

# **OVERVIEW.**

## **WHAT THE LANDCARE GROUP WANTS TO DO**

This Report and Action Plan has been specifically prepared for the Royalla/Williamsdale Landcare Group in response to their concerns about the increasing degradation of their Guises Creek system.

The report is concerned only with the creek itself, and immediate riparian zone. Examination of the catchment, and the catchment-wide degradation processes, is beyond the scope of this report.

Many reaches of Guises Creek have severely degraded riparian zones, are actively eroding, with stock allowed unlimited access to the water. There are some sections, especially towards the mouth of the creek, where the native riparian vegetation is intact, water quality is high, and the system is not degraded. This report identifies the major degradation problems of the Creek, and offers actions for halting and even reversing them.

The Landcare Group, by general consensus, wishes to halt the degradation processes occurring in both the creek channel, and the riparian strip, as their central objective.

For the purposes of this report, the riparian strip is approximately 100m either side of high water mark / gully top / of wetland. Tied to this central objective is the opportunity to begin to reverse this degradation over time, so that water quality and the riverine ecology improves. This will then have the dual benefit of increasing productivity and ecological bio-diversity.

By prioritising the actions necessary to overcome the degradation processes, the Landcare group can apply accordingly for funds and in-kind support to systematically carry out these actions, as no individual landholder can afford to undertake these reparation costs unassisted. Both the Landcare Group's objectives, and the recommendations of this report, are based on the philosophy of Ecologically Sustainable Development. (ESD). This is a holistic philosophy whose goal is to foster development that improves the total quality of life, now and in the future, in a way that maintains the ecological processes on which life depends. ESD is embraced in the principle of Total Catchment Management(TCM), and in the ethic of Landcare.

TCM is a holistic concept recognizing the interconnectedness of all components of a water catchment. It is "the coordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis so as to balance resource use and conservation to manage them sustainably." (Upper Murrumbidgee Catchment Draft Action Plan)

The Decade of Landcare Plan provides the framework for responsibility of environmental reparation to be shared cooperatively amongst local communities to eventually achieve long-term sustainable resource use. Within the tenets of Landcare, all stakeholders (government and private landmanagers) must meet their agreed responsibilities through a coordinated, cooperative commitment to Best Management Practices to achieve their landcare objectives.

Landcare is often viewed as a public benefit, a community movement, a property management scheme, and a government assistance program. All the enthusiastic goodwill in the world will eventually diminish without the support of appropriate resources, and the recognition for the effort involved.



Photos, Section 1. Immediately downstream from the break of slope at the beginning of Guises Creek. Here the creek is a 'chain-of-ponds'. Note the stabilising tussock grasses and reeds, together with stock trampling and erosion in the muddy edge, and erosion. Excluding all stock from these ponds will result in a bio-diverse wetland and pondage system within a few years.





Final Section of the Creek, as it flows into the Murrumbidgee River.  
This area is undisturbed by clearing or grazing, and except for fires, is probably relatively pristine.





A deep pool, typical of those found throughout the length of the creek. The Poplars are becoming invasive, and the fallen tree may create trouble downstream if washed away in a serious flood. While some timber strewn along the banks is essential for habitat, and stream-bank stabilisation, care needs to be taken to maintain a balance here. Native riparian grasses line the edge. There is some damage by stock to the edge of the pond, just visible to the left-hand edge of the photo. Poplars control is needed, with replacement with appropriate native species that won't sucker.



Downstream of another deep pool, choked out by Poplars, an occasional willow, and Hawthorns just out of sight. Massive root and fallen tree obstructions have caused the creek to gouge out new channels, the water here is anoxic, with little aquatic life. Slow and steady poisoning of these mid-stream and edge trees, together with the establishment of appropriate native species, will improve water quality, biodiversity and creek stability over time.



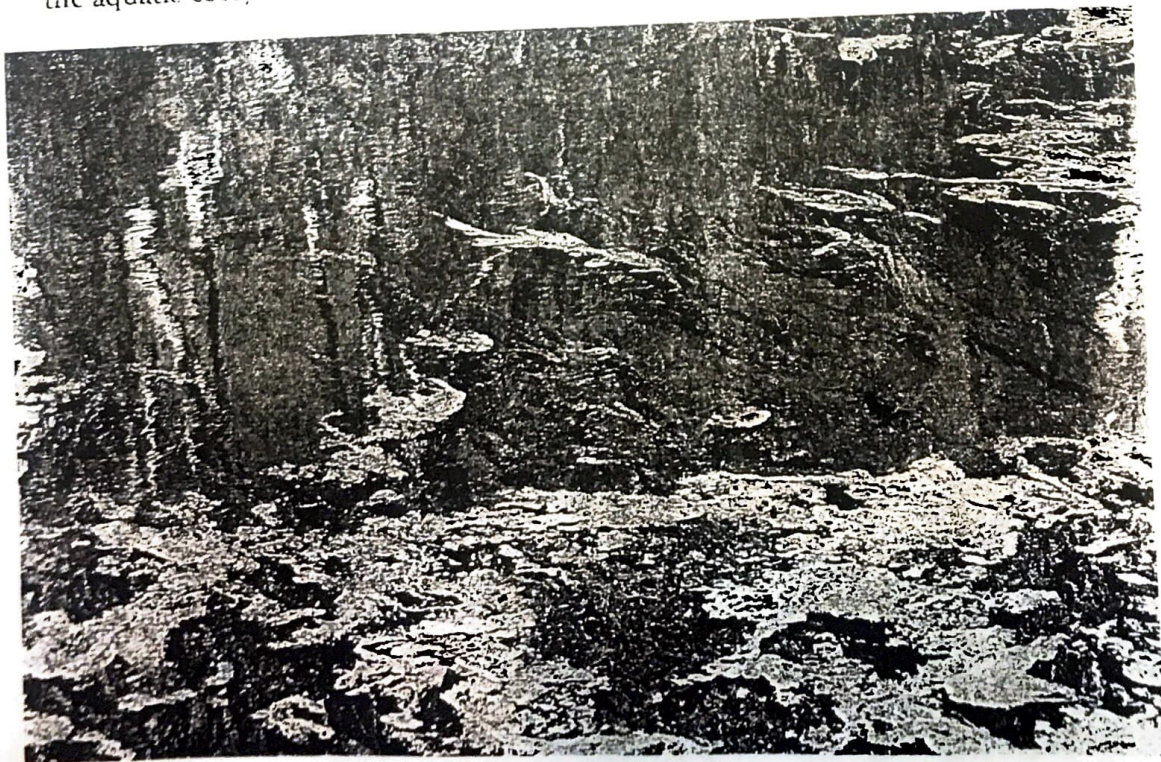


Three repair jobs are in order here!

