



**Land & Water  
Resources**  
Research &  
Development  
Corporation

# RIVERCARE

Guidelines for Ecologically Sustainable  
Management of Rivers  
and Riparian Vegetation

Occasional Paper No 03/95

**Occasional  
Paper  
Series**



## **C. LANDCARE AND RIVERCARE GROUPS**

### **SOLVING LOCAL PROBLEMS THROUGH COMMUNITY COOPERATION AND INVOLVEMENT**

Where management plans are called for, these will be best implemented and undertaken as a member of a **LANDCARE or RIVERCARE GROUP**.

Essentially, **these Groups work as a community team** to tackle common problems shared by a number of landowners along a section of river.

The idea is to provide an interactive forum with your river neighbours to work together on joint projects. LANDCARE and RIVERCARE GROUPS work particularly well to fix erosion, floodplain stripping and silting problems in the river valleys. The many interests, skills and ownerships available within these communities can together evolve long term management outcomes.

Once the Group has established its common resolve, an approach is made to the DEPARTMENT OF LAND AND WATER CONSERVATION for assistance in the preparation of a RIVERCARE PLAN.

The planning process can include meetings with the Group, the funding application, setting up a plan base, preparation of the aerial photograph plan and overlays, inspections, advice on permits and final recommendations.

The Department's standard procedure for the implementation of RIVERCARE PLANS is set out in Section G following.

**As EVERY RIVER SYSTEM IS UNIQUE this standard RIVERCARE planning procedure can vary and it is best discussed with your local Departmental Officer. The process devised by the Department is very much an interactive one. For example, you need to provide property details and preferred management options. The Department's role is one of advice, consultation and facilitation in such matters as permits and technical data.**

**THE LANDCARE AND RIVERCARE GROUP is the cooperative way to firstly fix your river system and then secondly to regularly maintain it.**

**LANDCARE AND RIVERCARE GROUPS DO WORK**

**So talk to your neighbours and get them involved.**



## **D. THE MANAGEMENT PROCESS**

### **LOOKING FOR THE CAUSE OF EROSION**

**Erosion commonly occurs on the outside of bends during floods.**

**What we want to do is to make these outside bends strong enough to resist these erosive forces.**

**We can make the outside bends strong enough by planting and maintaining vegetation, preferably native species.**

**In severe situations, a preferred option could be to install structural devices such as Jacks or Rock.**

**The river flows are thus guided past the potential erosion site from one stable section of the river to another.**

**The inside bends or point bars provide a temporary storage area for sediments passing through the river system. We need to recognise this when considering our management options, as it may be necessary to remove consolidating vegetation and bushes from these point bars to allow the river processes to operate freely.**

**This guide does not go into the causes of riverbank erosion except in its simplest meaning. Your DLWC adviser has further references and more detailed information.**



## **CHANNEL WIDTH AND ALIGNMENT**

### **THIS IS CRITICAL**

If the width of the river channel is too narrow or overgrown, the river flow becomes choked in a flood. This in turn causes the velocity of the flow to increase, producing a scouring effect — particularly on vulnerable outside bends.

In some instances, a badly blocked channel is bypassed, leading to overbank flow.

The extreme case can occur during prolonged flooding. This causes floodplain stripping and headward erosion of the floodplain itself when hectares of prime land can end up in the river estuary.

When channel widths are too wide, then the problem of instream deposition occurs.

This allows for the creation of sandbars and rapids, which if consolidated by vegetation and bushes then exert erosive forces on the adjacent banks.



## GETTING THE BALANCE RIGHT

The whole physical management of a river system is about getting the correct balance between:

**WATER FLOW**

**SEDIMENT MOVEMENT**

**BANK VEGETATION DENSITY.**

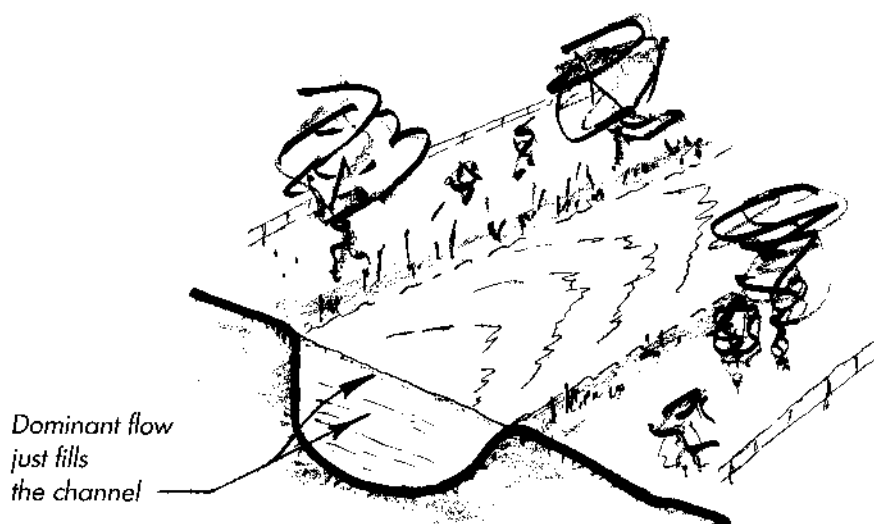
Of the seven factors which have been identified to affect general channel stability, there are two in particular which have a major influence.

These are the **DOMINANT FLOW** and the **BANK VEGETATION DENSITY**.

How do I know how big my river channel should be?

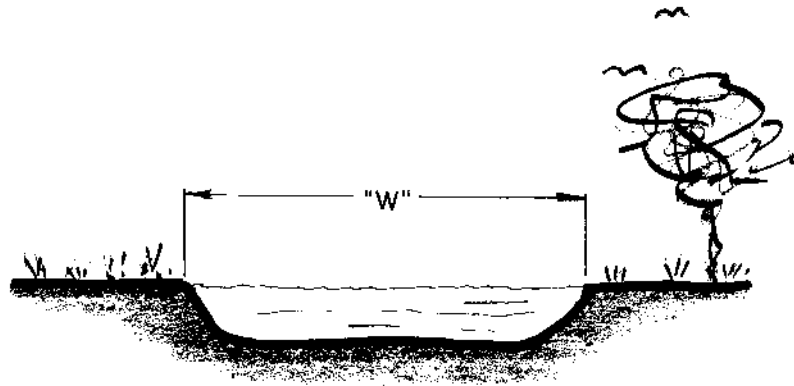
The size of the river channel has been found to be dependent on the river flow.

This flow, **THE DOMINANT FLOW** is the one that usually just fills the channel without overflowing its banks and occurs on average once every 18 months. This can vary up to 3 years.

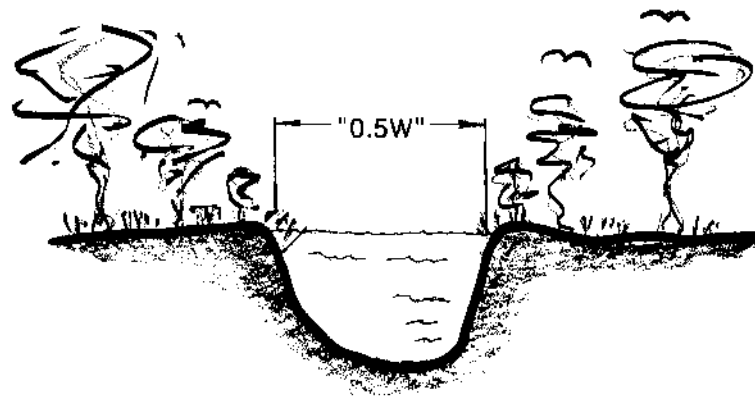


**How does vegetation density impact on the channel size?**

**NO VEGETATION**

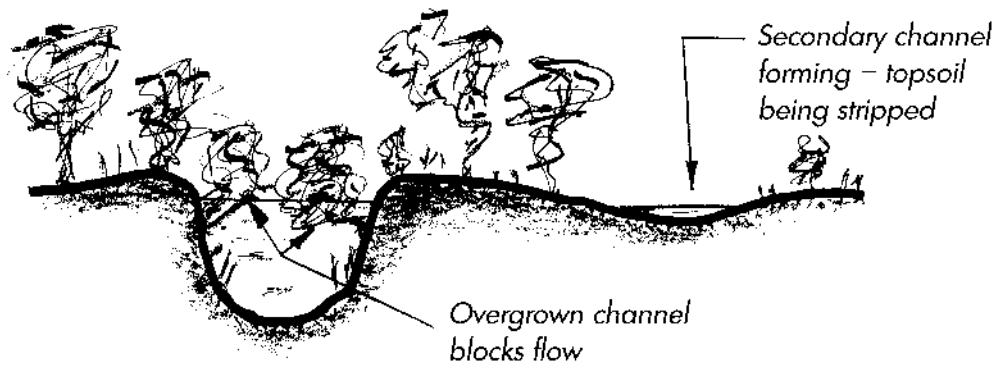


**GOOD VEGETATION**



Good vegetation will contract the channel width by about 50% and also deepen it. If vegetation is destroyed the channel will widen and become shallow.

**OVERGROWN WITH VEGETATION**



Of course there are other factors to take into consideration in the on site situation. The adoption of a RIVERCARE PLAN and its procedures will take into account the many and varied anomalies that can occur along your particular river system.

## **MANAGING YOUR RIVER**

Having assessed the general health of your river system, and formed a LANDCARE GROUP you should now be in a position to review the options available to start managing your river.

**THE MANAGEMENT PROCESSES** (see following foldout) sets out a visual methodology based upon a real situation and the sort of RIVERCARE PLAN and recommendations that would apply. This is only one situation and will probably differ from yours. It does, however, demonstrate how you can bring back a very degraded river to a balanced river.

Certainly, it is possible to contain a river system that is starting to deteriorate, whilst pristine rivers are about future management.

**SIMPLE MANAGEMENT OPTIONS** (see following foldout) shows some of the simple options and practices that are available to you.

This RIVERCARE Users Guide addresses the more common problems usually encountered by landowners.

Where more complicated problems such as:

**ACCRETION  
BANK SLUMPING  
BED DEGRADATION  
FLOODPLAIN STRIPPING  
HEADWARD GULLYING**

are occurring specialist advice is called for and should be sought from your local DLWC adviser.



# MANAGEMENT PROCESSES

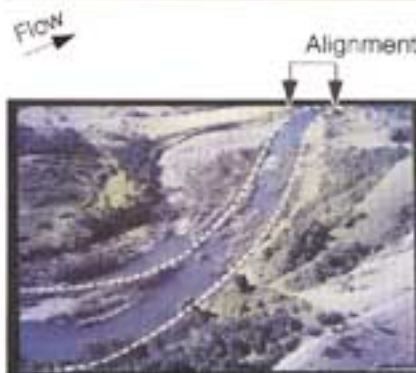


**FORM A RIVERCARE GROUP** and start a collaborative **RIVERCARE** plan with your neighbours.

River diverted and floodplains stripped



**THIS SHOWS A RIVER WHICH HAS OVERGROWN** in the main channel and has forced flood flows over the flood plain and is removing topsoil from the flood plain and back to raw gravel. The channel continues to overgrow with vegetation.



## TO REVERSE THIS TREND:-

- i) Set an alignment based on river parameters — see your DLWC advisor
- ii) Start planting out eroded banks and breakout points.
- iii) Start clearing within set alignment taking into account environmental factors.
- iv) Permits are needed.



## CONSOLIDATE THE PROGRAM:-

- i) Ensure good buffer strips at upstream end.
- ii) Plant up and fence out pasture area.
- iii) Provide stock access to the river downstream of the rapids.



## MAINTAIN THE RIVER BY:-

- i) Fencing out stock from vulnerable locations.
- ii) Removing regrowth from the river channel.
- iii) Replanting and repairing damaged areas after floods.

# SIMPLE MANAGEMENT OPTIONS



## A RIVER IN CONTROL - WITH GOOD BANK VEGETATION

- i) Preserve the existing state and
- ii) Ensure stock are excluded from banks.
- iii) Keep free of noxious weeds and exotic species
- iv) Preserve this environment, maintain a 30 metre wide buffer zone.



Clear unwanted debris

## A RIVER WHERE THE CHANNEL IS BLOCKED

- i) Cut back obstructing or exotic vegetation.
- ii) Leave root system intact to reduce the impact on the banks of the rivers.



keep clear



Plan along eroding toe

## A RIVER WHERE OBSTRUCTING VEGETATION HAS CREATED EROSION ON OUTSIDE BENDS

- i) Keep inside points and bars clear of obstructing vegetation within the alignment width - where needed.
- ii) This can be done by cutting back and/or the judicious use of an approved herbicide such as Round-up. (R).



Keep free of vegetation



Planting Australian Natives

## PLANTING VEGETATION

Where the channel is of adequate width and the alignment is not severe (straight) plant up the toes of the eroding banks using **NATIVE VEGETATION**. Where there is severe erosion use Poplars or Willows - jetted or backhoed into the riverbed, to act as the initial stabilising medium. Aim to replace them with natives as a long term goal.



Jet planting Willow cuttings



Structural Works necessary

Jacks planted with Willows

**STRUCTURAL WORKS** may be necessary where alignments are severe.

There are various options here and your DLWC advisor can discuss them with you

Their costs can vary widely and depend on local availability of materials.



