempt to help you as and when required.

Longer term projects can allow for local seed collection to allow planting back of local native species, involve children in more aspects of the revegetation process and be more successful.

A longer lead time will allow you to plan your project more thoroughly, give adequate thought to maintenance of the planting, allow time for good ground preparation, and increase the chances that your trees and shrubs will survive.

WHERE TO BEGIN

If you wish to green your playground, contact the Forestry Commission and the Soil Conservation service to have a soil test and arrange up to 30 trees for your playground. Contact the Teachers Federation about funds for playground trees.

If you want to construct a shadehouse and help grow trees for inland areas contact your local Rotary Club.

If you want to construct a shadehouse to provide trees for local projects your local Lions Club may be able to assist.

Identify a local area which needs revegetation, and involve a class in developing a revegetation plan for it. This can entail investigating species which would have grown here originally, finding out about soil types, remnant vegetation, weed invasion etc.

Register this site with Greening Australia as a potential site for revegetation even if you can't do the project yourself.

Contact Greening Australia for information about activities in your region, for advice and financial assistance with a revegetation project extending beyond the school grounds which you wish to undertake.

Contact Greening Australia to let us know about training or other support you need to participate in the Schools Greening Program, and we will do our best to find the help you need even if we can't provide it directly ourselves.

CONTACTS

Trish Menzies Greening Australia (NSW) Inc G.P.O Box 9868 Sydney, 2001 Phone 550 0593
Gus Sharpe

REGIONAL CONTACTS Contact the Regional Organizer closest to you.

Sydney Michael Adams or Ken Godfrey Phone 5500 720 or 622 6071

North Coast Mark Jackson PO Box 184, Lismore, 2480 Phone 066 220076

North West David Curtis PO Box 1467 Armidale, 2350 Phone 067 72 3248

Central West Tim Wilkinson 125 Lord Place, Orange, 2800 Phone 063 62 6879

South West Plains Martin Driver PO Box 1010, Deniliquin, 2710 Phone 058 82 3338

South West Slopes Dick Green PO Box 350, Wagga Wagga, 2650 Phone 069 21 8202

Southern Tableland and South Coast Greening Australia ACT Meg Bishop PO Box E216 Queen Victoria
Terrace, Parkes ACT Phone 062 823214

APPENDIX 1 DRAFT HRM MICROHABITAT AND SURVEY PROTOCOLS FROM DRAFT HRM RECOVERY PLAN

Microhabitat Survey Protocols

When attempting to identify potential HRM habitat the following protocol should be used:

Step 1. Determine whether or not the survey area falls within the predicted range of HRM by comparison with maps of the species predicted distribution held by NSW NPWS or Queensland Department of Environment and Heritage. If the area falls within or near (within 1 km) of the boundary of the species predicted range go to step 2.

Step 2. Classify and map vegetation cover in the survey region (from aerial photographs or existing mapped information such as forest type maps) into broad cover categories (eg rainforest, wet sclerophyll, dry sclerophyll, woodland, grassland, etc).

Step 3. Inspect vegetation communities at the site and delineate the following areas for microhabitat survey:

- wet or dry sclerophyll forests with a grass, sedge or heath understorey,
- woodland with a grassy, sedge or heath understorey,
- wet or dry sclerophyll forest or woodland with dispersed patches of sedge, grass or heath.

Step 4. Re-examine topographic maps and aerial photographs and identify and map any areas with outcropping rock cover including escarpments, scree slopes, and boulder fields in or within 1 km of the survey area.

Step 5. Mark out a 100m transect in representative areas within each area of habitat identified in steps 3 & 4 in the survey area. Transects should be oriented parallel to drainage lines or otherwise in a direction which samples areas of potentially optimum habitat, that is habitat with a high total vegetation cover, and sedge/rush/grass cover. Where rock outcrops are present locate at least one or more transects within close proximity (0- 100 yards) to rock shelter.