Tunnel erosion on the stock track visible on the right-hand, uphill bank is now going under the fence. A small swale built above it to divert and dissipate water flow will halt that problem. Stock access downstream of the fence, including cattle and poultry, are seriously degrading water quality, stream-edge stability, and creating localised pasture weed invasions. With stock exclusion, there would be no need for the fenced floodgate, saving considerable time and cost in repair.

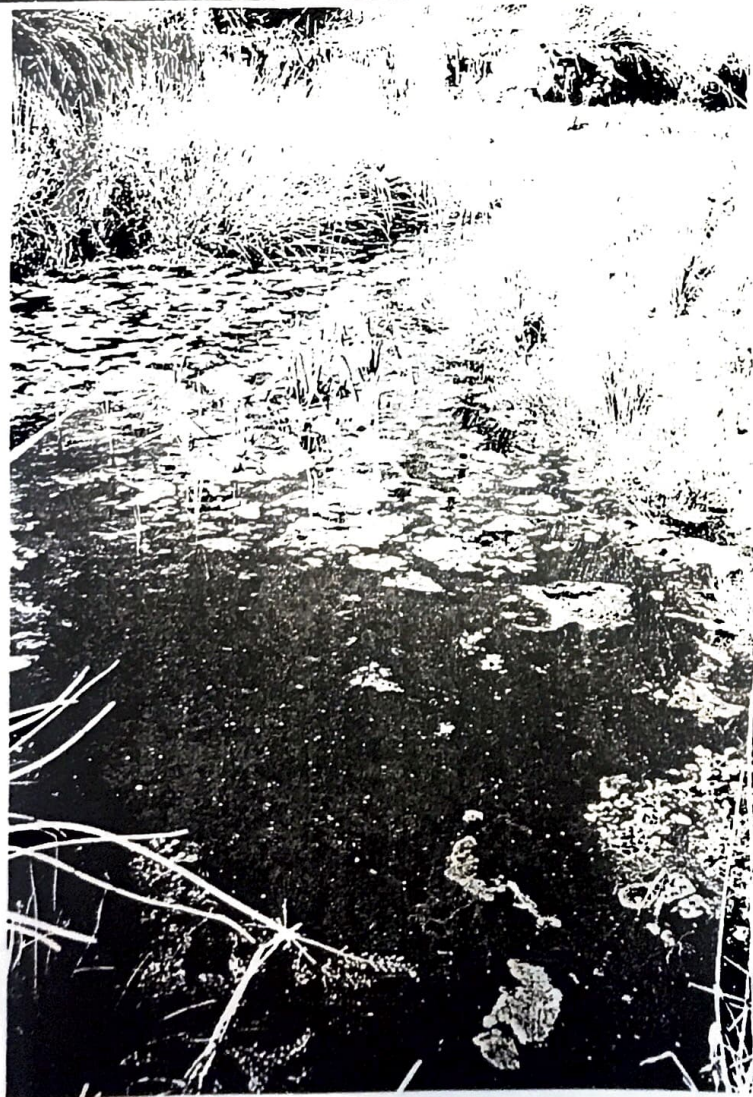


Algal Blooms in a still-water pool indicative of low-nutrient water. These blooms trap silt and attached particulates, and provide a breeding ground for aquatic life, and form an essential part of the aquatic ecosystem.





Algal Blooms indicative of very high nutrient levels in the water. These flourish only when the source of nutrient is available, and are therefore found at degradation 'hot spots'. The bare, footprinted edge leaves the visitor in no doubt as to where the stock come to drink.





Guises Creek flows in an incised channel through these grazing paddocks, with little to no riparian vegetation protecting it from surface run-off, and unlimited stock access down the banks and into the creek gully. Fencing out the stock and re-vegetating the filter and buffer zones will halt erosion, improve water quality, and bring back many species of native plants and animals.



Stock tracks criss-crossing the banks, actively eroding them and preventing vegetation growth. Native grasses still hanging on. These grasses will flourish with stock exclusion, and well survive rotational grazing once they have re-established.





Not far from where the creek becomes wild, Fred enjoys the feel of the cool water! Stocking pressure appears lower in this section of the creek. The surviving native riparian plants are holding the Poplars at bay, and the pool and riffle sequences in the watercourse are stable.



Phalaris, Blackberry and Poplars flourish amongst the occasional native reeds beneath the railway.





# **BACKGROUND INFORMATION**

Guises Creek rises in the ACT at the junction of two small streams flowing from Enchanted Hill, becoming a series of chain - of - ponds first evident at the break of slope. (see photos section 1). The Creek exits into the Murrumbidgee River in NSW some 16 kms downstream. (see photos, Final Section of the Creek)

During its course, the Creek runs through agricultural grazing land bi-sected by the Monaro Highway, and surrounded by a mountainous catchment (altitude 800m plus) that is mostly wooded or forested on the upper slopes, and cleared for grazing on the lower slopes.

At its source, the Creek ponds are surrounded by native reed and tussock marshland which is intermittently flooded. The catchment of the upper creek was cleared in the early part of this century, with only occasional stands of timber and native *Poa* tussock remaining on rocky outcrops. The land is grazed by cattle and sheep, who have full and year-round access to the pondage system of the creek. The stocking rates vary with the vagaries of season and economy, consequently varying the seasonal stocking pressure on the ponds.

The 'chain-of-ponds' found here are an uncommon sight in the local stream/ creek / river systems of the ACT and SE Region today.

It is believed many of the local watercourses, including Jerrabomberra Creek, Woolshed Creek, sections of the Molonglo River, Ginninderra Creek, and of course Gooroomon Ponds, were originally 'chain-of-ponds'. Extensive land clearing, over-grazing, rabbit plagues, fires, the loss of native riparian vegetation, and the consequent erosion events caused the watercourse to cut out incised channels, connecting and thus destroying these pools in the process.