Rock toe protection

## **GETTING THE VEGETATION RIGHT**

**A second booklet in this series:**

**“Revegetating Streams: a Guide to Species and Planting Methods”**

**sets down some suggestions on the correct species of trees to plant along your riverbanks. It provides a guide to planting techniques and sets out the locale to get the best results for erosion control given the growing potential of each species. This guide also covers other environmental considerations**

**Remember, the aim of any RIVERCARE project is about putting your river back into balance and this includes the maintenance of the natural ecosystem.**

**For further detail or information please contact your local DLWC adviser.**

## **E. LEGISLATIVE CONTROLS**

**Action in or about your river is controlled by many Acts of Parliament including:**

### **THE RIVERS AND FORESHORES IMPROVEMENT ACT**

**This Act amongst other matters controls the removal/excavation of materials in the riverbed or within 40 metres of the top of the riverbank.**

### **THE SOIL CONSERVATION ACT**

**This Act controls the removal of timber, shrubs etc. within 20 metres of the top of the riverbank.**

**These Acts prescribe that certain actions, permits, etc must be undertaken or obtained before works can begin.**

**There are many situations where these and other Acts may or may not be applied. It is not intended, here, to set these situations out in detail other than to advise of their existence and the need to meet the statutory requirements.**

**The use of the RIVERCARE planning process allows Departmental Officers to guide landowners through the necessary requirements as defined by the particular management options adopted by that LANDCARE or RIVERCARE GROUP.**



## **F. TAX CONCESSIONS**

The Income Tax Act provides concessions for this kind of work.

There are two information booklets for further reference:-

**LANDCARE TAXATION ARRANGEMENTS — A GUIDE TO SECTION 75D.**

**INCOME TAX DEDUCTIONS FOR LANDCARE RELATED ACTIVITIES — A GUIDE TO SECTIONS 51(1), 53, 54, 75B, 75D**

Copies of these can be obtained through your DLWC representative or from:

**National Landcare Policy Branch  
Department of Primary Industries and  
Energy  
GPO Box 858  
CANBERRA ACT 2601  
Telephone (06) 272 5838**

The AUSTRALIAN TAXATION OFFICE can also provide information on tax concessions. The telephone number for general inquiries is listed in the White Pages.

Lastly, discuss the matter with YOUR ACCOUNTANT.



## **G. THE RIVERCARE PLAN**

### **THE DLWC PLAN — AN OVERVIEW**

#### **STEP ONE — INITIAL DISCUSSIONS**

**LANDCARE GROUP** advises DLWC they require a Riverplan.

**DLWC** talks to the group and explains the procedures that are involved.

**DLWC** adviser gives a talk to the **LANDCARE GROUP**, which includes screening of the video, funding options available etc. The length of the stream or river to be studied is determined at this meeting.

Cost of the plan is estimated by the **DLWC** adviser in consultation with the **LANDCARE GROUP**.

#### **STEP TWO — FUNDING APPLICATION AND SETTING UP PLAN BASE**

**LANDCARE GROUP** applies for funding e.g. NLP.

Once funding is obtained, the **DLWC** orders the flight run information.

From the flight information, aerial contact prints are ordered. In addition, topographic and property maps are ordered as required.

On receipt of the contact prints, the scale is checked and the extent of the enlargements needed is marked out. Consideration will be taken to the size of the final plan and the final scale.

The aerial enlargements are ordered and on receipt are prepared for presentation to the **LANDCARE GROUP**.

### **STEP THREE — INITIAL PRESENTATION OF THE PLANS TO THE LANDCARE GROUP AND COLLATION OF INFORMATION**

Arrange and talk at LANDCARE GROUP meeting, to show what is required. This is an Information Workshop.

Landowners provide information and their ideas as set out in the LANDOWNER PARTICIPATION ACTIVITY GUIDE.

DLWC then assesses this information on the plans.

### **STEP FOUR — SITE DISCUSSION, FINALISE INFORMATION AND PERMITS**

Site inspection and discussion between DLWC and landowners. This is arranged through the LANDCARE GROUP.

Transfer essential information onto the aerial enlargements and set up plans.

Organise approvals for clearing of vegetation and moving of sand and gravel.

### **STEP FIVE — FINAL ACCEPTANCE OF THE RIVERCARE PLAN**

Arrange for the LANDCARE GROUP to view the final plan and make final comments.

Present plans at a meeting of the appropriate CATCHMENT COMMITTEE.

Add any changes or information to the final plan.

### **STEP SIX — THE COMPLETED RIVERCARE PLAN**

Final presentation of the plan and all associated permits and approvals is made to the LANDCARE GROUP.

## **H. TO SUMMARISE**

**MAKE THE DECISION TO MANAGE YOUR RIVER AS PART OF YOUR OVERALL PROPERTY MANAGEMENT.**

**RATE THE STATE OF YOUR RIVER AND ITS BANK VEGETATION.**

**APPROACH YOUR NEIGHBOURS AND YOUR LOCAL CATCHMENT COMMITTEE FOR ADVICE AND ASSISTANCE ON HOW TO FORM A LANDCARE OR RIVERCARE GROUP.**

**FORM A LANDCARE GROUP TO UNDERTAKE A RIVERCARE PLAN.**

**SEEK DEPARTMENTAL ASSISTANCE.**

**BEGIN THE RIVERCARE PLANNING PROCESS.**

**IMPLEMENT YOUR RIVERCARE PLAN.**

**MAINTAIN YOUR RIVER FOR ITS LONG TERM HEALTH AND VIABILITY.**

**WITH RIVERCARE PLANNING, WATCH AS YOUR FARMS FUTURE SUSTAINABILITY IS GREATLY IMPROVED.**

**For further detail or information contact your nearest DEPARTMENT OF LAND AND WATER CONSERVATION Office listed in your WHITE PAGES and referenced through the INDEX of STATE GOVERNMENT DEPARTMENTS, AUTHORITIES or SERVICES.**

**APPENDIX 3 Nambucca River and Missabotti Creek  
Rivercare Plan: Landowner Participation  
Activity Guide**

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## **RURAL FORMAT**

### **DEPARTMENT OF LAND & WATER CONSERVATION**

#### **NAMBUCCA RIVER AND MISSABOTTI CREEK RIVERCARE PLAN**

#### **LANDOWNER PARTICIPATION ACTIVITY GUIDE**

JULY, 1995

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**The document was revised by the NAMBUCCA CATCHMENT MANAGEMENT COMMITTEE  
RIVER STABILISATION SUB-COMMITTEE on 4 July 1995**

## A) “RIVERCARE” – A Landowner Driven Riverine Corridor Management Process

### 1) BACKGROUND

The need for the better management of our RIVERS and STREAMS to stem bank erosion, improve water quality, improve habitat, and reduce the effects of flooding, has been apparent for many years.

The HUNTER REGION of the Department of Land and Water Conservation (DLWC) in conjunction with the MANNING VALLEY CATCHMENT MANAGEMENT COMMITTEE has devised a system of river management which allows for *DEPARTMENTAL* and *LANDOWNER* inputs to produce “RIVERCARE” management plans on a collaborative basis.

### 2) MANAGEMENT

These “RIVERCARE” plans form the basis of the management of a particular section of river under the jurisdiction of a particular Landcare Group.

The plans allow for a **group permit** process. Permits which currently require individual applications, now can be a single application by the Landcare Group based on the agreed “RIVERCARE” plan.

### 3) RIVERCARE PLANNING

Some important features and advantages of Rivercare plans are:

- **consultation** between neighbours, DLWC, other government bodies, including local and State, and river users.
- **technical advice** is provided.
- **flexibility** — the plan is adapted to a particular stretch of stream to meet the needs of river users.
- **long and short term goals** can be set.
- **permits** for tree destruction and other river works cover the length of stream in the plan.
- **funding** to carry out works can be applied for on the basis of a planned approach.
- **tax concessions** for fencing and other works.

A **Landcare/Rivercare** Group is needed to create a **Rivercare plan**.

Broader catchment problems, such as gullying, can impact on channel stability. In these cases, a **catchment plan** is probably needed. A **Rivercare plan** would be an integral part of a **catchment plan**. It can also provide a continuity base for whole farm plans along the river.

#### **4) THE PROCESS**

Using enlarged aerial photographs with a series of overlays, all relevant riverine corridor information such as the physical, environmental, and the managerial can be recorded by the Landowners and DLWC. Most of the data is collected by the Landowners with the Department's role being one of co-ordination, guidance and technical input.

This information forms the basis of a Rivercare management plan.

#### **B) METHODOLOGY – Summary**

This manual has been developed to assist you in the preparation of a Rivercare plan. The plan consists of a number of layers that will help you develop a workable management plan for your area. The initial plan is usually developed for what can be achieved by your group over the next five years.

The pages have been colour coded to aid you in completing each section/layer of the plan. The pens provided correspond to the colour code. Mistakes can be erased using the white correction pen, or special rubber.

The following sets out a brief outline of the process and the diagram shows a graphical representation of the procedure.

##### **1) AERIAL PHOTOGRAPHS**

The aerial photographs have been enlarged to enable features of the area to be easily identified and to permit clear depiction of the final management options. The photographs are to a standard scale so that direct measurements can be taken from them.

##### **2) BOUNDARY AND PROPERTY OWNER – INFRASTRUCTURE**

This is the first layer and is closest to the aerial photograph. A black pen has been provided with your kit and all information on this layer should be marked with this pen. See Grey section of this manual for requirements here.

##### **3) ENVIRONMENTAL LAYER**

This is the second layer and this is for noting all features of the existing environment that are there at present, such as bank erosion, aboriginal sites, vegetation details, existing riverworks, items of interest, etc. Features on this layer should be marked with the green pen.

#### **4) GEOMORPHIC FEATURES and PERMITS/AUTHORITIES GRANTED**

This layer is arrived at by looking at the dynamics of the river i.e. whether it is aggrading, degrading, the history of water holes, nature of any modifying works done on the river e.g. tree removal, gravel extraction etc. Information such as rock outcrops or bars in the river etc. is needed to assist in the design of the stable channels. An orange pen is provided for use on this layer.

#### **5) LANDOWNERS' MANAGEMENT OPTIONS AND PREFERENCES FOR THE NEXT FIVE YEARS**

This layer shows proposed works. This is the planning layer and is prepared by the Landowners. A red pen is provided for use on this layer.

#### **5j) CHANNEL DIMENSIONS**

This is not a layer on the plan, but gives you an idea of the optimum channel widths for the river. It is an addendum to the Landowners Management Options Layer.

#### **6) FINAL MANAGEMENT PROPOSAL/TCM DETAIL**

For this layer, DLWC advisory staff go along the river and discuss the various options, attributes, environmental factors, etc, and put together with you, the Landowners, a workable management plan to be implemented over (say) the next five years.

Note areas that are of specific interest to discuss — as shown in blue pen.

Final management options are developed and areas of competing interests are examined and resolved. A blue pen is used for this.

A brown pen is provided for you to mark down supplementary information that you consider to be important to the overall management of the catchment.

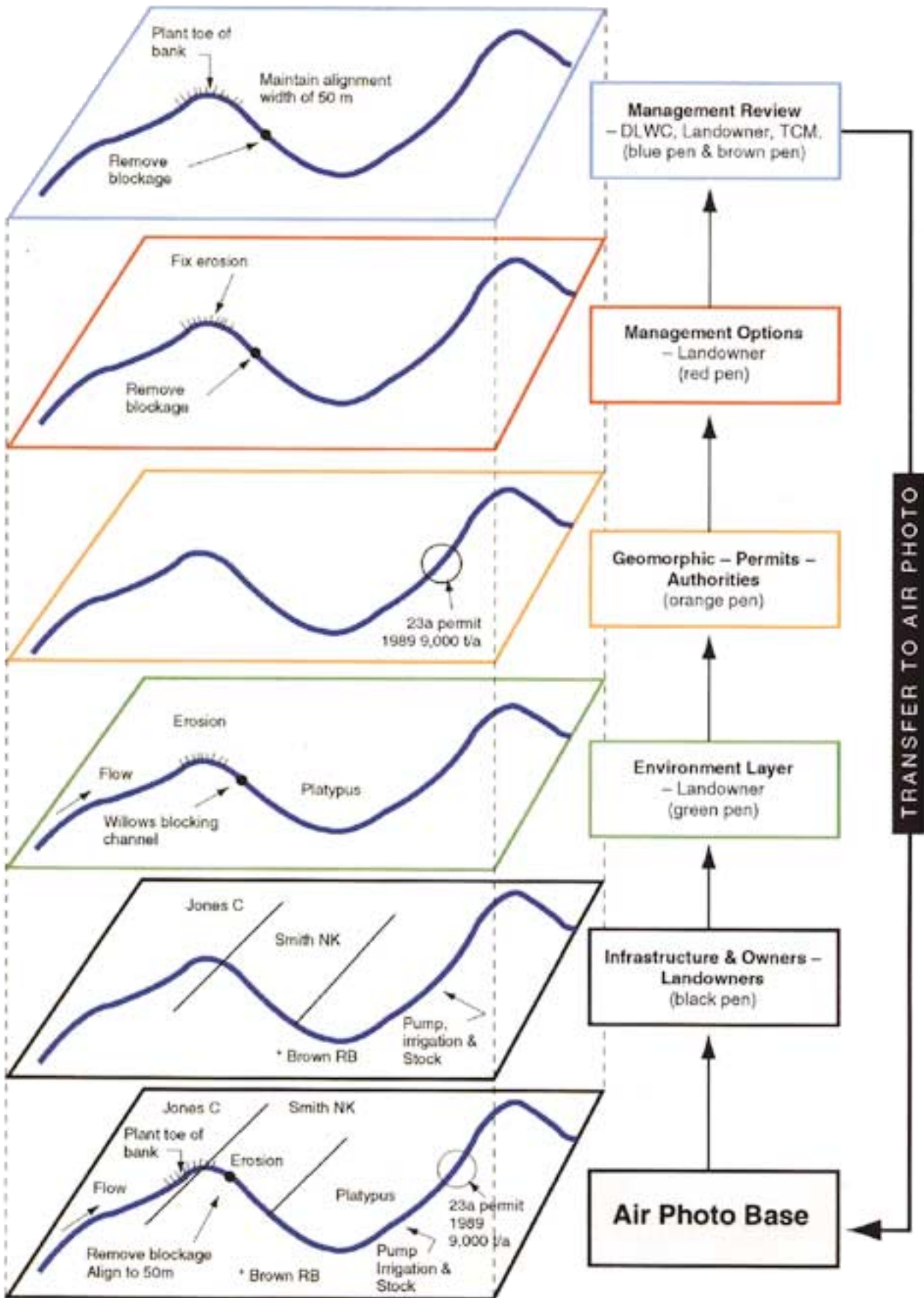
#### **7) FINAL ACCEPTANCE AND APPROVAL**

The essential information is transferred onto the Aerial Photographs and laminated after final assessment and endorsement by the Rivercare Group and Catchment Management Committee.