Step 6. Determine the number of transects to be undertaken based on habitat heterogeneity and survey area. As a guide, survey a minimum of one transect for every 10 hectare of potential habitat determined in step 3. Where potential habitat is patchily distributed sample a minimum of four patches.

Step 7. Conduct a microhabitat survey along each transect using the following procedures:

a) Grass, sedge and rush cover: sum the cover of grass, sedge and rush species at one metre intervals along the 100 metre transect (giving 100 samples) using a step point count which records presence or absence at each sample point. This is summed to give a percentage cover.

b) Shelter Index SI: count the following within a 20 m strip on either side of a 100 m transect line (100 metre x 40 metre) and sum and divide by 4 to give an index of shelter:

- the number of natural burrows (individual holes > 4 cm diameter and 30 cm depth) to a maximum of 40;
- the number of large trees with basal cavities (holes > 4 cm diameter and 30 cm depth),
- the number of rock cavities (> 4 cm entrance diameter and >30 cm depth) to a maximum of 40,
- the number of logs (>30 cm diameter),

Record the presence or absence of a rock scree, escarpment or outcrop of more than 100 m length within 500m of the transect.

c) Vegetation Cover: sum the number of contacts with a 1 cm diameter range pole between 10 cm and 75 cm above ground at 100 points along the transect;

d) Heath Cover: sum the cover of heath plants in the genera *Leucopogon*, *Epacris*, *Oxylobium*, *Pultanea*, *Daviesia*, *Dillwynia*, *Hakea*, *Leptospermum*, *Baeckia*, and *Callistemon*, in a 100m step point count in representative habitat.

Step 8. Compare the resulting values with the ranges indicated in the Table 1 to give a score of 0, 1, or 2 for each variable. Sum the total scores and classify microhabitat at the site as unsuitable (0 or 1), moderate (2-4) or high quality (5 or 6) using models 1 (additive model) in Table 1. Apply the steps indicated in Model 2 (substitutional model) to classify the site as unsuitable, moderate or high quality microhabitat.

WHAT TO DO IF INTERESTED

1. **Contact** Greening Australia - write or phone our office or your regional organiser.
2. **Register** your school and project on the Registration Forms we will send you. These forms are designed so that in filling them out you think through your project carefully - our organisers can help you plan your project and complete the Registration Form if needed.
3. **Request** whatever assistance you need to bring your project about - this is done on the Registration Form.

The *One Billion Trees* Program is a ten year government commitment. The *Schools Greening Program* will last for the next five years, so there's plenty of time to work out what you want to do.

There is no fixed closing date - Greening Australia will attempt to help you as and when required.

Longer term projects can allow for local seed collection to allow planting back of local native species, involve children in more aspects of the revegetation process and be more successful.

A longer lead time will allow you to plan your project more thoroughly, give adequate thought to maintenance of the planting, allow time for good ground preparation, and increase the chances that your trees and shrubs will survive.

WHERE TO BEGIN

If you wish to green your playground, contact the Forestry Commission and the Soil Conservation service to have a soil test and arrange up to 30 trees for your playground. Contact the Teachers Federation about funds for playground trees.

If you want to construct a shadehouse and help grow trees for inland areas contact your local Rotary Club.

If you want to construct a shadehouse to provide trees for local projects your local Lions Club may be able to assist.

Identify a local area which needs revegetation, and involve a class in developing a revegetation plan for it. This can entail investigating species which would have grown here originally, finding out about soil types, remnant vegetation, weed invasion etc.

Register this site with Greening Australia as a potential site for revegetation even if you can't do the project yourself.

Contact Greening Australia for information about activities in your region, for advice and financial assistance with a revegetation project extending beyond the school grounds which you wish to undertake.

Contact Greening Australia to let us know about training or other support you need to participate in the Schools Greening Program, and we will do our best to find the help you need even if we can't provide it directly ourselves.

CONTACTS

Trish Menzies Greening Australia (NSW) Inc G.P.O Box 9868 Sydney, 2001 Phone 550 0593
Gus Sharpe

REGIONAL CONTACTS Contact the Regional Organizer closest to you.