For the chain - of - ponds in Guises Creek to still be intact is a valuable ecological and hydrological asset. Their conservation is a high priority. To the credit of the farmers who farm this section of the creek, they are very keen to conserve the integrity of these ponds by protecting them from stock, and enhancing the bio-diversity of their marshland/wetland vegetation. See Action Plan for details.

When the Creek becomes a flowing watercourse, about 1km after it rises as a chain-of-ponds, it runs through almost 10km of grazing country before entering into a broad, gorge-like formation with steep, rocky sides, untouched natural riparian vegetation, and rock pools, waterfalls and riffle sequences. (See Photo over). The Creek continues in this manner until it reaches the Murrumbidgee. This last section of the Creek is quite wild, and as such it is also an ecological asset to the farmer, the Landcare group, and the local community. (See Action Plan for details)

As the Creek flows through the undulating grazing land, it encounters a variety of geological and hydrological changes.

- In places the creek channel is neither incised nor eroding, with substantial riparian vegetation in the form of native tussock grasses and occasional wattles protecting it.
- Elsewhere, the creek has incised a deep and broad channel, where the creek banks and creek bed are still actively eroding. Poplars and willows appear to form the main threat as invading weeds, with some Hawthorns and Blackberries in specific sections. Willows, Poplars, Elms, Hawthorns and other exotic tree and shrub species known to thrive in



water-saturated soils, were once planted extensively along sections of the creek below farmhouses. They provided soil and stream-bank stabilization, aesthetic pleasure according to the cultural values of the time, and thrived in the available habitat with minimum maintenance. Only recently has the nature of their ecological damage become understood. African Lovegrass is rapidly colonising disturbed land alongside the government TSR, and where the rocky embankments have been built to protect the creek banks from erosion from the construction of the road-bridge over the creek.

- There are many deep, sometimes clear, pools throughout the length of the creek, which apparently never run dry. Yabby holes are frequent, frog song common, but no fish species were sighted on the day. (See Photo)

A number of small tributary creeks and gullies run into Guises Creek. Most of them are also actively eroding - from their banks, in their channels, and in many cases, tunnelling uphill at their source. (See Photo) Some farmers have attempted to control this by in-filling the tributary channel with truckloads of fill, concrete, building rubble, and old cars - an old Australian tradition!

Through many farms, the creek is the major water supply for all stock - cattle, sheep, horses, and, in the past, goats. Evidence of wild pig disturbance was found along sections of the lower Creek. Little effort has been made to restrict stock access to the watercourse through the years. The cumulative impacts of stock access are well known- loss of species in the filter and buffer sections of the riparian zones, continuing bank and channel erosion, high nutrient levels in the water and accompanying algal blooms, siltation of the water due to trampling and wallowing, potential transport of livestock diseases downstream, and potential loss of productivity by a decrease in optimum health of stock. (see Appendix)

The water quality of Guises Creek further suffers from the surface water run-off from the Monaro Highway which runs alongside it, together with stormwater outlets that drain the road. Run-off into the Creek from pastures, farmhouses and farm gardens is often not buffered by riparian vegetation. Hydrocarbons, litter, particulate, heavy metal residues, and fertilizer/herbicide/insecticide residues would be the commonest pollutants found in the stormwater discharges along the creek. Although preventing the pollution at source would be extremely difficult in the short-term, buffering and dissipating their arrival into the Creek with riparian re-vegetation is possible, practical and cost-effective in the short-term

There is little information available about the quality and quantity of the groundwater connected to Guises Creek. This is potentially another source of both quality and quantity pollution into the Creek, and will undoubtedly become an issue in the future.

In summary, the creek is being degraded by a number of interconnected processes : active erosion is exacerbated by stock access and the loss of riparian vegetation; riparian vegetation cannot be repaired while stock graze and trample it; pollutants flow into the water unimpeded by vegetation buffers, and increase in-channel by erosion and stock excreta and trampling.



## **Land Tenure:**

Farmers with ownership of land that includes Guises Creek in NSW, have the security of free-hold tenure, within the bounds of Local, State and Federal Government laws, legislation, policies and regulations. Recent sales and sub-divisions in the area show that nothing remains the same.

Farmers with land that includes Guises Creek within the ACT have a nebulous security of tenure, as they must lease the land from the government, pay both rent and rates on this land, and are subject to both ACT Government and Federal Government laws, legislation, policies and regulations. Compliance with mandatory Property Management Agreements, currently before the Legislative Assembly for ratification, will be an essential component of renewing expired leases, and extending the duration of an existing lease. Compliance will include an adherence to land management practices which ensure the highest possible water quality flowing through each local catchment, and into the Murrumbidgee River.

The history of government attitudes to the leased rural "landbank" has changed with incumbent governments and their perceived needs and budgets. Consequently, an air of insecurity and frustration pervades the ACT rural leaseholders, and the on-going negotiations to formalize a secure system acceptable to both leaseholder and farmer continue.

It is to the credit of this Landcare Group that they are prepared to find solutions to the degradation of their creek despite insecurity of tenure in some instances.

### **ENVIRONMENTAL VALUES OF THE CREEK WITHIN THE ACT:**

With the publication of the ACT WATER QUALITY POLICY in 1981, all waterways in the ACT were ascribed Environmental Values. These are "used to define the attributes of streamflow, water quality, and ecology, that are judged by pertinent scientific opinion, and by the community, to be worthy of protection" (State Of Environment Report 1995)

The Environmental Values GIVEN TO Guises Creek are:

- The conservation of aquatic ecology
- Recreational usage, e.g. fishing, bird watching walking, cycling, picnicking, etc
- Domestic water supply
- Secondary water supply, e.g. for irrigation
- Landscape values

The ACT Government has adopted the National Water Quality Management Strategy, under the Inter-governmental Agreement on the Environment. This Agreement secures the protection of water quality, and the sustainable use of water resources, across Australia. It does so by having in place an administrative code that requires each government to identify the environmental values of the waters to be sustained. Once these are identified, the water quality guidelines necessary to sustain these values must then be determined. The previously determined environmental values for Guises Creek were affirmed in the adoption of the National Water Quality Management Strategy, and are explicitly outlined in the ACT Territory Plan.

Within the ACT, The Water Pollution Act 1984 further protects these environmental values, which are given statutory status through the Territory Plan (1993), and are measured against, and maintained by, the ACT Water Quality Guidelines (Published 1989, reviewed



and re-released in 1995), and the most recent Water Resources Management Act, and the Environment Protection Act.