Permits for works are arranged and then presented to the group with the plan.

**WORKS CAN NOW COMMENCE.**

# RIVERCARE PLANNING PROCESS



### C) BOUNDARY AND PROPERTY OWNER. INFRASTRUCTURE

This layer shows the boundaries of the various properties in the LANDCARE GROUP as well as the owners name/company.

There are two methods that are used:

**METHOD 1** – Where Owner/Property Details have been shown, please check that they are correct. If not, then please make the appropriate amendments.

**METHOD 2** – Details have not been placed on this layer due to the lack of information. Owner/Property Details are to be placed on the layer.

Please indicate in black pen, the following information for each holding:-

#### 1) Is this particular holding represented in the LANDCARE GROUP?

Please mark against name thus "\*" if a member, e.g.

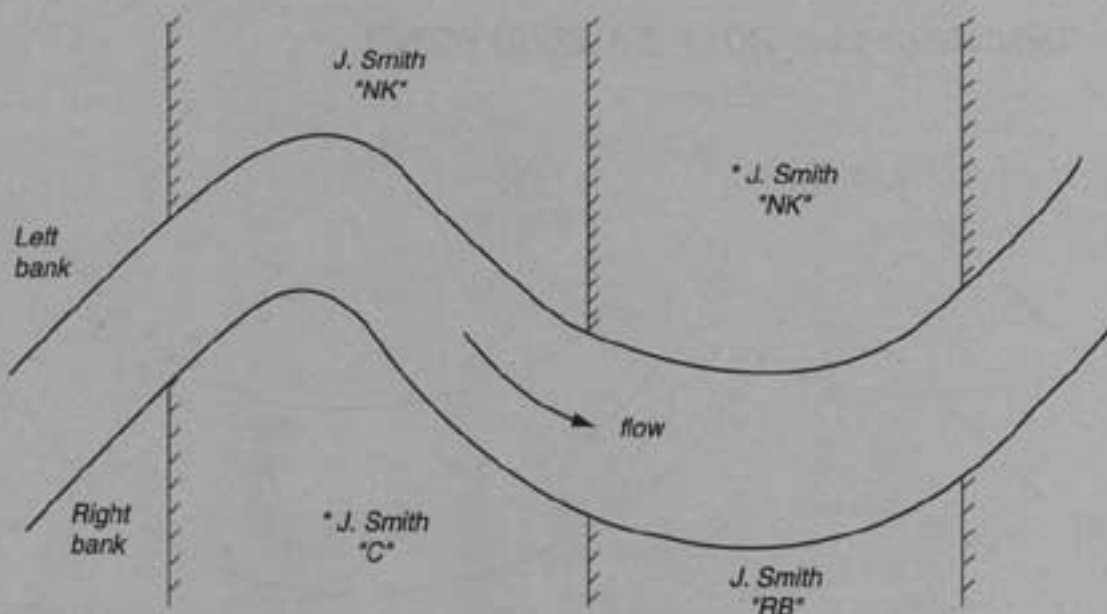
\* J. Smith (is a member)  
J. Smith (is not a member)

Please mark Landcare/Rivercare Group boundaries.

#### 2) Indicate whether the property boundary is to the centre thread of the river "C", to the river bank "RB", or not known "NK"

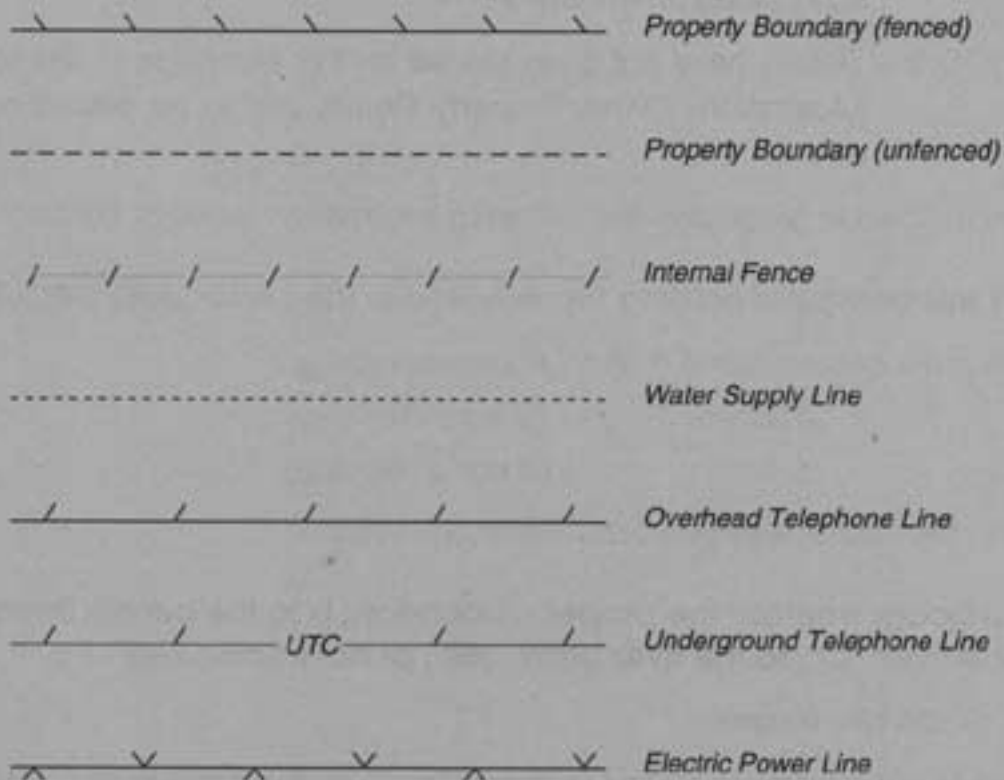
e.g. J. Smith NK, means:-

J. Smith is not a member of the Landcare Group, and it is "not known" whether his property boundary is the centre thread of the river or at the river bank.

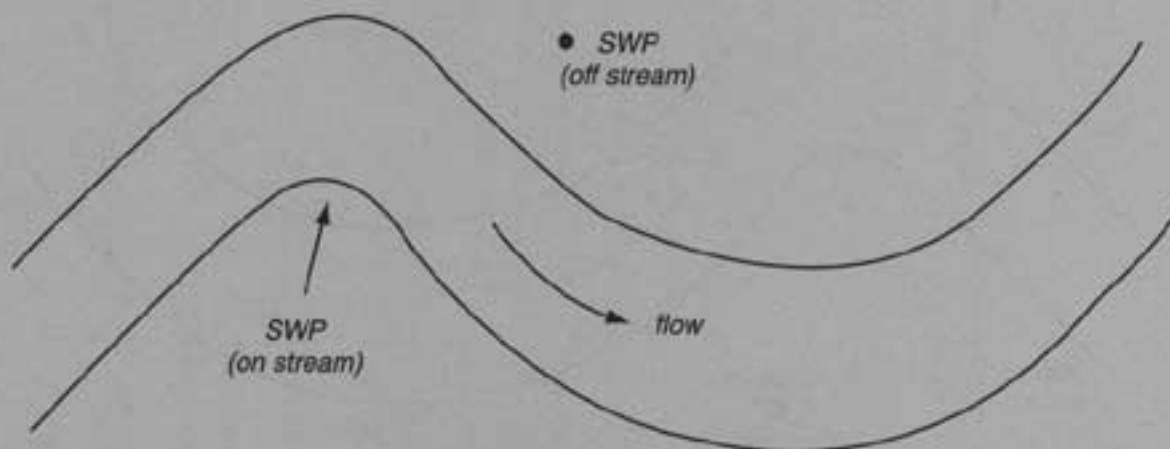


- 3) Indicate by way of sketching on the layer any **IMPORTANT FENCE** needed in the management of the river area of the property, for example a boundary fence with a neighbour. Also indicate water supply pipe lines, power and telephone lines.

Symbols are:

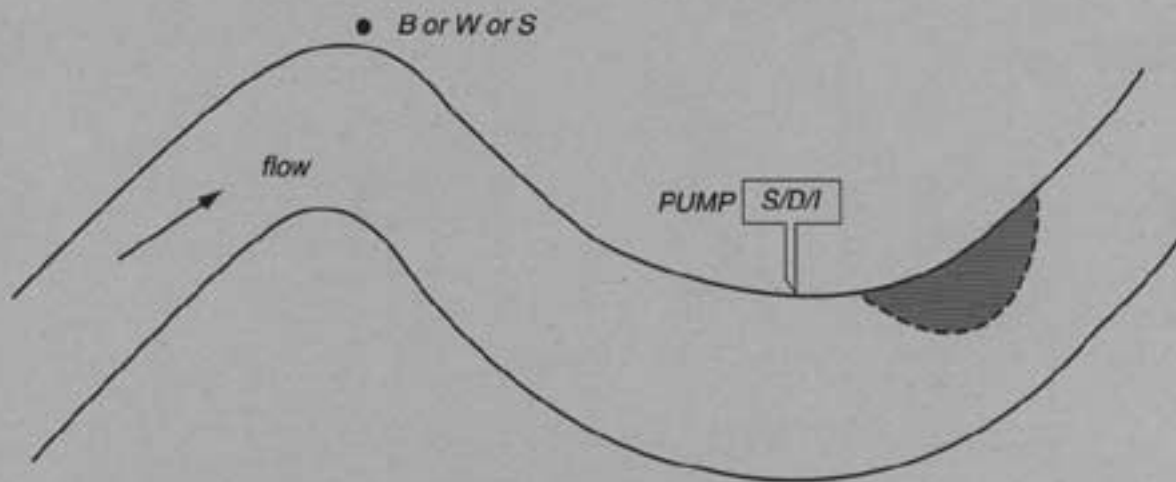


- 4) Indicate existing **STOCK WATERING POINTS**



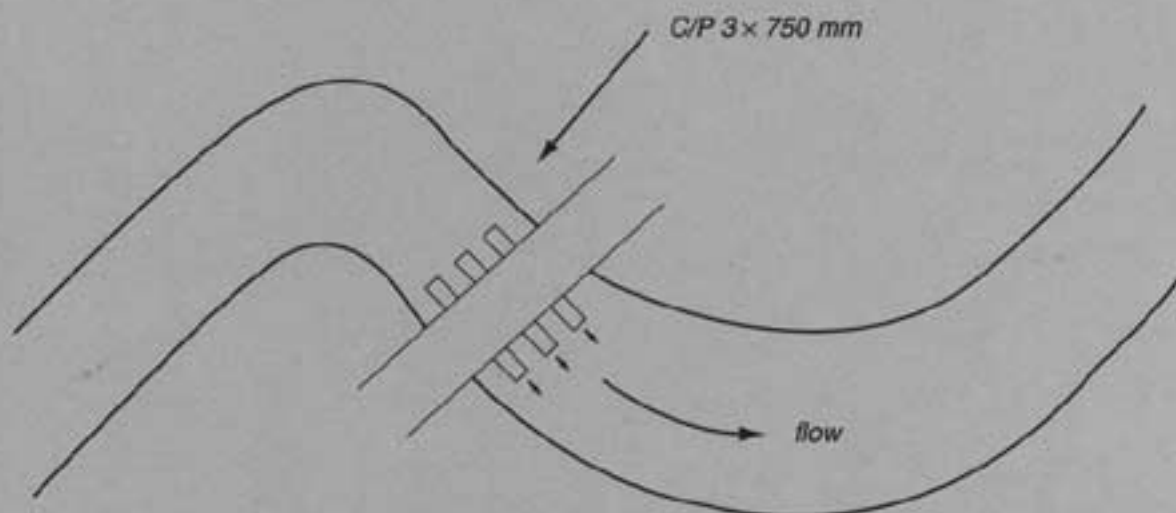
- 5) Indicate river pump locations and show whether they are for stock, domestic, or irrigation, or a combination. Also show any bore, well/windmill, spring or seepage close to the river.

e.g. PUMP/S/D/I is PUMP/Stock/Domestic/Irrigation or B/D is a bore with a domestic pump.