Sydney Michael Adams or Ken Godfrey Phone 5500 720 or 622 6071

North Coast Mark Jackson PO Box 184, Lismore, 2480 Phone 066 220076

North West David Curtis PO Box 1467 Armidale, 2350 Phone 067 72 3248

Central West Tim Wilkinson 125 Lord Place, Orange, 2800 Phone 063 62 6879

South West Plains Martin Driver PO Box 1010, Deniliquin, 2710 Phone 058 82 3338

South West Slopes Dick Green PO Box 350, Wagga Wagga, 2650 Phone 069 21 8202

Southern Tableland and South Coast Greening Australia ACT Meg Bishop PO Box E216 Queen Victoria Terrace, Parkes ACT Phone 062 823214

Where a site has been recently burnt (within the past two years) scores for grass/sedge/rush cover and vegetation cover should be enhanced by one category (eg low to mod) if there is evidence from unburnt vegetation in the region that cover will increase to this level within 5 years of fire. Alternatively habitat assessment should be deferred until at least 2 years after fire.

Note: once experienced has been gained in the application of this procedure it is anticipated that it will be possible to identify and map areas of potential medium to high quality HRM Habitat by visual inspection. The use of this rapid assessment approach should be subject to training.

Draft microhabitat model

Draft microhabitat model (after Smith and Quin 1997). Model 1 additive model. Model 2 substitutional model.

HASTINGS RIVER MOUSE MICROHABITAT PREDICTION

	LOW	MOD.	HIGH
SCORE	0	1	2

Grass/sedge/rush
cover (GSRC):

SCORE:	<10	>9<30	>30
--------	-----	-------	-----

Shelter Index (SI):

SCORE:	<17	>16	rock scarp present
--------	-----	-----	-----------------------

Vegetation Cover
10 to 75 cm (VC):

SCORE:	<251	>250
--------	------	------

Heath Cover (HC)

SCORE:	<1	1 or >1
--------	----	---------

Model 1	TOTAL SCORE:	0,1	2,3,4	5,6
	HABITAT SUITABILITY:	unsuitable	moderate	high

Model 2

UNSUITABLE HABITAT: 1. GSRC score = zero, or
2. GSRC score = 1 or 2 and SI score = 0, and
VC score <251 and HC score = 0

HIGH QUALITY HABITAT 1. GSRC score = 2, and SI score = 1 or 2, and VC >250

MODERATE HABITAT all other possible combinations in which
GSRC score = 1 or more, and
SI or VC or HC score = 1 or more

GREENING AUSTRALIA NSW INC

SCHOOLS GREENING PROGRAM

revised version 10 May 1990

Environmental Education is mandatory in all State Schools in NSW, since the adoption of the Environmental Education Curriculum Statement in 1989. This provides for a broad range of environmental activities in schools. The Gould League provides resource materials for children through its clubs in schools, reaching 45% of schools. Rotary has begun a school shadehouse project and Lions are set to adopt school shadehouses as a national project soon. The Cancer Council of NSW has a scheme to provide one tree per school for shade.

The NSW Education Department "Greening of Schools" program provided \$50,000 for environmental activities in schools in 1989. This provided for the setting up of environmental areas as well as assistance with playground greening. In 1990 the Forestry Commission is providing 20,000 trees to schools this year and the Soil Conservation Service is providing soil information support for this State Government effort.

The Tree Forum is supporting the revitalization of Arbor Day. 1990 is the centenary of Arbor Day in NSW and is being celebrated by the Education Department. Up to one third of public schools are expected to celebrate during Arbor Week, many with tree planting ceremonies involving the school community.

In this context it is proposed that Greening Australia's role is to extend the efforts of schools into broader greening projects in the community and to assist local community greening groups to develop projects with schools. Where possible school shadehouse projects may be extended to function as or with community nurseries.