This Act is based on the premise that the cost, and responsibility, of repairing and maintaining a healthy environment needs to be shared across the community.

This is relevant to the securing of assistance and funds to repair the Creek.

Today, with the heightened social awareness of environmental problems being translated into political and community action, there is a mandate for the ACT Government to maintain their leading edge reputation of sustainable high quality water in an urban and/or rural catchment.

The National Capital Plan 1992, identifies an integrated approach to water management across the ACT. This has now been adopted across the whole Upper Murrumbidgee River Catchment, through the ACT and Sub-Region Plan, and inter-related government agencies.

This includes

- assessment and control of sustainable land use and management practices
- protection of floodplain and waterway corridors
- discharge controls/licensing
- provision of pollutant interception infrastructure
- education
- management of lake recreation facilities
- Performance monitoring and strategy reviews.

Some of the government agencies implementing this are:

Environment ACT, Planning And Land Management (PALM), NSW Environment Protection Agency, NSW Department of Land and Water Conservation (DLWC), Yarrowlumla Shire Council, sections within Department Urban Services, and ACT Health.

Substantial legislation backs these strategies, the most pertinent being the ACT Public Parks Act, the ACT Lakes Act, the ACT Water Pollution Act, and the ACT Planning and Land Management Act, the ACT Environmental Protection Act, the NSW Environment Act, the NSW Local Government Act, the ACT Water Resources Management Act.



# **CURRENT DEGRADATION PROCESSES**

It is a truism to state that wherever riverine ecology is impoverished and/or degraded, so too is the water quality, and vice versa. Improved overall water quality usually arises automatically from improving the riverine ecology.

Professor Henry Nix, speaking on ABC Radio, World Environment Day, 1996:

"... the rivers are in trouble from all sorts of cause. A major source, probably the single largest source of trouble, is uncontrolled grazing on river banks. A great deal of the sedimentation in Australian rivers is coming from undercutting and erosion of bank material, and this is because of banks becoming unstable through livestock access, trampling, removing the cover so that the banks aren't bound....most landholders don't really appreciate this"

Guises Creek is currently experiencing 3 inter-linked degradation processes - erosion, loss of native bio-diversity, and pollution. All three are interrelated to each other, and to stock access to the watercourse.

## **EROSION:**

This is actively occurring in-stream, creek-bank, head-of-gully, dam burst, rill erosion on dam inlets and dam walls, behind and beneath concrete/car body/loose fill infills, along stock tracks. See photos.

### **Over-grazing.**

Is DSE the most appropriate measure of the real, sustainable carrying capacity of the land? What about the Kangaroo population explosion, and its effects on pasture sustainability, and disease control?

While the rate of channel incision is believed to be almost halted today, erosion is still actively occurring from both the banks and bed of the river, and this material is being transported downstream. Active in-stream erosion continues to cause changes in the river channel itself both at the site of erosion, and downstream where the transported sediment is deposited. This erosion commonly occurs where there is no stabilizing and buffering riparian vegetation, and where stock have unlimited access to the river. Stock graze and trample surviving river-bank pasture grasses, and trample the banks, batters and beds of the river, destabilising the soil until it falls away into the river.

The simplest method of achieving this is to exclude stock in appropriate places through the judicious use of fencing, with subsequent riparian revegetation of sufficient width and complexity, and ongoing riparian maintenance.

Stock are then watered from an off-river watering system, with the possibility of limited access to the river under carefully managed conditions.

It is essential to recognize that fencing out sections of the creek, in itself, is not an answer to its degradation problems. Fencing is a management tool only, with on-going maintenance issues and re-vegetation imperatives. However, by fencing pertinent sections of the riparian



zone as a tool to manage the riparian zone and stock access, farmers can be assured they will immediately slow, and eventually reverse, the rate of riverine degradation.

### POLLUTANTS -

#### **SEDIMENT: WHY IT DEGRADES WATERCOURSES -**

The extra sediment supplied to the river from erosion processes creates turbid water which, together with the extra phosphorous carried by the sediments, can exacerbate toxic blue-green algal blooms, especially during the low-flow summer months. Other substances, such as various heavy metals usually bound to the sediments, are released into the water when the sediment enters the water column.

Transported downstream, sediment is deposited in shallow, slower flowing sites. This creates islands, blocking water flow and eventually scouring-out new channels, thereby producing even more sediment. Cleared riparian zones, and the newly created sediment islands, form the perfect opportunity for colonising species such as Blackberries, poplars and Willows to establish in and alongside the river.

Fine sediment also smothers the base of the river-bed, reducing the habitat available for aquatic species. This is evident on existing rock riffles on many properties, where the water has slowed down over the rocks and dropped its sediment. Many of the visible rocks are completely smothered with this silt, and valuable aquatic habitats are thus lost. Loss of habitat means there are less species available in the food chain, reducing the overall number of aquatic and riparian species.

**ORGANIC NUTRIENTS**, Stock using the river also directly degrade the water quality with their excreta.

Canadian studies show this is not conducive to optimum stock health, with a reported loss of up to 20% body weight in cattle who drink fouled water. **LIVESTOCK DISEASES AND OTHER Microbes & Parasites** is another form of pollution here.

(Organic pollution is evident as seen by bright green algal blooms on and below stock crossings and watering points).

**STORMWATER, HYDROCARBONS, and HEAVY METALS** - these have a variety of effects on the water quality. Strong flows wrought by surging discharges actively erode weak spots in the creek, and can cause damage to property. Heavy metals can bind to fine sediments, and be released when these sediments are suspended back into solution. Both these metals, and hydrocarbons are known to be toxic to biological systems.

### LOSS OF NATIVE RIPARIAN AND RIVERINE VEGETATION: WHY THIS VEGETATION IS IMPORTANT -

Appropriate riparian vegetation improves the rivers' water quality; stabilises the banks, toes and batter zones of the river, and provides habitat and food for a range of animal species living in and around the water. This increased diversity, together with high water quality, will enhance productivity over time, while compensating the farmer for the potential loss of productive land that has resulted from fencing out the riparian strip.