- 6) Indicate essential RIVER CROSSINGS that need to be retained in the final management proposal, and give detail of type

R/C	River Crossing
C/P	Concrete Pipe/s
C/C	Concrete Causeway
Bridge	Bridge (Wooden, Concrete etc. give dimensions)



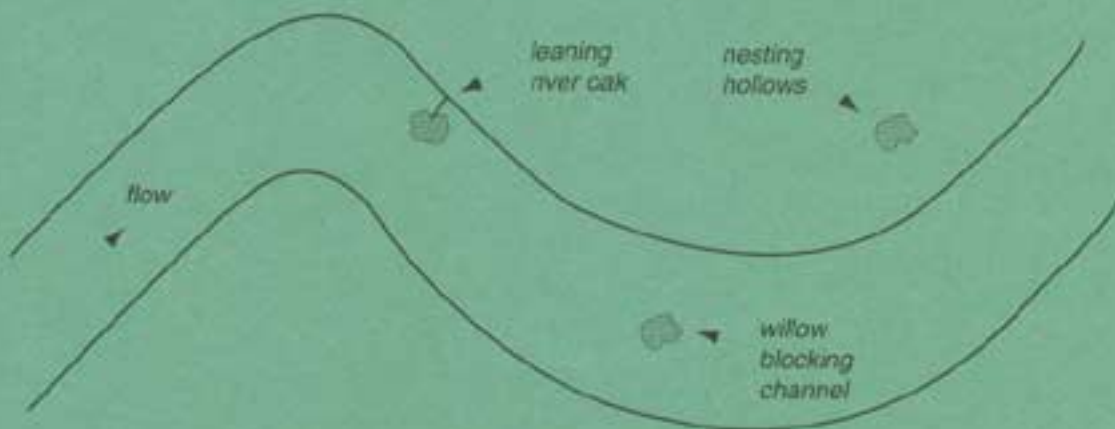
## D) ENVIRONMENTAL LAYER

The purpose of this layer is to identify the various environmental factors which need to be taken into account as part of the final management plan. Any work carried out should not have any adverse effect on the stream stability or the environment as a whole. Please mark with green pen provided.

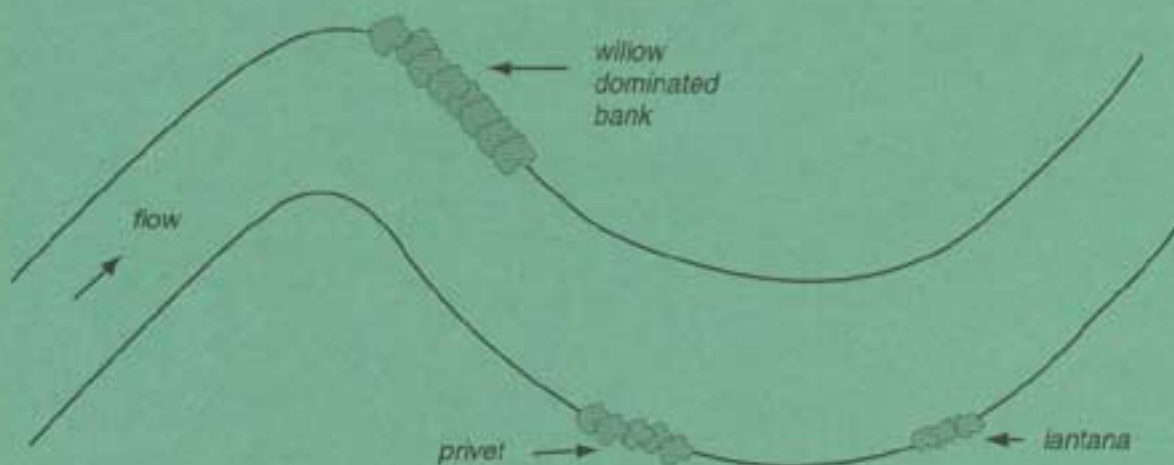
### 1. VEGETATION

(a) Important trees — try and specify why.

- (i) **Habitat trees**      large old native trees provide nesting hollows for birds and animals.
- (ii) **Problem trees**      large trees, such as leaning River Oaks or Willows, causing or potentially causing bank erosion.



(b) Exotic vegetation — banks dominated by exotic vegetation (privet, lantana, willows, camphor laurel) at the expense of native vegetation diversity are undesirable for the long term.



## VEGETATION cont.

If possible specify weed infestation. See list in Appendix.

### (c) Aged vegetation

Indicate specific trees or sections of the river where vegetation is aged and loosing its bank binding properties e.g. no understorey vegetation or no recolonisation.

### (d) Vegetation change

Please write a short note showing the nature of changes in riparian vegetation cover.

Provide photos or other records to illustrate this change for copying.

In this we are looking at the dynamics of that change.

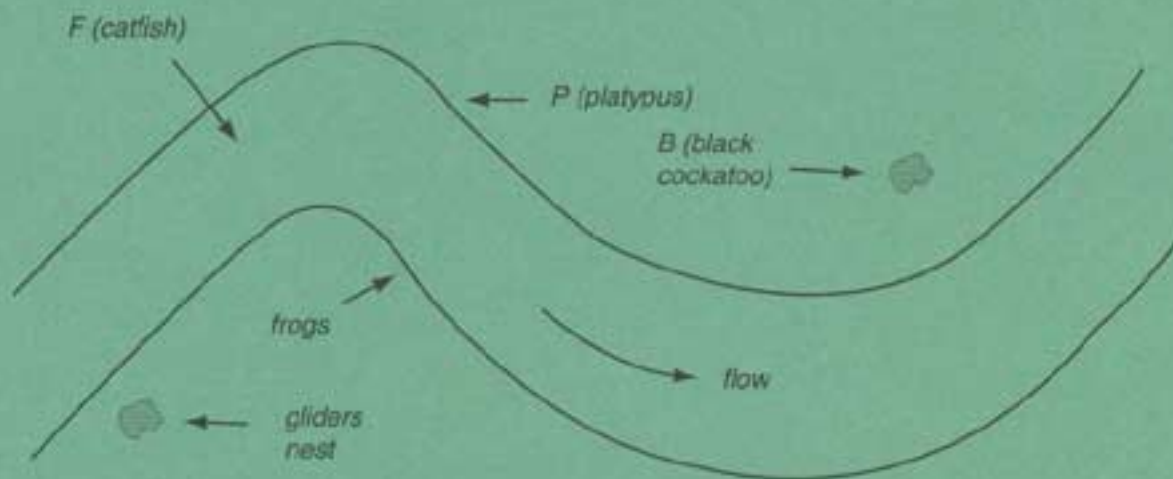
- e.g.
- i) pre 1880 flats covered by rain forest species.
  - ii) 1880–1910 timber cleared for extensive agriculture/ grazing.
  - iii) 1920–1940 willows planted to overcome bank eorsion problems.
  - iv) 1950–1955 ageing willows destroyed by floods particularly 1950.
  - v) 1960–present diebacks of riparian vegetation — invasion of channel by tea tree or river oak.



## 2. FAUNA (BIRDS, MAMMALS, FISH, REPTILES AND AMPHIBIANS)

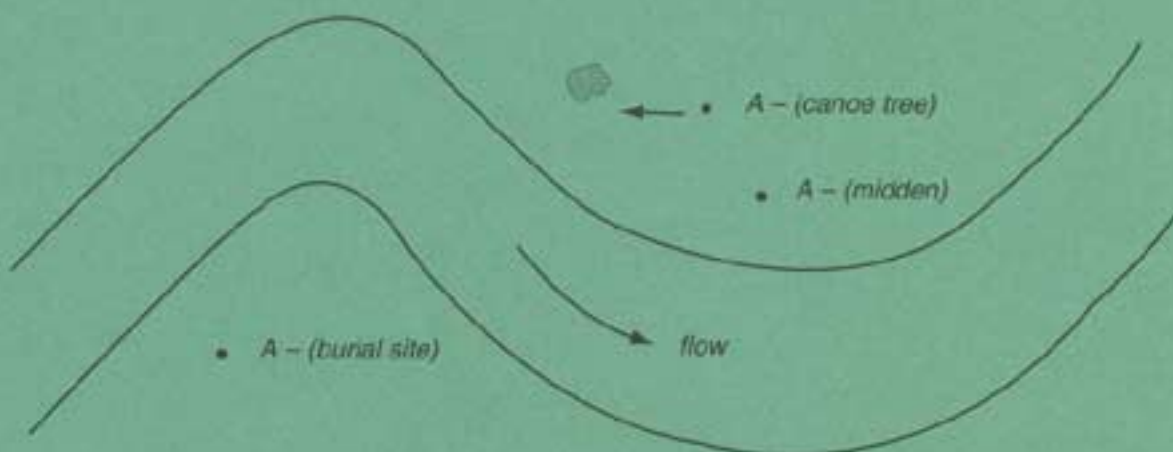
If possible, specify the type of bird, animal or fish.

- (a) Presence of fish (F)
- (b) Presence of platypus (P)
- (c) Presence of birds (B)
- (d) Presence of other fauna (e.g. gliders, frogs)



## 3. ABORIGINAL SITES

If possible, specify the type of site, e.g. canoe tree, midden, burial site, stone tools.

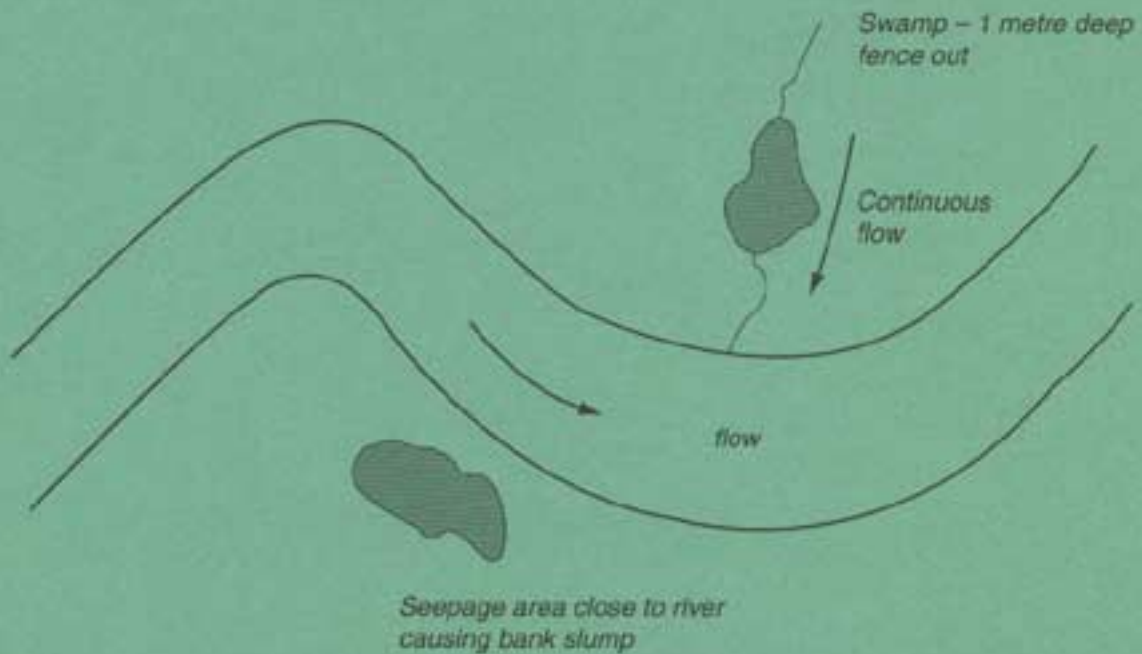


## 4. OTHER FEATURES

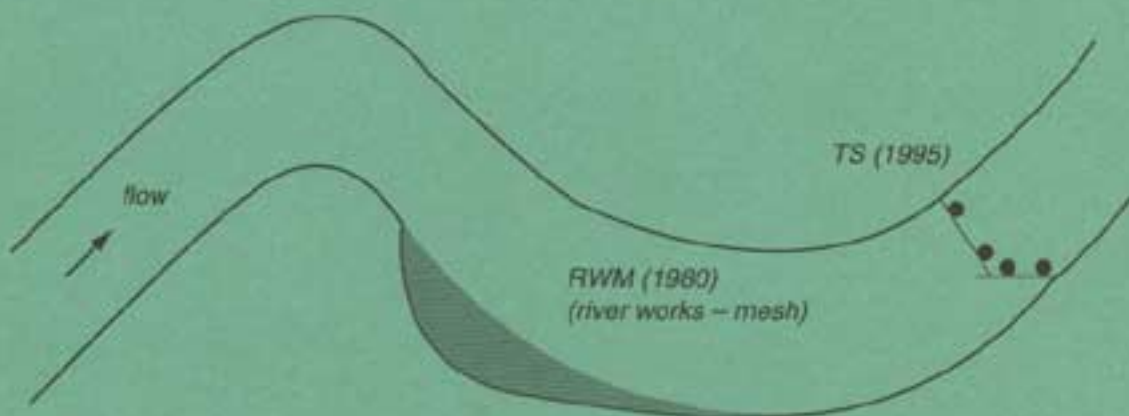
Caves close to the river, areas of diverse habitat are of interest, e.g. remnant rainforest areas adjacent to the river.

## 5. STREAM AND FLOODPLAIN FEATURES

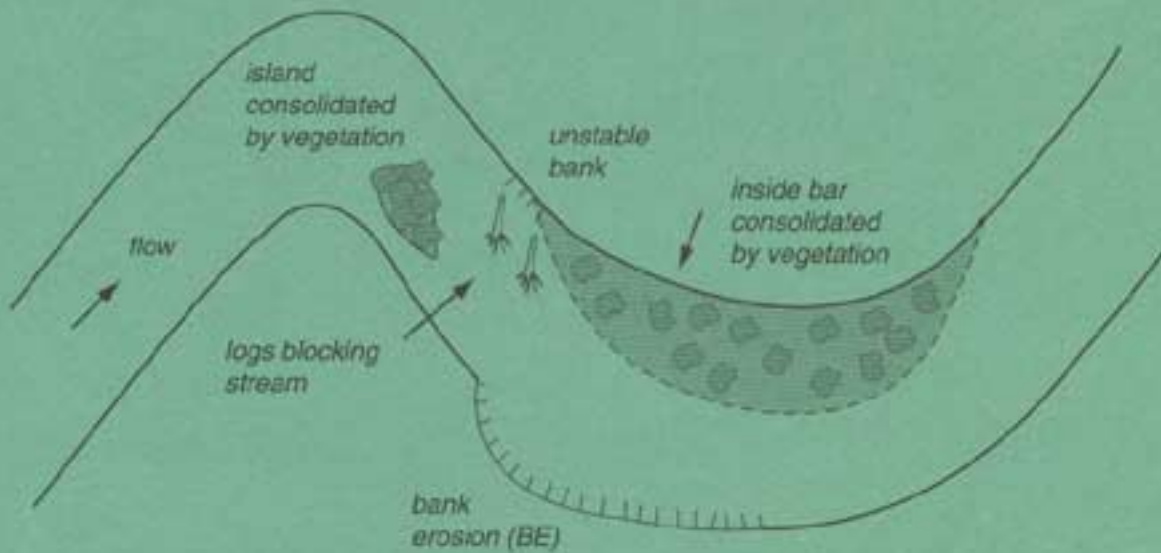
- (a) Important off-river valley or wetland — mark out these areas thus:-



- (b) Existing river works specify type, i.e. "M" for Mesh, "R" for Rock, "G" for Gabions or "P" for Plant, "TS" for timber sills, "RS" for rock sills, etc.