1. GOALS

To encourage school students in growing, planting and learning about trees (through hands-on experience), and influencing other children and adults by example;

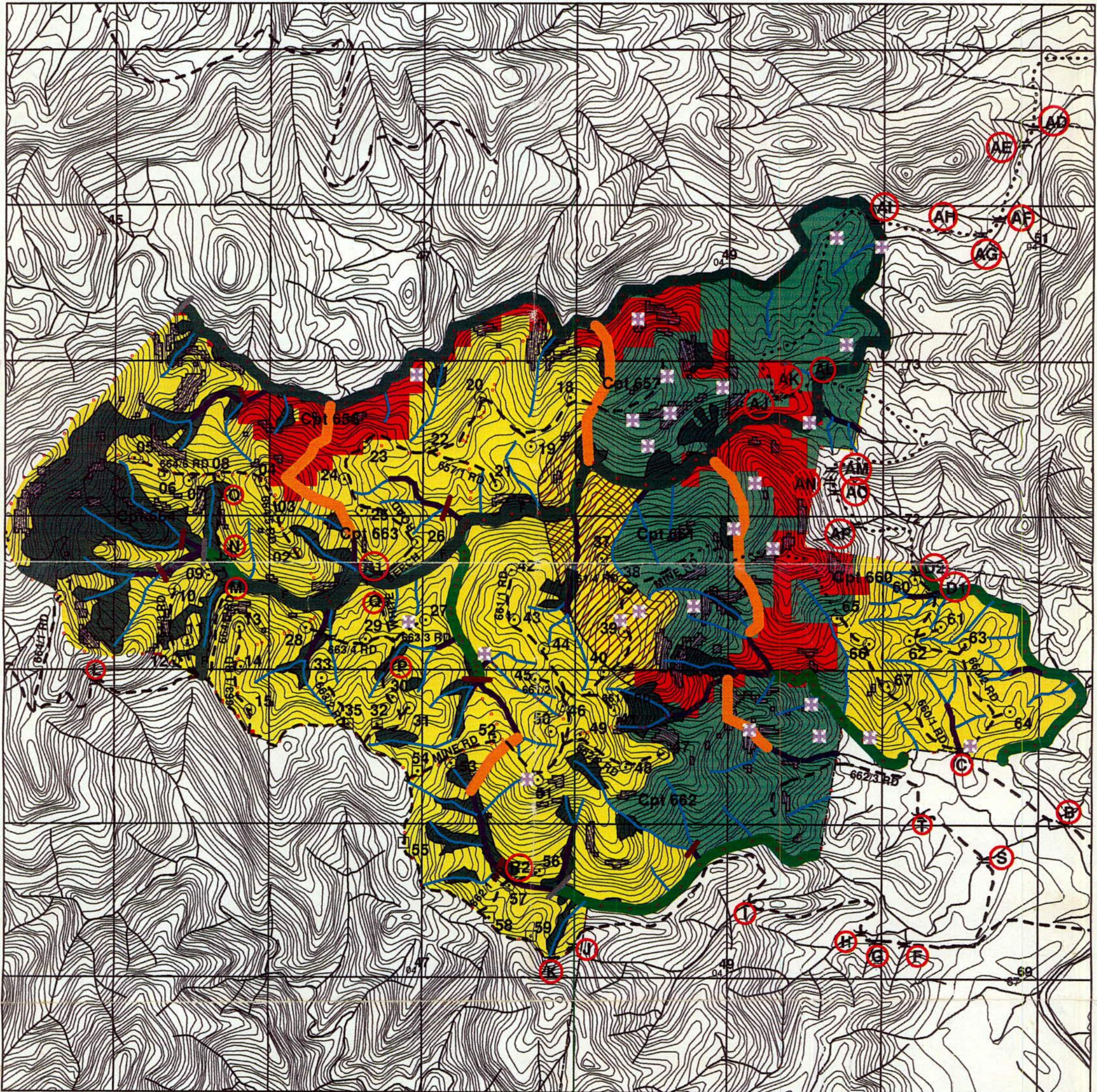
To have at least 60% of NSW schools participating in the SGP by the end of 1994

To encourage community organisations and individuals learning about trees, participating in projects to grow and plant trees and knowing they have a role in helping others to keep tree projects going.