Loss of the riparian vegetation (the sedges, reeds, water grasses, bulrushes, wattles, tea-trees, water ribbons, and a multitude of other water and water-edge plants) automatically alters the physical, chemical, and biological status of the water -eg. temperature, pH, dissolved oxygen, turbidity, heavy metals, nitrates, phosphates, other chemical residues, and the diversity and abundance of all living creatures in the aquatic and riparian system. With the absence of riparian vegetation, much of the base of the food chain is destroyed, inevitably reducing the



diversity of worms, insects, fish, birds, frogs, tortoises, reptiles and mammals living in and around the river.

This loss of bio-diversity is especially important to farmers, as many native riverine animal species can assist in maintaining healthy livestock and crops through natural pest and disease control, and thus raise productivity. The aesthetic and recreational value of the river is diminished by the loss of its plant and animal species. It is important to note that wherever riparian vegetation is absent along the River, residues of agricultural fertilizers, pesticides and herbicides used on surrounding paddocks can run-off during rain events and chemically contaminate the water.

While there is active debate about many of the methods and strategies suggested to reverse this degradation, there is widespread agreement that a watercourse with an appropriately vegetated riparian zone will be more stable; filter in-coming pollutants; produce less sediment; increase bio-diversity; retard floodwaters; and generally improve the quality of the water.

See Appendix for a list of recommended native riparian species, and the riparian zones in which they appear.

## WEEDS :

### POPLARS AND WILLOWS.

A steady reduction in their density along the creek, in view of their impacts on:

- Creek bed substrate
- Interception of organic material
- Direct contribution of organic material to the Creek
- 'channelisation' of stream in short term, and ultimate choking and destabilisation of the Creek channel
- Elevation of flood levels.

### HAWTHORNS:

These are scattered throughout the watercourse, not yet in overwhelming numbers. Control and replacement plantings at this stage, over the next 3 to 5 years, will ensure they do not become a problem.

### PHALARIS:

Easy to grow, tenacious, excellent fodder, Phalaris grass has been extensively sown for pasture and to stabilize soils. Due to its vigorous growth and alleopathic qualities, Phalaris will create a species monoculture whereby other, more desirable species, can't colonize. Consequently, the hardy and biodiverse native grassland species are unable to grow. Phalaris can also create a real fire hazard during summer. Much of it is more than a metre tall, with a wealth of dry, combustible herbage. Access to the creek itself is prohibited in sections due to the height and thickness of the Phalaris tussocks. Slashing, shock grazing, burning, ripping and re-vegetating are some of the control mechanisms for Phalaris along the Creek.

The management of areas covered in Phalaris requires staged patch burning or block spraying with Round-up Bioactive, over a period of years, steady revegetation with native grassland species or woodland species, and continued weeding of Phalaris seedlings.



Other exotics in the Catchment which out-compete native species and therefore reduce biodiversity are Hawthorn, Poplar, Elm, Briar Rose, Phalaris, (to name a few) and other declared weeds such as St. John's Wort and African Lovegrass.

AFRICAN LOVEGRASS IS QUITE DENSE ALONG THE DISTURBED AND POORLY RE-VEGETATED TSR, AND NEEDS CONTROLLING AS A MATTER OF URGENCY.

While Serrated Tussock and Chilean Needle Grass are not yet seen except as scattered clumps in the riparian zone, these need immediate spraying and/or chipping to ensure the problem doesn't worsen.

Steady removal of these undesirable plants over the five years, to be replaced with appropriate, local provenance, native species of ground covers, grasses, shrubs, and trees.

Older plantings of native tree species are currently surviving with mixed success.



# **RECOMMENDATIONS.**

- Stock exclusion for the duration of repair works along the creek will be essential. This is not exclusion forever.!
- Fencing is simply a management tool to assist in halting and reversing the degrading impacts of landuse practices on the quality of the riverine system.
- The riparian zone needs to have an average width of approximately 30 metres minimum either side of the river (let common sense prevail) in order to provide sufficient buffering, streambank protection, and a diversity of habitats to restore ecological health.
- River reaches of highest priority are those still actively eroding and consequently unstable; those with little to no remaining native vegetation; and those with unstable channels due to sediment deposits and weed/Poplar invasions.
- Each farmer has a range of fencing, stock access, off-point watering and re-vegetation options to choose from, and these are detailed in the report. By having this range of options, each farmer can tailor the riparian management to suit their unique needs and farming practices.
- Fencing should only be undertaken when there is also a realistic plan in place, and available resources exist for access gates, river crossings, stock access points (if any), off-point stock watering, weed control and re-vegetation. To do this is the measure of the TRUE cost of fencing, and needs to be taken into account when funding and resources for riparian work is made available.
- Fenced-out areas requiring re-vegetation need total stock exclusion until the vegetation is relatively stock-proof. From then on, stock access is recommended only under careful management, with limited access for short time periods. Stock rotation is essential, and the riparian zone would be inappropriate as another long paddock.
- Once repaired, it is recommended that the riparian zone should be managed to retain the unique land-water interface system that it is.
- Tributaries actively contributing to the degradation of river reaches are to be fenced out where appropriate, as part of the management of the river system.
- Poplars Willows are to be removed in a staged, prioritised process over time. (see ACT Willow Strategy).
- Removal of the willow canopy, together with other weed removal, must be immediately followed by re-vegetation with appropriate native species, for the weed control to be successful.
- Further funding, resources, in-kind contributions, sponsorship and incentives should be actively sought to meet the substantial costs (gates, floodgates, off-point stock watering, weed control, re-vegetation, etc) of this creek repair ("fencing") program.

The recommendations in this report are based on common-sense and currently accepted best management practices, offering a range of options for each identified situation along Guises Creek. The dynamic, ever-changing nature of both the living system of the river, and of our very human understanding of it, is recognised as a given truth throughout the report. There are no hard and fast rules, nor black and white answers. Final land management decisions are up to each farmer. This report salutes the integrity of those farmers who find yet other ways of achieving the common goal of a healthy, vibrant river system.



## **THE BENEFITS OF FENCING:**

While there are no immediate, tangible benefits to farm productivity from fencing-out certain sections of Guises Creek and revegetating it, there is indisputable evidence that you will help to:

- Decrease the rate of erosion, sedimentation and nutrient transport downstream
- Improve the water quality for yourself, and those downstream
- Improve the aquatic and riverine ecosystems
- Maintain the existing watercourse
- Decrease the number of insect pests by increasing the diversity of their predators
- Increase the capital value of your property
- Increase the 'sustainability' of your property
- Lower the water table
- Increase stocks of native fish
- Reduce the number of algal blooms

Appendix 2 highlights these points from a riparian fencing scheme undertaken on a farm in Tasmania.