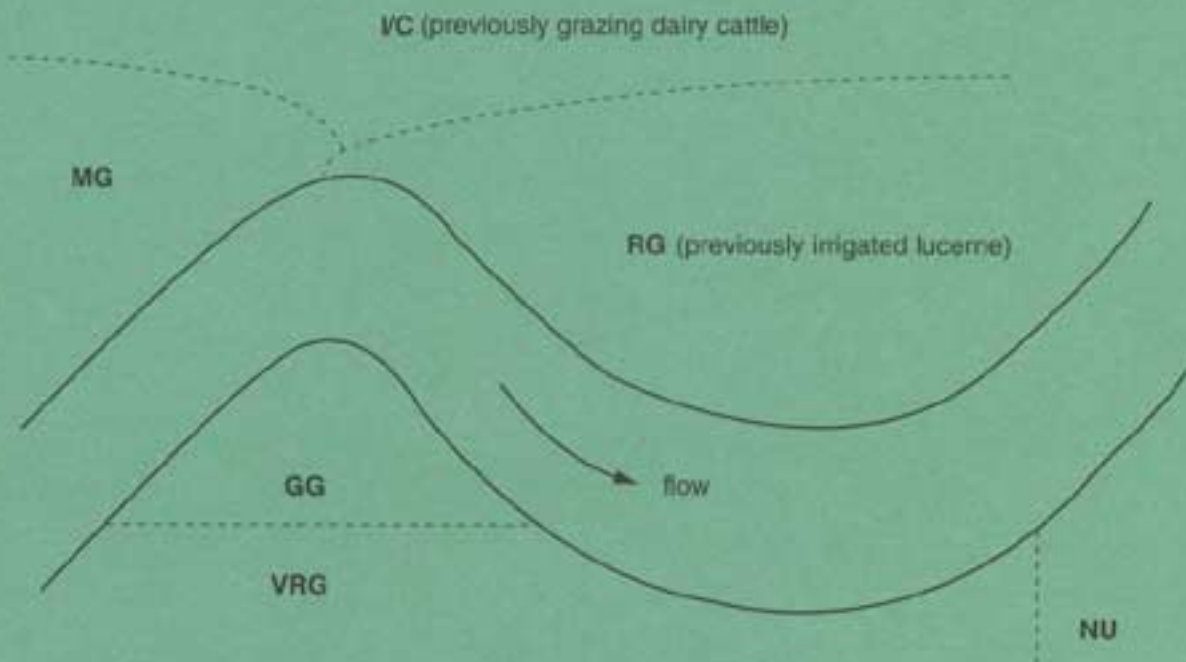
**(c) Bank erosion and instream blockages caused by vegetation**



**(d) Land use types**

Please indicate Land Use types adjacent to the river channel as below:

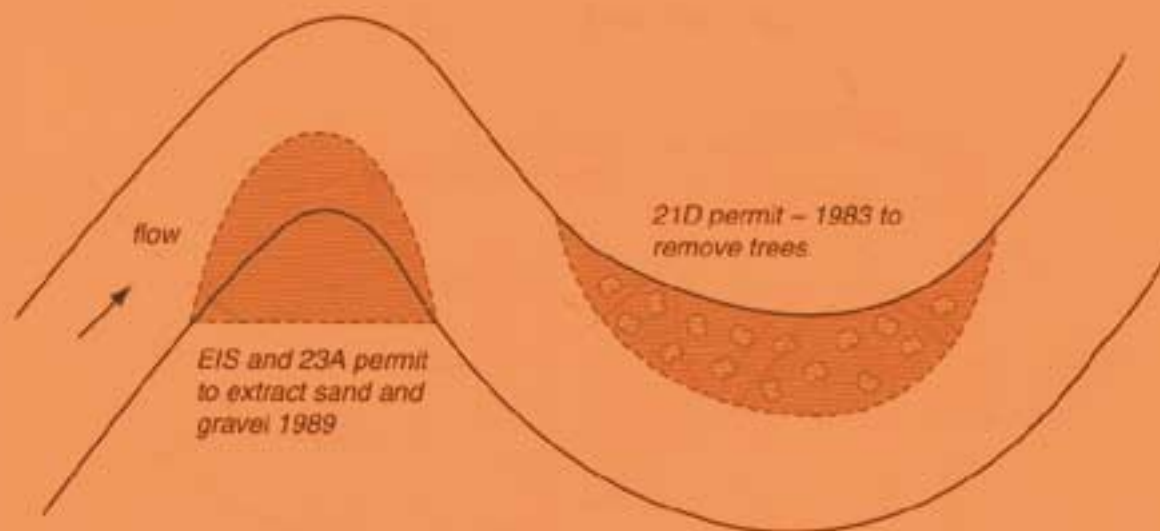
- |                                    |     |
|------------------------------------|-----|
| i) Very Rough Grazing              | VR  |
| ii) Rough Grazing                  | RG  |
| iii) Moderate Grazing              | MG  |
| iv) Good Grazing                   | GG  |
| v) Irrigated/Irrigable or cropping | I/C |
| vi) Not used                       | NU  |



If land use has changed in the last 20 years please indicate previous land use as above.

## E) GEOMORPHIC FEATURES and PERMITS/AUTHORITIES granted

- (a) WITH THE ORANGE PEN PROVIDED IDENTIFY ANY AREA THAT IS OR HAS BEEN THE SUBJECT OF AN ENVIRONMENTAL IMPACT STATEMENT OR PERMIT APPLICATION UNDER PART 3A (23A PRIOR TO APRIL 1992) OF THE RIVERS AND FORESHORES IMPROVEMENT ACT, OR SECTION 21D OF THE SOIL CONSERVATION ACT, thus:-



Give history of extraction sites thus:-

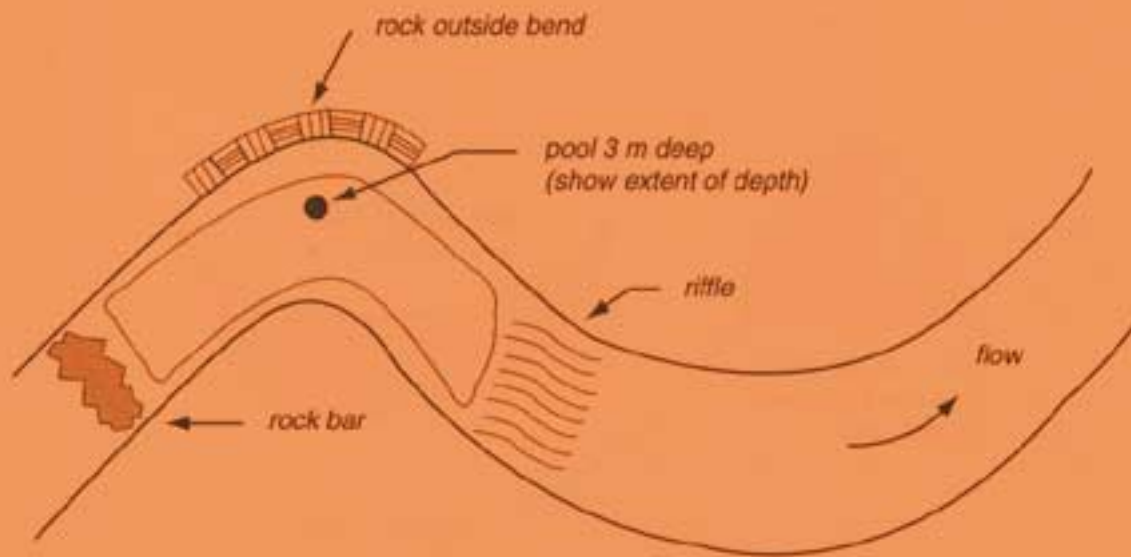
Extracted 3 times between 1989 and 1993 — approx 20,000 tonnes removed (total)

### (b) Instream features — that have changed over time.

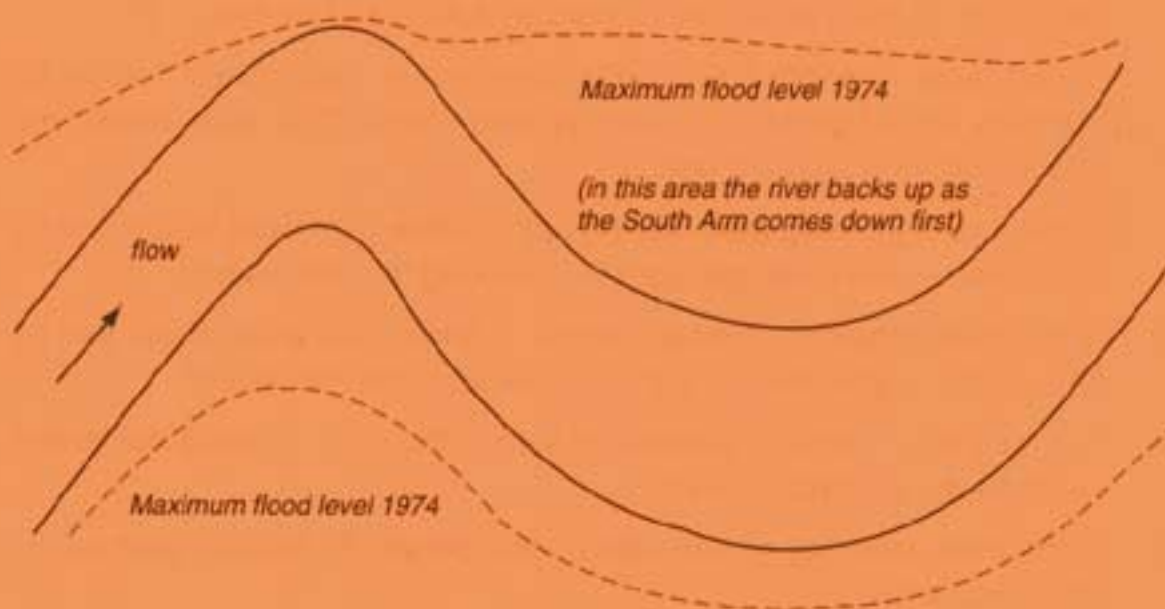
- i) Where pools have been lost — indicate details and location e.g.  
Buller's hole — length 300 m up to 50 m wide — "bottomless" habitat for platypus, mullet, perch, eels, herring and catfish. This hole existed pre 1949/1950, now a gravel bed.
- ii) Is the river aggrading (bed coming up) — show over what length and by how much — what are the signs — how long has this taken?
- iii) Is the river degrading (bed dropping) — show over what length and by how much — what are the signs — how long has this taken?
- iv) If you consider there is a sediment slug in the river — designate extent — when did you first notice it?
- v) Is the river widening or narrowing? give details if possible, particularly times, locations, etc.

(c) Instream features — at the present time.

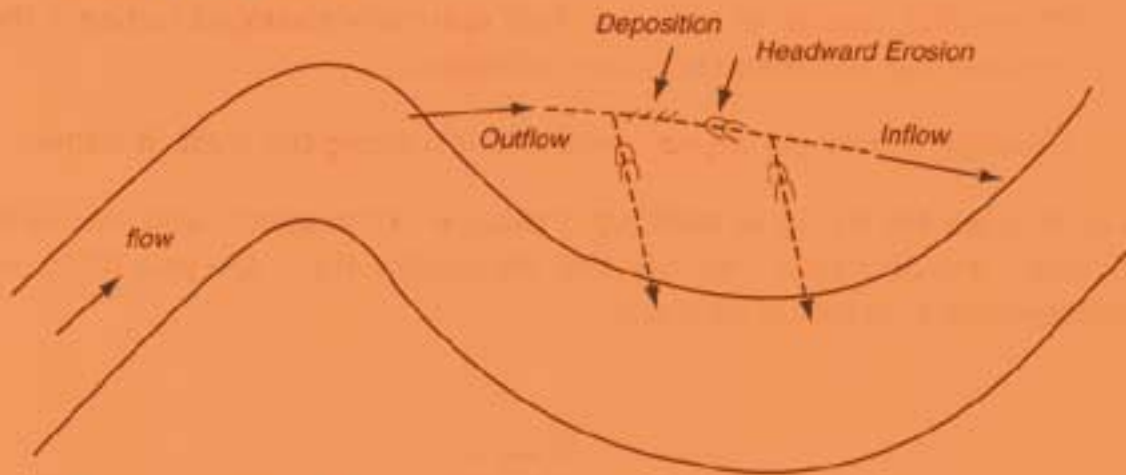
- i) Rock bars or logs important to control the level of the stream bed.
- ii) Rock banks or logs which control lateral migration of the channel.
- iii) Important gravel bars and riffles which control pools.
- iv) Detail of existing pools.