2. AIMS

- 2.1 To give schools which are already "green" an opportunity to extend their efforts into projects addressing the greening of their surrounding community or of a local degraded area. Such projects should go beyond, but may include, the greening of the school grounds.

NORTHERN REGION - CASINO DISTRICT
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 657, 656, 660-664
EWINGAR STATE FOREST
MALARA CREEK MAP SHEET
HARVEST PLAN NUMBER Q 656, 657, 660-4
SCALE 1:25000



830 0 830 1660 2490 3320 4150 Meters

BOUNDARIES

- State Forest Boundary
- • • • • Compartment Boundaries

ROADS (Proposed in Red)

- Natural Surface
- Sealed or Gravelled
- • • • • Four wheel drive

NORMAL PRESCRIPTIONS

- Yellow Harvestable Area

NON HARVEST AREAS

- Red Old Growth
- Green Flora and Fauna Protect
- Diagonal lines Historical Values
- Stippled Slopes likely over 30 degrees
- Dark green Rainforest

DUMP SITES OR LANDINGS

- Temporary Dry
- Temporary Wet

WATERCOURSES & DRAINAGE

- External Drainage
- Blue line 1st Order 10 m
- Thick blue line 2nd Order Stream 20 m

WATERCOURSES & DRAINAGE

- Green line 3rd Order Stream 40 m
- Thick green line Catchment Greater Than 100 ha
- Orange line Catchment Greater Than 40 ha
- Thick orange line Connection Corridors
- Thick black line Wildlife Corridor
- Symbol Approved Crossings

- Star Mine Site
- A Drainage Crossing Reference

MN
1

Your reference
Our reference

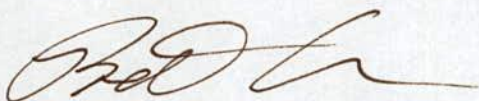
March 9, 1998

North East Forest Alliance
C/- Big Scrub Environment Centre
123 Keen Street
Lismore 2480 NSW

Georgia Beyer,

Please find attached a variation for Harvesting Plan CAS604-608 for Ewingar State Forest Compartments 604-608. I hope the maps of this variation contain the information you requested. If you require any further information please don't hesitate to contact me at the Casino Office.

Sincerely,



Brett Cann

For: Robert Williams

Planning Manager



**State Forests of
New South Wales**

Casino District

PO Box 688

Casino

NSW 2470

Phone (066) 62 4499

Fax (066) 62 5826

STATE FORESTS OF NSW

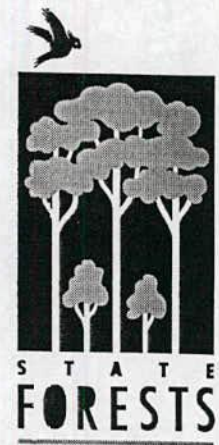
MANAGING • CARING • SUSTAINING

NORTHERN RIVERS REGION

HARVESTING PLAN No. CAS604-608

COMPARTMENTS 604 - 608

EWINGAR STATE FOREST No. 845



NOTIFICATION OF MINOR VARIATION TO HARVESTING PLAN

The following variations to the Harvesting Plan for Compartments 604-608, Ewingar State Forest No. 845 is required to provide protection for a nest site of a Masked Owl located in compartment 605 and to minimise the level of ground cover disturbance adjacent to Bulldog Rock to minimise disturbance to the foraging resource for the Brush-tailed Rock Wallaby.

Variation of Part 1: Operational Map

The Harvesting Plan Operational Map for Compartment 605 is amended to exclude harvesting from an area either side of 604/605 road East of log dump 25.

The Harvesting Plan Operational Map for Compartment 608 is amended to include a 200m strip of modified harvesting zone extending from the Connection Corridor in compartment 608 to the drainage feature West of 608/2 road.