## **WHERE TO FENCE?**

If the fence is built within a few metres of the creekbank in order to use the most of the productive alluvial floodplain, it will be washed away in the next flood.

Similarly, for riparian vegetation to be effective in the multitude of roles that it serves (ie. - stabilising the banks and batter zones, filtering run-off, increasing bio-diversity by increasing the food chain and offering a range of habitats) a narrow strip of vegetation will not be able to achieve this.

The recommendation that, within reason of topography, soil type, and existing biological conditions, the riparian zone be fenced approximately 30 metres or more from highest water mark on either creekbank is not the dream-wish of out-of-touch greenies, but has a sound practical basis. Obviously, the fence is less likely to be washed away a safe distance from high water mark. A substantial riparian zone will offer streambank stability and buffering protection against high flows, it will thoroughly filter incoming pollutants, and genuinely increase bio-diversity by extending the food chain and offering a greater range of habitat options.

Secondly, the regenerating vegetation has more of a chance to mimic nature (see reprinted diagram overleaf) growing from the batter zone to the filter zone.

Thirdly, a reasonable width allows room for vehicle access to the area to undertake weed control, fire hazard reduction, care of young seedlings, and stock management as part of shock grazing practices.

NOTE: All the following recommendations describe fencing strategies that allow parts of the fence to become 'sacrificial', and thereby saving the rest of the fence in floods.



It is recommended that the fence-line follow the curvature of the creek wherever practicable. As it is a first and second order river, it does not meander much. As such, following its curves as a general principle for a solid wire fence is not difficult. The reason for angling the fence is so it is able to withstand flood events. An analogy is the old fable of the reed that bends in the flood and remains to tell the story, whereas the solid oak tree is uprooted and carried away.

Alternatively, if the riparian area is rarely used by stock, it may be much more efficient to erect an electric fence along the riparian zone. Details of this are in the accompanying information from the Upper River Torrens Landcare Group.

Landcare farmers in Victoria, Numeralla, Bredbo, and Tarcutta (to mention only a few) have fenced riparian sections following the course of their rivers with great initial reluctance. However, they are now advocates of this fencing method. Perhaps a field day to an appropriate site could be arranged for the skeptics.

## **TYPE OF FENCES:**

(see accompanying detailed information on fencing systems over the page)

The actual fence structure to be used will vary depending on the landuse in each area, which stock are being excluded, soil type and topography, and resources/money available. Types of fencing, alternative off-stream watering systems, re-vegetation sequences, species to plant, weed control strategies, and other river-bank management options which could be undertaken, are all detailed through the report.

For standard fencing, it is recommended that the fence be four or five single strand wires (barbed for cattle if necessary), and TIED, NOT THREADED, to the outside of the relevant hole in the star droppers. Although more time consuming, experience has shown that if the flood-waters are unusually strong, and break the wire, the dropper remains standing, and the wire may only be broken in sections. This makes repair work much easier, and reduces costs to the farmer.

Rabbit netting or hinge-joint is not recommended unless rabbits are a very serious threat to the regeneration, as debris will be caught in it during times of flood, weakening the fence, eventually causing it to break, and costing the farmer time, money and effort.

Many farmers no longer use metal star droppers in their riparian fences. Rather, they use fibreglass or insulwood droppers, which are cheaper yet strong and durable. Using insulwood droppers can make you feel politically correct, as they are made from mill wastes!

Another innovation used more frequently today is to keep the tension up to the end-posts and strainer posts using metal struts (approximately \$55 installed) that sit on the ground at right angles to the post, with a threaded bolt that can be tightened to adjust the tension. This is particularly useful in fences that may be under frequent flood pressure.

## **ELECTRIC FENCING**

(see overleaf for farmers reports on this)

This can range from single electrified white tape to keep cattle at bay, to a permanent fence to keep all stock away, including Roos and Wallabies.



Each farmer has a different, apparently foolproof way of making their electric fence work, and an equal number of horror stories about how they don't work.

The following are a couple of proven methods, there are yet others over the page, and you will doubtless know of others. Choose the one best suited to your needs.

It is quite common to erect a 4-strand wire fence, with 2 wires electrified, the lowest and second top wires. This keeps cattle, sheep, roos, and apparently often rabbits, at bay. The live and the earth circuits need to be complete and separate, and the fence can be kept on year-round except during total fire-bans. It is crucial to keep the spring flush of growth down so that the grasses don't drain the current from the earth wire. This also prevents the dry grass in late summer becoming ignited if the circuit shorts out. The bottom wire needs to be earthed with an isolation switch at all times Isolator switches are also valuable to separate different paddocks and fences.

Another electric fencing idea some farmers swear by, is to run a 4-wire fence with the top wire electric, next wire barbed, third wire electric, and bottom wire barbed. This also deters both domestic stock, and wildlife, and doesn't have the potential fire risk that the first option has.

If it is possible to run the electric fence off the mains electricity, the costs are estimated to be about \$20 to \$30 per year.

If the river regularly breaks its banks during floods, and the fence is vulnerable to wash-away, the fence can be built so that it can be jacked-up or alternatively laid-down ahead of the floodwaters. This will obviously save money and time re-building the fence. Farmers in the Torrens River Catchment are using this type of fencing very successfully, and it is currently being installed by members of the Tarcutta Landcare Group.

### **Fencing across the river, at a boundary or river crossing.**

One of the many apparent difficulties in fencing out the river, is the hassle of opening gates across access culverts/roads/bridges/etc, or keeping stock out of the neighbours. Or perhaps keeping your neighbours stock out!

Most fences/flood gates across rivers capture the silt, sediment and debris to a point where they become so weighed down that they collapse and need rebuilding. They also come to grief in fast-moving flood-waters. All in all, they can be a constant maintenance headache and financial drain.

Solutions to this problem, trialled and accepted by the farmers on the River Torrens Landcare Group, are to erect an electric fence system to cross the river using electrified chain-links, or electrified hingejoint sections linked with break-away wires. Either system has a strainer-box assembly at either end. The farmer can set a flood switch (responsive to pressure) to whatever level is appropriate, so the electric current turns off under high flows. The approximate cost of either of these river-crossing fences is \$400 to \$500 in total. Rather than re-write their advice, all the details are included in the next 6 pages.