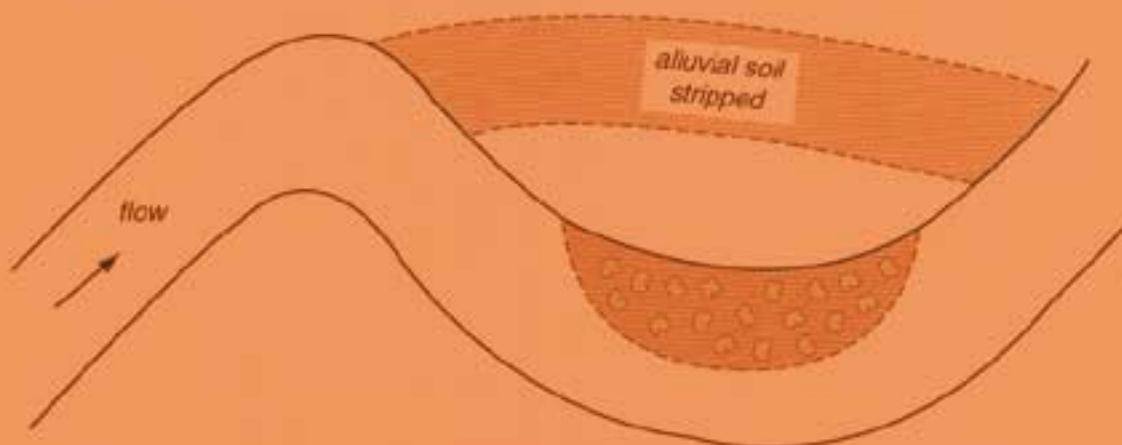
(d) Highest known flood level — make a comment about different types of flood or sequence of flooding.



- (e) Floodplain features — that have changed over time — also floodplain composition
- i) Major outflow and inflow channels — headward erosion — has the river been artificially or deliberately straightened? — show old course and date



- ii) Composition of the river flats — show nature and extent e.g.  
 “Quartz underlying silts deposited over — silt 4 metres deep — quartz 2 metres over bed rock.”  
 or  
 “Top flat — silt over clay base” — give profile if known.
- iii) Benches on the floodplain — the history, composition and timing of these, if known.  
 Please mark extent and write detail in note form.
- iv) Floodplain stripping or aggradation.



v) Other important details to note

- If there has been excessive floodplain stripping or soil deposition (e.g. sand) on the river flats please indicate.
- Indicate any buried fences/fencelines.
- Where the course of the river has naturally changed indicate the old channel and when changes occurred.
- Location of any surveyed cross-section along the river, if known.

In all this we are trying to build up a picture of the processes that have occurred through your memory and documentation. Do you have old photographs that would be useful?



## F) LANDOWNER'S MANAGEMENT OPTIONS AND PREFERENCES FOR THE NEXT FIVE YEARS.

This layer allows you to list your preferred options for the management of your stretch of the river. It provides a means of discussion with Department of Land and Water personnel and your neighbours about your best management options, taking into account the condition of the river, constraints imposed by land useage, environmental considerations and similar issues.

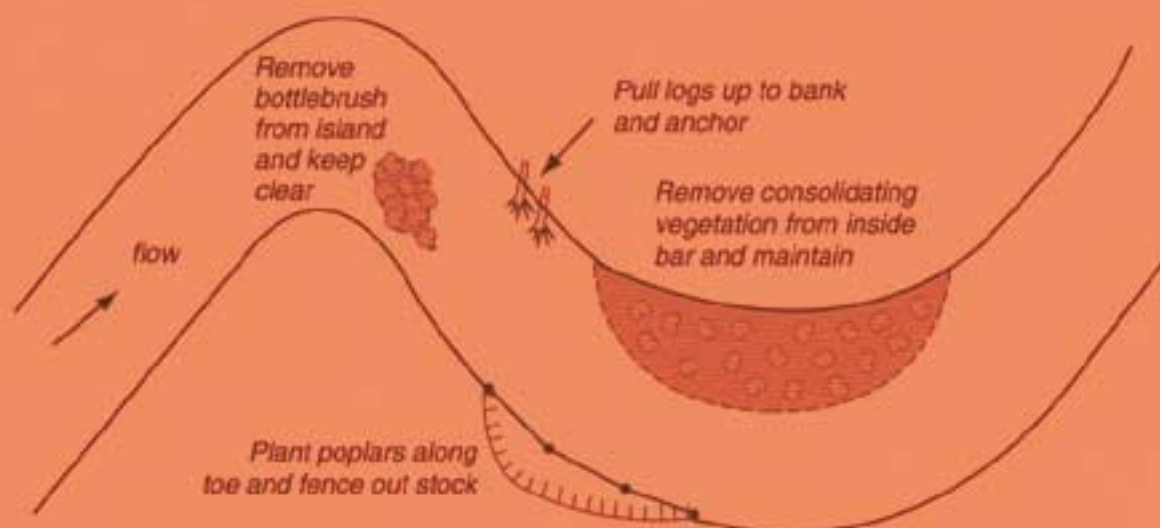
Perhaps the best way of starting this layer is to look at the features such as bank erosion, instream blockages, floodplain stripping, etc., marked in the environmental layer and start to devise simple solutions to these problems, within the resources available to manage them. See foldout sheet on "Management Processes and Simple Management Options".

Draw on the layer with the red pen provided your ideas, and signify next to those ideas what you feel is necessary to effectively manage the river and adjacent area, e.g. remove oak trees from the centre of the river, or plant bank to stop erosion, etc. Look at what might be achievable in a five-year time frame.

It is also necessary for you to know the 'dominant width' or optimum channel width of the river through your property. This is set out on the following pages titled "Channel Dimensions".

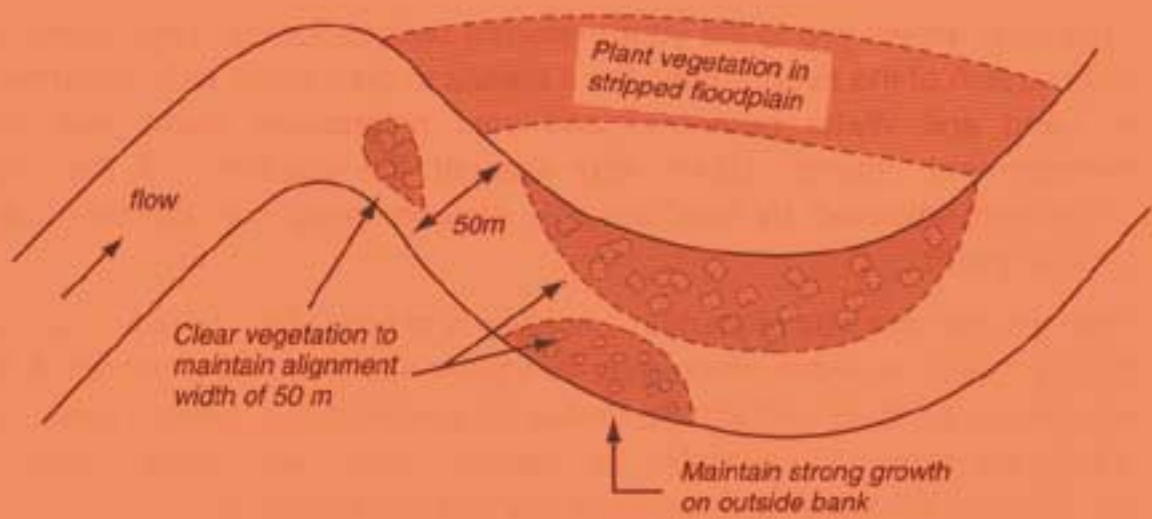
### Examples of how to mark in Landowner's management options

#### Example a)



\* This is given in Appendix 2 of this LWRRDC Occasional Paper.

**Example b)**



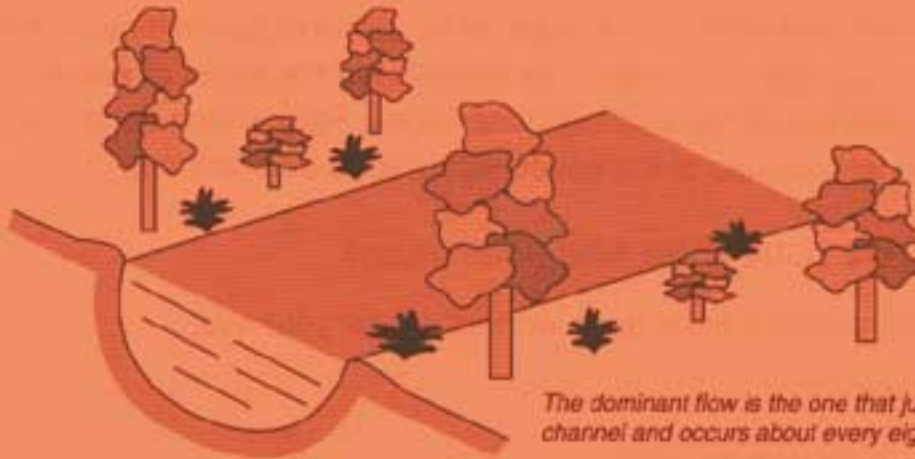
When you have completed all the steps return the plans to the Department of Land and Water Conservation for preliminary assessment.



## CHANNEL DIMENSIONS (CRITICAL\*)

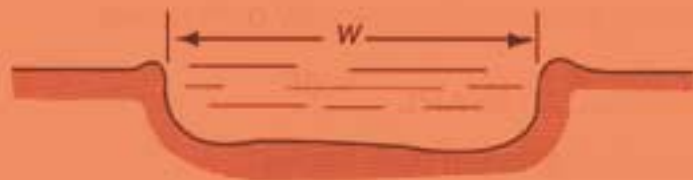
### How do I know how big my river channel should be?

The size of the river channel has been found to be dependent on the 1 in 18 month river flow. This flow is the one that fills the channel without overflowing its banks.



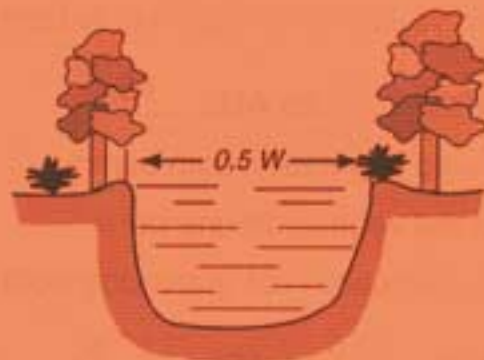
### How does vegetation impact on the channel size?

#### No vegetation



#### Good vegetation

*Good vegetation will contract the channel width by about 50% and also deepen it. If vegetation is destroyed the channel will widen and become shallow*



\* Critical channel dimensions — are in areas such as rapids, diversion to outflow channels and channels downstream of these locations, bends in rivers, reaches demonstrating channel flow characteristics.

## CHANNEL DIMENSIONS

### How do I work out the size of my river channel?

There are mathematical formulas which can be used. Your Department of Land and Water Conservation adviser can show the details of these.

A simpler way is to look at a stable section of a river and derive your section from this.

In looking at on-ground widths, one needs to be aware of any outflow or inflow points of minor channels or streams, as these have the effect of altering the "bankfull" flow and hence the channel dimensions. Rapids also decrease the width of a channel because of the speed water flows across them.

### DIMENSIONS FOR YOUR RIVER ARE! (Preliminary)

The following dimensions have been worked out for your river.

#### Missabatti Creek

ARL *0.0* to ARL *8.0*

Good vegetation both banks	19–23 metres
Good vegetation one bank	26–30 metres
No vegetation or grass only both banks	34–38 metres

ARL *8.0* to ARL *9.85*

Good vegetation both banks	15–19 metres
Good vegetation one bank	22.5–26 metres
No vegetation or grass only both banks	30–34 metres

ARL *9.85* to ARL *13.0*

Good vegetation both banks	13–15 metres
Good vegetation one bank	18–22 metres
No vegetation or grass only both banks	25–30 metres

ARL *13.0* to ARL *17.5*

Good vegetation both banks	10–13 metres
Good vegetation one bank	14–18 metres
No vegetation or grass only both banks	19–23 metres

ARL <i>17.5</i> to ARL <i>For discussion</i>	
Good vegetation both banks 5sq km	<i>6.0</i> .....metres
Good vegetation one bank	<i>8.5</i> .....metres
No vegetation or grass only both banks	<i>11.0</i> .....metres

**Nambucca River (*Preliminary*)**

ARL <i>28.5</i> to ARL <i>39.0</i>	
Good vegetation both banks	<i>27.5–32.5</i> .....metres
Good vegetation one bank	<i>37.5–42.5</i> .....metres
No vegetation or grass only both banks	<i>50–55</i> .....metres

**Junction Missabotti Creek (39.0 km)**

ARL <i>39.0</i> to ARL <i>55.0</i>	
Good vegetation both banks	<i>21–25</i> .....metres
Good vegetation one bank	<i>31–35</i> .....metres
No vegetation or grass only both banks	<i>40–45</i> .....metres

ARL <i>55.0</i> to ARL <i>70.0</i>	
Good vegetation both banks	<i>20–24</i> .....metres
Good vegetation one bank	<i>29–33</i> .....metres
No vegetation or grass only both banks	<i>37.5–42.5</i> .....metres

ARL <i>70.0</i> to ARL <i>80.0</i>	
Good vegetation both banks	<i>15–19</i> .....metres
Good vegetation one bank	<i>22.5–26.5</i> .....metres
No vegetation or grass only both banks	<i>30–35</i> .....metres