Variation of Condition 4.8: Modified Harvest Conditions

Condition 4.8 is amended to include (f) Modified Harvest Zone. The SFO is responsible for ensuring that the contractor minimises ground disturbance within the Modified Harvest Zone by utilising walkover technique where possible and minimising snig tracks.

Reason for variations:

The variations to exclude harvesting from the area either side of 604/605 road East of Log Dump No. 25 is required to offer protection for a Masked Owl nest site. The harvesting exclusion zone will prevent noise and disturbance to the nest site.

The variation to implement a modified harvesting zone is required to minimise the level of ground cover disturbance adjacent to Bulldog Rock to minimise disturbance to the foraging resource for the Brush-tailed Rock Wallaby. Minimising ground cover disturbance will be achieved by reducing the number of snig tracks and maximising walk over technique.

(a) Variation Preparation (by Forester, Forest Assistant)

Prepared by Brett Cann

Signature

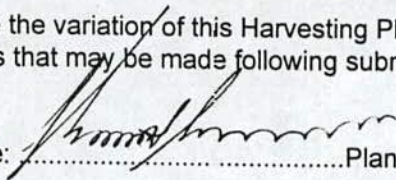
Title Planning Forester

Date

6/3/98.

(b) Regional Approval (by Planning Manager)

I approve the variation of this Harvesting Plan subject to any amendments, endorsements or approvals that may be made following submission to the Environment Protection Authority.

Signature:  Planning Manager Date 9th Mar 1998

(c) Industry Field Supervisor/Bush Supervisor Acknowledgment

I acknowledge that I have received a copy of the Variation to Harvesting Plan No CAS604-608 and that I understand the Conditions of the Variation as explained to me by a State Forests officer.

Signature: Licence No.: Date:

Position:

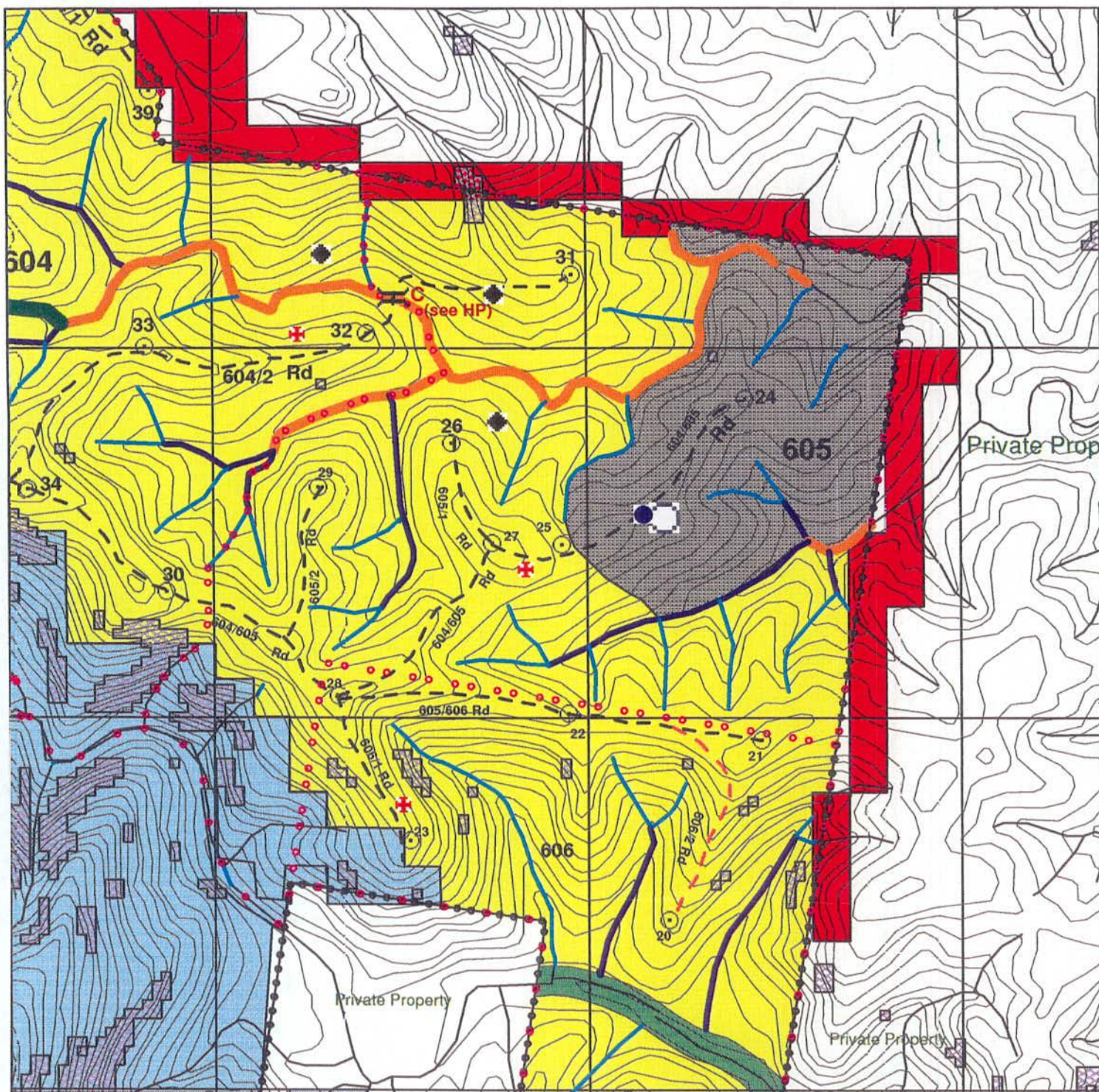
(d) Supervising Forest Officers Acknowledgment