# **OFF-RIVER STOCK WATERING.**

This is an emotional, initially expensive, and usually complex issue.

There is no easy, single answer to stock watering off-river. Type and number of stock, available resources, positioning and topography of paddocks, grazing management practices, potential real estate value, all need to be accounted for in the decision making.

This report recommends that each landmanager make the decision as to the most appropriate way to water their stock off-river after assessing all this information against their own unique circumstances.

The most complete account of all the available options, and their costs, has been put together by the KONDININ Farmers group in W.A., and is reproduced in full following this summary of their findings:

1. The first is allowing your stock limited access to the fenced out-zone, according to your management practices. The recommendation is that stock be completely excluded from areas that are actively eroding, and where revegetation is occurring. Commonsense tells you this anyway. However, it is possible to build-in an access point to the river that is fenced on either side, and then across the water at the low water mark. This cross-fence through the low water mark can just be live electrical tape using a solar-powered energizer, which is most effective. This can be either an electric fence system, or permanent. It is critical that the stock use it only to reach drinking water, and not to graze along and loiter in. Make sure there is no seductive shade nor palatable food within reach. It is also critical that the access is provided on a long, gentle slope (max. 1:6) into the water, which has been strengthened with rock cobbling to prevent erosion. Ensure that stock move into the river in the direction of water flow, so that peak flows go past the access point, rather than into it. The width you make this access point will depend on the number of stock expected to use it, so can range from 2 to 20 metres. Alternatively, some farmers dig a small trench parallel to the river which is filled with water, so that faeces etc. have time to decompose before they enter the river. More details of all these options overleaf.
2. Limited access can also mean that stock enter the entire fenced-out area as part of your integrated weed management, and/or cell grazing, practices. In these conditions, it is recommended that a temporary electric fence at the edge of the riverbank excludes them from the river itself, thus preventing trampling, erosion and fouling of the water. It is recommended that the stock remain only as long as is necessary to eat-out the weeds, and then be removed. While the re-vegetation plantings are in their early growth stages, stock need to be totally excluded. Erosion is minimised by grazing sandy soils in spring while they are still damp, and the clay soils in the summer, when they are dry.
3. If it is critical for you to use the riparian 'paddock' as an occasional holding bay/lambing paddock/etc. for stock, it is recommended that the area already be well-established with relatively unpalatable grasses such as native *Poa* and *Stipa* tussocks, making it more of a shelter zone than a grazing zone, with the vegetation continuing to stabilise the riverbank.



4. To alleviate the need for stock to re-enter the river again, or at least until the vegetation has become established, water can be supplied to them by DAMS or by a number of WATER TROUGHS in the paddock.

5. Dams can catch up to 90% of the sediment that runs off from the paddocks and hillslopes, and also trap other run-off pollutants. If well-designed, they can also double as water-bird/water animal refuges, and become part of the waterscape/water ecosystem of the near-by river. Although there are significant costs in building the dam/s, they also enhance the re-sale value of the property, and can improve the health of the animals drinking clean water. To prevent stock tracks to the dam eroding, and dams becoming putrid mud-baths in late summer, care needs to be taken in dam design. Size, position, shape, and number of dams in a paddock are all part of the farm planning process, together with stocking rates, and practices such as set stocking/rotational grazing.

A note of caution with building new dams. Under the new Water Resources Bill, installing large capacity dams ( no exact size in ACT, but in NSW, any dam holding more than 10% of the water catchment capacity of the farm must be licenced, the details of which are still being grappled with!) will require licences. Aside from this, very large dams can severely affect the amount of water running into the river system, and possibly severely reduce flow downstream.

6. Water-troughs scattered across a paddock can minimise eroded stock tracks, while providing clean, fresh water to stock year-round, thereby keeping them in optimum health. However, there is a perception that there are many costs, difficulties and maintenance problems associated with keeping the water up to the troughs. Certainly, they need regular cleaning. Water can be pumped from dams, the river, or a bore (check licensing requirements of the new Water Resources Bill) into a holding tank then gravity-reticulated into the trough, with a valve ensuring a stable water level in the trough. There are a variety of pumps that can be used for this purpose, and they can use mains power; solar power; wind power(windmill); water power; or petrol/diesel. See details overleaf.



# **HOW CAN WEEDS BE CONTROLLED ONCE THE AREA IS FENCED OFF?**

There are as many answers to this as there are to - How long is a piece of string!  
For each situation, there is a different answer, so here is a blow by blow summary:

1. Where the fenced-out riparian zone already contains a variety of appropriate native species, there's a high probability that these will rapidly spread once the stock are removed. If this is the case, chipping of the remaining recalcitrant weeds, and perhaps spot spraying, would be all that is necessary
2. Where the fenced out zone is mostly exotic pasture grasses, has been part of a fertilising regime, and will grow a wilderness of thistles, St John's Wort, etc, you have many options -
  - (a) you could let it go, burn it outside the fire season, and let the weeds eventually die out as the nutrients in the soil are used up.
  - (b) You could poison them all, deep rip if necessary, spray out rip lines with Round-up BioActive, and direct seed native riparian species onto the cleared site, hoping they will germinate and outgrow the re-emerging weeds, and follow-up weed control over the next few years.
  - (c) You could 'shock graze' the area to crop the exotics as low as possible, deep-rip if necessary, and direct seed/re-vegetate immediately, then keep vigilant with weed control over the next few years.
  - (d) In all cases, judicious grazing by stock to manage the weeds, especially after the re-vegetation is tall enough to withstand stock damage, is a valid weed control strategy.

The choice is yours!

3. Where the fenced-out zone already contains noxious, and other intractable weed species, you have an imperative to get these under control by the most appropriate means available, regardless of fencing initiatives. Once under control, use methods of re-vegetation best suited to your site, and ongoing weed management strategies.  
Essentially, all this is really saying is, continue to practice integrated weed management in your newly-fenced riparian zone, just as you would for any other part of the land you manage.

Wherever Poplar and Willow species dominate sections of the Creek, they create serious impacts on stream morphology, ecology and water quality.