ARL ..... to ARL .....	
Good vegetation both banks	.....metres
Good vegetation one bank	.....metres
No vegetation or grass only both banks	.....metres

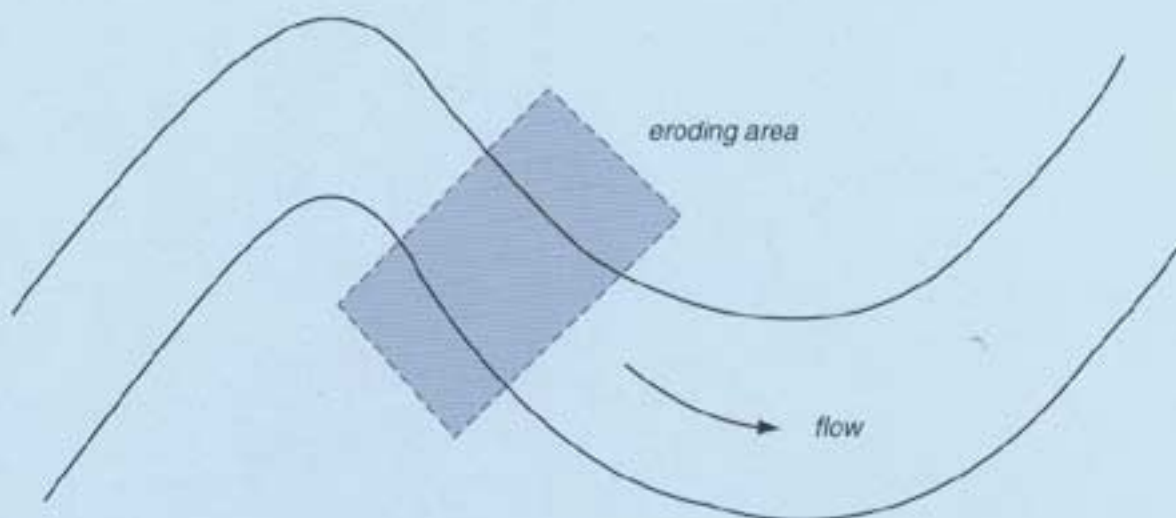
## G<sub>i</sub>) FINAL MANAGEMENT PROPOSAL

In this layer, your DLWC Advisors go along the river and discuss the various options, attributes, environmental factors, etc., and put together with you a workable management plan to be implemented over (say) the next five years.

Final management ideas are developed and areas of competing interests are examined and resolved.

This layer is completed in the **blue pen** provided.

**Eroding or degraded areas or areas of special interest** — mark out areas for discussions with your DLWC advisor as shown using the **blue pen** provided.



## G<sub>ii</sub>) TCM DETAIL

Please note down, using the **brown pen** provided, any supplementary information or comments that you consider to be important to the overall management of the catchment.

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## H) FINAL ACCEPTANCE AND APPROVAL

The management options accepted by the **Rivercare Group** as a whole will be transferred to the aerial enlargement/s.

Errors located on the plan will be corrected.

Approval of the **DRAFT MANAGEMENT PLAN** will be sought as required from Local Council and State Government Bodies (e.g. NSW Fisheries, National Parks and Wildlife Service).

Any variations sought will be discussed with the **Rivercare Group** before the plan is varied and presented to the Catchment Committee for final endorsement.

On endorsement the **DRAFT MANAGEMENT PLAN** becomes the **MANAGEMENT PLAN**. The photographic plan is now **LAMINATED**.

Permits associated with any works proposed will be obtained and provided to the Group, with the **RIVERCARE MANAGEMENT PLAN**.

**WORKS CAN NOW COMMENCE.**

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## APPENDIX "A"

The following plants are classified as Noxious as of 10th June, 1993 for Nambucca Council Area.  
21d permits are not required prior to their destruction.

### NOXIOUS PLANTS

Botanical Name	Common Name	Category
<i>Acacia karoo</i>	Karoo thorn	W1
◆ <i>Ageratina adenophora</i>	◆ Crofton Weed	W3
◆ <i>Ageratina nparia</i>	◆ Mistflower	W3
<i>Alternanthera philoxeroides</i>	Alligator Weed	W1
<i>Baccharis hahmifolia</i>	Groundsel Bush	W2
<i>Cannabis saliva</i>	Indian Hemp	W1
<i>Cenchrus Incerlus</i>	Spiny Burr Grass	W2
<i>Cenchrus longispinus</i>	Spiny Burr Grass	W2
<i>Cestrum parqui</i>	Green Cestrum	W2
<i>Chromolaena odorata</i>	Siam Weed	W1
◆ <i>Cortaderia selloana</i>	◆ Pampas Grass	W2
◆ <i>Eichhornia crassipes</i>	◆ Water Hyacinth	W2
<i>Equisetum arvense</i>	Horsetail	W1
<i>Eythmxyhtm coca</i>	Coca Leaf	W1
<i>Gymnocoronis spilanthoides</i>	Senegal Tea Plant	W1
<i>Kochia scoparia</i>	Kochia	W1
<i>Lagarostphon major</i>	Largarosiphon	W1
◆ <i>Lantana camara</i>	◆ Lantana (Red flowered)	W3
<i>Papaver somniferum</i>	Opium Poppy	W2
<i>Parthenium hysterophorus</i>	Parthenium Weed	W1
<i>Pistia stratiotes</i>	Water Lettuce	W1
<i>Rubus fruticosus (aggl. spp.)</i>	Blackberry	W2
◆ <i>Salvinia molesta</i>	◆ Salvinia	W2
<i>Seneclo Madagascariensis</i>	Fire Weed	W3
<i>Sorghum halepense</i>	Johnson Grass	W2
<i>Sorghum x alnum</i>	Columbus Grass	W2
<i>Sporobolus indicus var. major</i>	Giant Parramatta Grass	W3
<i>Sporoboluspyramidalis</i>	Giant Rat's Trail Grass	W2
<i>Toxicodendron succedaneum</i>	Rhus Tree	W2
<i>Xanthium spinosum</i>	Bathurst Burr	W2
◆ <i>Xanthium Occidentale</i>	◆ Noogoora Burr	W2
<i>Xanthium spp.</i>	Californian & Cockle Burrs	W2

◆ are the weeds commonly found near or in the river systems of the Nambucca.

W1 Notifiable W2 Need to fully and continually suppress and destroy W3 Must prevent spread and reduce numbers

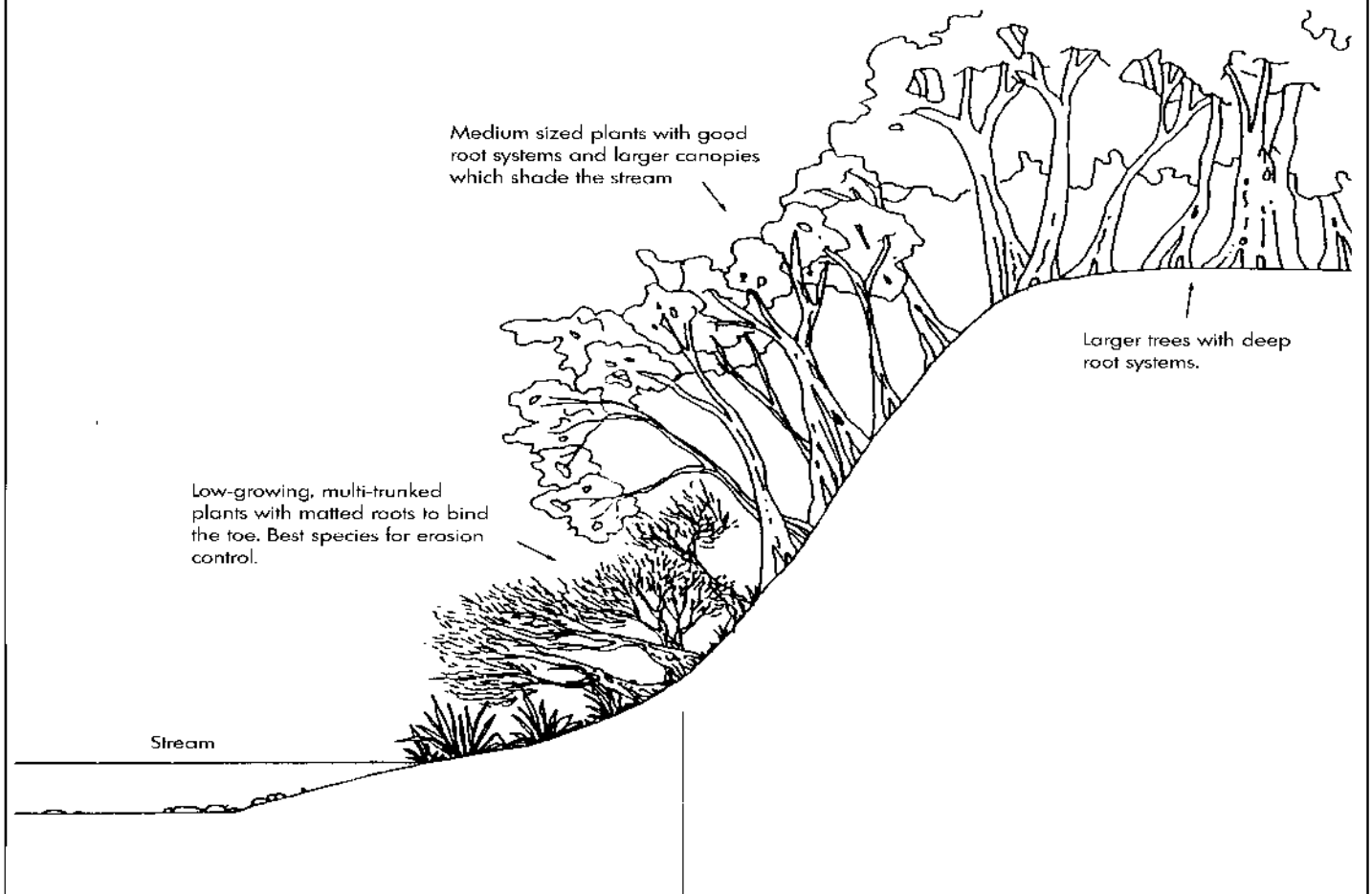
For more information contact Noxious Weeds Inspector Mr. John Ennis – phone 015-457-231

**APPENDIX "B"**

**Trees for River Planting  
Species by Stream and Location**

*Prepared by Allan Raine  
Senior Catchment Management Officer  
Department of Land and Water Conservation  
GRAFTON – Phone (066) 42 7799*

# SPECIES BY STREAM AND LOCATION



STREAM	TOE	MIDDLE	UPPER
ALL (including Warrell Creek)	<i>Leptospermum brachyandrum</i> <i>Lomandra hystrix</i> <i>Tristanopsis laurina</i>	<i>Acmena smithii</i> <i>Alectryon subcinereus</i> <i>Aphananthe philippinensis</i> <i>Archontophoenix cunninghamiana</i> <i>Austrosteenisia</i> sp. <i>Bacchousia myrtifolia</i> <i>Callicoma serratifolia</i> <i>Capparis arborea</i> <i>Ceratopetalum apetalum</i> <i>Cordyline stricta</i> <i>Cryptocarya glaucescens</i> <i>Cryptocarya microneura</i> <i>Cryptocarya obovata</i> <i>Daphnandra micrantha</i> <i>Eudriandra meulleri</i> <i>Ficus cornuta</i> <i>Glochidion ferdinandi</i> <i>Gmelina leichhardtii</i> <i>Gutera semiglauc</i> <i>Hymenosporum flavum</i> <i>Jagera pseudorhus</i> <i>Mallotus philippensis</i> <i>Melicope micrococca</i> <i>Milletia megasperma</i> <i>Neolitsea dealbata</i> <i>Pittosporum undulatum</i> <i>Planchonella australis</i> <i>Rhodomyrtus psidioides</i> <i>Syzygium australe</i> <i>Tristanopsis laurina</i>	<i>Acacia irrorata</i> <i>Acacia maidenii</i> <i>Acacia melanoxylon</i> <i>Alphitonia excelsa</i> <i>Aphananthe philippinensis</i> <i>Cryptocarya obovata</i> <i>Diploglottis australis</i> <i>Ehretia acuminata</i> <i>Elaeocarpus obovatus</i> <i>Eucalyptus grandis</i> <i>Flindersia schottiana</i> <i>Grevillea robusta</i> <i>Jagera pseudorhus</i> <i>Lophostemon confertus</i> <i>Mallotus philippensis</i> <i>Melia azedarach</i>
TAYLORS ARM	<i>Callistemon viminalis</i>	<i>Bosistoa floydii</i>	
BUCKRA BENDINNI		<i>Bacchousia anisata</i>	
ALL (except Warrell Creek)		<i>Amorphospermum whitei</i> <i>Cuddehuia paniculosa</i> <i>Cullisia riburnea</i> <i>Sloanea australis</i> <i>Sloanea woollsii</i> <i>Waterhousia floribunda</i>	<i>Agyrodendron actinophyllum</i> <i>Dysoxylum fraserianum</i> <i>Ficus</i> spp. <i>Elaeocarpus grand</i> <i>Toona australis</i>

## DESCRIPTION OF RIVERBANK PLANTS NATIVE TO THE NAMBUCCA CATCHMENT

HEIGHT - refers to maximum height in an OPEN situation. Some species may grow taller in protected areas.

FROST RESISTANT - refers to the frost resistance of newly planted seedling. 1 = definite resistance; 2 = some resistance (light frosts); 3 = none or very little frost resistance.

PROTECTION WHEN YOUNG - 1 = requires no protection; 2 = may require some watering and protection on exposed sites; 3 = plant requires watering and protective cover of taller plants.