I acknowledge that I have received a copy of the Variation to Harvesting Plan No CAS604-608 and that I have been briefed on the Conditions of the Variation and the supervision and operational control requirements as explained to me by the District Harvesting Forester.

Signature: Date:

Position: Supervising Forest Officer

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 605
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15 000, DATE 6/3/98, V4.



250 0 250 500 750 1000 1250 1500 1750 Meters

BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- Natural Surface
- Scaled or Gravelled
- - - Four wheel drive
- - - Proposed Road

MODIFIED PRESCRIPTIONS

- Minimise Ground Disturbance

NORMAL PRESCRIPTIONS

- Harvestable Area

NON HARVEST AREAS

- PMP 1.1.7 Flora & Fauna (40m)
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection Squirrel Glider & Owl Nest Site
- Old Growth

WATERCOURSES & DRAINAGE

- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

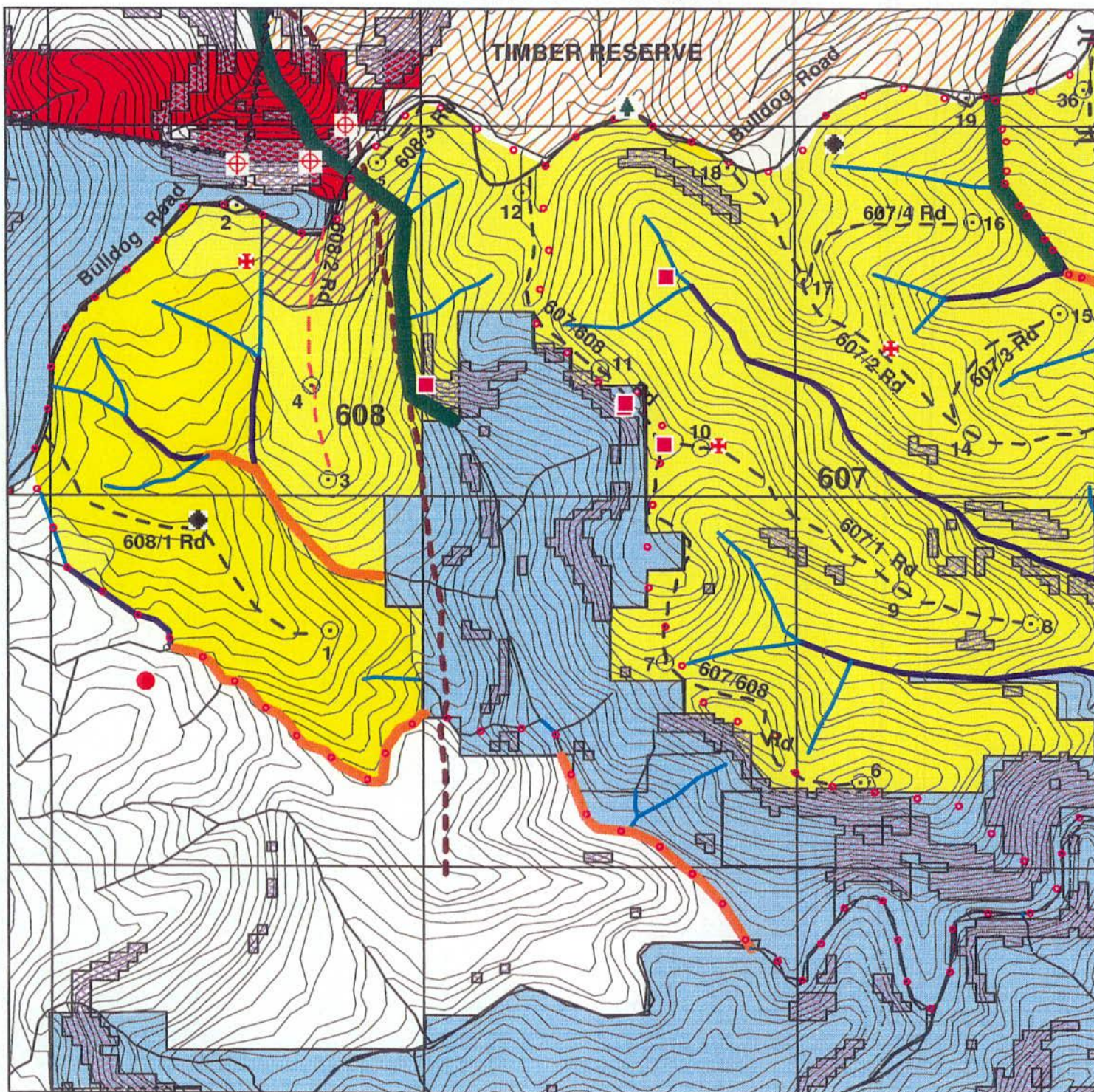
- Approved Crossings
- Soil Sample Site
- Temporary Dry
- Temporary Wet
- Soil Boundary

RECORDED SPECIES OR FEATURES

- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Powerful Owl
- Glossy Black Cockatoo
- Masked Owl Nest Site



NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 608
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15 000, DATE 6/3/98, V4.



250 0 250 500 750 1000 1250 1500 1750 Meters

BOUNDARIES

- State Forest Boundary
- Compartment Boundaries

ROADS

- Natural Surface
- Sealed or Gravelled
- Four wheel drive
- - - Proposed Road

MODIFIED PRESCRIPTIONS

- Minimise Ground Disturbance.
- Old Growth

NORMAL PRESCRIPTIONS

- Harvestable Area
- NON HARVEST AREAS
- PMP 1.1.7 Flora & Fauna (40m)
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection
- Squirrel Glider & Owl Nest Site

WATERCOURSES & DRAINAGE

- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES

- Approved Crossings
- Soil Sample Site
- Temporary Dry
- Temporary Wet
- Soil Boundary

RECORDED SPECIES OR FEATURES

- Sooty Owl
- Masked Owl
- V-roth Tree
- Squirrel Glider
- Powerful Owl
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN
|
|