BOTANICAL/COMMON NAME	BRIEF DESCRIPTION	MAX. HEIGHT (m)	FAST GROWING	PROTECTION WHEN YOUNG	FROST RESISTANT	OTHER USES	WILDLIFE
<i>Acacia irrorata</i> , green wattle	Small, fern-leaved wattle with pale yellow flowers. Very hardy.	6	+	3	1	Good canopy species for protecting rainforest plantings	Attracts insect-eating birds
<i>Acacia maidenii</i> , Maidens wattle	Medium-sized, bushy wattle with pale yellow flowers. Very hardy.	8	+	3	1	Good canopy species for protecting rainforest plantings	Attracts insect-eating birds
<i>Acacia melanoxylon</i> , blackwood	Medium-sized bushy wattle with pale yellow flowers. Very hardy.	10	+	3	1	Useful buffer tree for planting on the outer edges of stormiest plantings	Seeds attract birds
<i>Acmena smithii</i> , lilly pilly	Medium-sized rainforest tree with a dense habit and pink to purple fruit	10		2	2	Some forms make useful windbreaks if given sufficient water	Fruit attracts birds
<i>Alectryon subcinereus</i> , wild quince	Medium-sized rainforest tree with a dense crown, often bushy to the ground	8		2	2	Useful rainforest regeneration species, timber suitable for small turnery	Fruit attracts birds
<i>Alphitonia excelsa</i> , red ash	A medium-sized tree with some drought tolerance. Leaves have a white underside. Hardy	12	+	1	1	Timber suitable for building or cabinet work. Stock forage tree. Good rainforest regeneration tree	Seeds attract birds
<i>Amorphospermum whitei</i> , rusty plum	Medium-sized rainforest tree with large fruits that are rusty-hairy beneath. Large black fruits in spring. Rare	10		1	3	Feature tree for rainforest plantings	
<i>Aphananthe philippinensis</i> , rough-leaved elm	Small to medium-sized rainforest tree with stiff, elm-like leaves and dense, dark crown. Hardy	12		2	2	Timber hard and suitable for handles. Edible fruit. Useful rainforest regeneration species	Fruit attracts birds
<i>Archontophoenix cunninghamiana</i> , bangalow palm	Single-stemmed, feather-leaved palm. Needs plenty of water. Best for upper catchment	8	+	1	3	Landscaping	Fruit attracts birds
<i>Argyrodendron actinophyllum</i> , black booyong	Tall rainforest tree with dense, dark canopy and fan-shaped leaves. Needs plenty of water	18		1	3	Attractive feature tree. Useful timber tree for indoor work	Seeds eaten by scrub turkeys
<i>Austrosteenisia</i> spp.	Large vine species with red flowers. Blood red sap produced from freshly cut trunk	Vine		1	2	Riparian vine species	
<i>Baccharis antisata</i> , ringwood	A tall, dense-crowned rainforest tree. The crushed leaves have a distinct aniseed smell	15		1	2	Leaves can be used for their aniseed odour. Timber durable	
<i>Baccharis myrtifolia</i> , grey myrtle	Slow-growing bushy rainforest tree with some drought tolerance. Usually found on steep rocky banks. Hardy	8		2	2	Screen plant. Wood hard and tough, and suitable for handles	Good host for orchids and ferns
<i>Bosistoa floydii</i> , five-leaved bonewood	Small to medium sized rainforest tree with dense, dark crown. Slow growing. Needs water to start. Rare	15		1	3	Ornamental tree	
<i>Caldecaria paniculosa</i> , soft corkwood	Medium sized rainforest tree which produces small, showy cream flowers in November	15		1	3	Suitable for cabinet timber	Good host for orchids and ferns

BOTANICAL/Common Name	Brief Description	Max. Height (m)	Fast Growing	Protection when Young	Frost Resistant	Other Uses	Wildlife
<i>Callicoma serratifolia</i> , callicoma	Shrub or small rainforest tree with distinct toothed leaves and white underside. Usually on shaded rocky banks. Needs water to establish	8		1	3	Useful understorey species in protected, shady areas	
<i>Callistemon viminalis</i> , weeping bottlebrush	Multi-stemmed tree with hard furrowed bark and red bottlebrush flowers. Very hardy	5	+	3	1	Excellent erosion control species. Used for direct seeding	Flowers attract honeyeaters
<i>Casuarina cunninghamiana</i> , river oak	Tall, pine-like species. Very common on the North Coast. Hardy. Needs management as may contribute to erosion	20		3	1	Fixes nitrogen. Good canopy cover species for rainforest regeneration. Direct seeding.	Larger, older trees used as roosting sites
<i>Ceratopetalum apetalum</i> , coachwood	Medium sized rainforest tree with attractive pale trunk with prominent rings	12		1	2	Cabinet timber species	
<i>Cordyline stricta</i> , slender pal-lilly	Slender shrub often forming clumps	2		3	3	Landscaping, understorey plant in shaded areas	Fruit attracts birds
<i>Cryptocarya glaucescens</i> , jackwood	A medium-sized, dense-crowned rainforest species producing wrinkled black fruit in autumn	10		3	2	Cabinet timber species	Fruit attracts birds
<i>Cryptocarya microneura</i> , murrugun	A medium-sized rainforest species producing shiny black fruit in summer/autumn	10		3	2	Reasonably hardy species for rainforest plantings	Fruit attracts birds
<i>Cryptocarya obovata</i> , pepperberry tree	Medium to tall densely-crowned rainforest tree with hairy new growth and dark leaves	18		3	3	Good shade tree	Fruit attracts birds
<i>Cutisia viburnea</i> , cutisia	Small, soft-leaved rainforest species producing showy white flowers in spring/summer. Usually on shaded, rocky banks. Dislikes drying out	6		1	3	Useful understorey species for shaded, rocky sites	
<i>Cyathea</i> spp., tree fern	Tall, single-trunked fern	4		1	3	Useful understorey species for protected, shaded areas	
<i>Daphnandra micrantha</i> , socketwood	Medium-sized, straight-stemmed rainforest tree with compact, dense canopy and horizontal branches	12		3	3	Sometimes used for ornamental rainforest plantings	
<i>Diploglottis australis</i> , native tamarind	Attractive tall rainforest tree with large leaves and rusty hairy new growth	15		3	3	Attractive tree for landscaping. Edible fruit	Fruit attracts birds
<i>Dysoxylum fraserianum</i> , rosewood	Medium to tall rainforest tree with shady spreading crown. Needs water to establish	18		3	3	Timber is rose scented and used for cabinet work	
<i>Ehretia acuminata</i> , koda	Medium-sized rainforest tree. Deciduous, with grey, fissured bark and masses of orange fruits in summer/autumn	10		2	2	Fruits are ornamental	Fruit attracts birds
<i>Elaeocarpus grandis</i> , blue quandong	Tall, buttressing rainforest tree with sparse canopy and large blue fruits in spring/summer	30	+	2	3	Valuable timber tree for interior work. Shade tree. Edible fruit	Fruit attracts birds
<i>Elaeocarpus obovatus</i> , hard quandong	Tall rainforest tree tolerant of wet soils. Hardy. Produces masses of small blue fruits	15		2	2	Useful timber tree for interior work. Shade tree	Fruit attracts birds
<i>Endiandra muelleri</i> , green-leaved rose walnut	Bushy tree with pink new growth and black fruits in Autumn	12		1	3	Landscaping	Fruit attracts birds.

BOTANICAL/COMMON NAME	BRIEF DESCRIPTION	MAX. HEIGHT (m)	FAST GROWING	PROTECTION WHEN YOUNG	FROST RESISTANT	OTHER USES	WILDLIFE
<i>Eucalyptus grandis</i> , flooded gum	Very tall eucalypt with smooth white bark. Mostly found at lower elevations	35	+	1	2	Hardwood timber. Good pollen tree	Koala food tree
<i>Ficus coronata</i> , Greek sandpiper fig	Small bushy tree with sandpapery leaves	6		2	2	Excellent riparian species with edible fruit	Fruit attracts birds
<i>Ficus</i> spp., other figs	Large trees with buttress roots and spreading canopy	20		1	3	Excellent shade tree. Edible fruit	
<i>Flindersia schottiana</i> , cudgerie	Tall tree with open canopy. Very hardy	20	+	2	2	Very fast growing tree which is ideal for rainforest regeneration. Useful timber for indoor work	
<i>Glochidion ferdinandi</i> , cheese tree	Tree has spreading canopy with attractive foliage. Fruit looks like small cheeses	8		2	2	Excellent riparian regeneration species and small shade tree	Fruit attracts birds
<i>Gmelina leichhardtii</i> , white beech	Medium sized rainforest tree with spreading canopy and large purple fruits in summer/autumn	15		1	3	Valuable timber species. Good shade tree	Fruit attracts birds
<i>Grevillea robusta</i> , silky oak	Tall, sparse canopied species with golden flowers. Drought tolerant. Very hardy	15	+	3	1	Excellent species for rainforest regeneration. Cabinet timber. Minor to medium value for bees	Flowers attract honeyeaters
<i>Guioa semiglauca</i> , guioa	Small rainforest tree. Leaves with silvery underside. Hardy	10		2	2	Attractive tree for landscaping. Useful for rainforest regeneration	Fruit attracts birds
<i>Hymenosporum flavum</i> , native frangipani	Small rainforest tree producing numerous yellow and white flowers in spring. Hardy	10	+	1	1	Useful species for rainforest regeneration	Fruit attracts birds
<i>Jagera pseudorhus</i> , foambark	Small rainforest tree with attractive ferny foliage and hairy yellow-brown fruits. Hardy	12		2	2	Very attractive tree for landscaping. Useful for rainforest regeneration	Fruit attracts birds
<i>Leptospermum brachyandrum</i> , thin-fruited tea tree	Small, multi-trunked tree, common in the catchment. The bark peels in spring, turning from a copper colour to white. Very hardy	4	+	3	1	Good erosion control species. Can be used for direct seeding	Good habitat species for shading the stream edge
<i>Lomandra hystrix</i> , spiny mat-rush	Small, tussocky rush, forming thick clumps. Hardy	1		1	1	Good for erosion control if planted in sufficient density. Large spreading root system	Good stream edge habitat species
<i>Lophostemon confertus</i> , brush box	Tall tree with spreading growth when grown in the open. Hardy	25	+	2	2	Good hardwood timber. Shade tree. Good quality nectar and pollen for bees	Useful habitat tree when large
<i>Mallotus philippensis</i> , red kamala	Small bushy, dense-crowned rainforest tree producing hard red capsules in spring/summer. Very hardy	8		2	2	Useful rainforest regeneration plant. Fruit can be used for dye. Wood suitable for tool handles	
<i>Melia azedarach</i> var <i>australasica</i> , white cedar	Very hardy deciduous tree. Drought tolerant	15	+	1	1	Cabinet timber species	Fruit attracts birds
<i>Melicope micrococca</i> , white euodia	Small rainforest tree with light-green foliage. Leaflets arranged in threes	10	+	3	2	Useful rainforest regeneration species on protected sites	Fruit attracts birds
<i>Milletia megasperma</i> , native wysteria	Large vine species producing large pods similar to black bean tree	Vine		1	3	Riparian vine species	

BOTANICAL/Common Name	BRIEF DESCRIPTION	MAX. HEIGHT (m)	FAST GROWING	PROTECTION WHEN YOUNG	FROST RESISTANT	OTHER USES	WILDLIFE
<i>Mischocarpus pyriformis</i> , yellow pear-fruit	Small rainforest tree with dark green foliage. Fruits yellow and pear-shaped	10		1	5	Landscaping. Understorey plant	Fruit attracts birds
<i>Neolitsea dealbata</i> , white boly gum	Small bushy tree with large drooping leaves that are vivid white underneath	10		5	5	Landscaping plant. Understorey tree	Fruit attracts birds
<i>Pittosporum undulatum</i> , native daphne	Small bushy tree with fragrant flowers in spring. Hardy	8	+	1	1	Landscaping plant. Low windbreak tree. Good for rainforest regeneration	Fruit attracts birds
<i>Planchonella australis</i> , black apple	Medium-sized rainforest tree with dark glossy leaves and large black fruits in spring/summer	12		5	5	The large black fruits are edible	Fruit attracts birds
<i>Sloanea australis</i> , maiden's blush	Spreading, shady canopy rainforest tree with large glossy toothed leaves. Likes plenty of water	15		1	3	Useful timber tree for interior work	Fruit attracts birds
<i>Sloanea woollsi</i> , yellow carabceen	Spreading, shady canopy rainforest tree with large glossy toothed leaves. Likes plenty of water	15		1	3	Useful timber tree for interior work	Fruit attracts birds
<i>Syzygium australe</i> , brush cherry	Small, dense crowned rainforest tree with dark green leaves and red fruits from summer to early winter	10		2	2	Edible fruit. Good riparian rainforest regeneration species	Fruit attracts birds. Good host for ferns
<i>Toona australis</i> , red cedar	Large rainforest tree with large leaves and spreading canopy. Semi-deciduous. Hardy	20	+	2	2	Good shade tree. Valuable timber tree. Subject to attack by tip moth	
<i>Tristaniopsis laurina</i> , water gum	Medium-sized tree with flaky bark and yellow flowers produced in summer. Hardy	12	+	2	1	Useful erosion control species and some value for cabinet work. Useful nectar and pollen species. Used for direct seeding	Roots provide habitat for stream-dwelling animals. Good riparian shade species
<i>Waterhousea floribunda</i> , weeping myrtle	Medium to large tree. Densely crowned with weeping foliage and round green fruit in summer/autumn. Hardy	15	+	2	2	Excellent erosion-control species with extensive mat-like root system	Roots provide habitat for stream-dwelling animals. Good riparian shade species