These are some of the findings by researchers from Department of Land and Water Conservation of the impact of Poplars and Willows on riverine systems:

(NOTE: this information applies equally to Poplars, however the report being quoted specifically addresses Willows)

- Having reached a substantial height and breadth, Willows create a closed canopy during the summer months. This exacerbates the water conditions typical of traditionally low summer flows. The canopy shades -out most of the watercourse, thus creating microclimatic conditions unsuitable to many native species.



- Unlike Eucalypts, when Willow leaves fall, they do so all at once during autumn, creating a large organic load in the water. Research results are not yet clear as to which native animal species are able to successfully incorporate the soft, nutrient-rich flesh of the willow leaves into their diet. Researchers suspect most native species cannot use this food source.
- Willows don't offer nesting hollows and other essential habitat critical to many native birds, mammals, and invertebrates, as they are soft-wooded. Similarly, they don't produce the nectar, fruit and seed foods to which the native fauna is adapted.
- The root mass produced by willows, once believed so valuable in stabilizing stream banks, creates such a proliferation of fine root fibres, and to such depth, is now known to severely damage the stream channel itself, and radically alter the shape of the water-course. These roots, along with broken limbs in the creek bed, trap large and fine sediment, litter and other debris. They block the bed of the channel to such an extent that floodwater levels are raised, and often diverted, in places that are a danger to human life and property. It is thought these roots may further deoxygenate the water as they grow and respire, further lowering water quality.
- As a highly successful opportunistic species, they grow readily and rapidly from vegetative parts. Twigs, branches, roots, of almost all willow species, will rapidly take root when broken off from the parent and washed downstream. Other survival adaptations which willows have include: the ability of many willow species to hybridize with each other; to produce either male or female flowers depending on the seasonal requirements in the local population; and to sexually reproduce to create plentiful, genetically diverse and viable seeds. Like all opportunistic species, give a willow an inch and it will take a mile!

By increasing sediment load, further deoxygenating the water, offering an inappropriate food source to the aquatic and riparian food chain, and dramatically altering stream morphology, willows are now identified as one of the major contributors to the degradation of Australian waterways.

However, willows don't compete well within stands of native vegetation. Like all opportunists, they thrive in disturbed, water logged areas.

Another serious problem posed by willows is the manner in which their broken limbs and matted root systems block the creek, creating mini-dams. These woody blockages trap and concentrate gross pollutants. The build-up of heavy debris deflects heavy stormwater flows across to unprotected banks, causing further erosion. It appears these woody dams don't break apart after heavy rain, causing the stormwater to rise over the top of them while the load of gross pollutants and willow parts it is carrying is trapped by the dam. This adds to the size and dominance of the dam.



# **WHAT ABOUT THE FIRE HAZARD?**

This is also a topic of heated controversy.

There are experts who are certain that denuded riparian zones will slow down a high-speed fire as there is nothing to burn.

Then there are those who are certain that the green tussocks and reeds characteristic of native riparian vegetation, together with the larger shrubs and trees, will often slow a high-speed fire down.

And whichever way you look at it, tall grasses such as *Phalaris* which dry out in summer present a real hazard.

Fires through open paddocks/pastures/grasslands can travel at high velocity, burn down the creek bank in a flash, jump the watercourse, burn up the opposite bank, and be off, leaving a trail of death in their path. Regeneration will often be weeds.

The same fire coming into a well-vegetated river bank will have more to burn, much of it green, some of it damp. Burning may then tend to occur in patches, as a mosaic, and it may or may not cross the river to continue up the other side. With the exception of the most intense fires, patches here tend to remain relatively unharmed, and the regeneration of desired plants begins almost immediately.

Farmers concerned about long, dry, rank fuel loads in their fenced off sections can reduce the fuel load as they would do so anywhere else on their property, using a range of strategies.

It is the belief of this report that the possibility of increasing fire hazards by fencing out the degraded riparian area isn't sufficient justification for not repairing their riverine system.



## **HOW DO I BEST RE-VEGETATE THE RIPARIAN ZONE?**

Firstly, assess your site, using the simple sketch over the page showing the types of plants to be found generally across the riparian zone. Do you have a reasonably sized buffer strip? Is there any active erosion on your banks? Toe? Channel?

To do this, use your own knowledge, or of someone knowledgeable in the area.

Do you already have a significant number of native species in your site? Is there a high quality riparian zone not far upstream from you?

If you answer yes to either, or both, of these questions, then fencing out the area to stock, and controlling the weeds, may be all you'll need to do. The plants will regenerate all by themselves. Some farmers help them along by mixing seeds of desirable species into clay balls, and placing them here and there in the banks.

You can speed the regeneration process up by collecting seed of desirable local species, and direct seeding them onto the site. If you're uncertain as to which species to collect seed from, how to store, treat and germinate the seed, then seek advice from groups such as Greening Australia, or the Botanic Gardens, or similar.

Most native plants which grow in the water ( the reeds, sedges, rushes, grasses, lilies, etc) will rapidly germinate and spread into their niches, once the constant disturbance of the stock have been removed. You don't need to do anything else.

If, however, you have nothing in and around your site except introduced species, then you'll have to do quite a bit more work.

You will need to control the weeds (already discussed in an earlier section of the report), and prepare the site for either direct seeding, planting out with tubestock, or a combination of both. The site preparation usually needs to be undertaken a couple of months, if not longer, before the planting/seeding takes place. Work undertaken in autumn and winter prepares the site for spring planting.

The species to plant are many and varied. (see Appendix ). As there are some intact riparian sites already thriving along the river, it is sensible to ask the farmer if seed could be collected from here, propagated, and grown elsewhere along the river. There are many nurseries and growers who will take your seed and return it to you as a thriving seedling months later, at very little cost.

Be conscious that trees are only one of many different types of vegetation needed along the river, and are by no means the most dominant specie in this zone. Scattered Eucalypt plantings, standing above thickets of various tall shrubs, patches of tussocks and other grassland types, leading down into the wetter banks and batter zones with all the grass-like macrophyte species, and wildflowers, will create the optimum bio-diversity.

The information on the following pages details all of this thoroughly. More information in this area and detailed species lists appropriate for Paddy's River (outside the scope of this report) can be obtained from talking to the writer of this report, Alison Elvin.



# **ACTION PLAN**

## **Spring, 1999**

1. Agree on the priority of actions as a group, and delineate responsibilities for each activity amongst the members.
2. Seek out funding, resources, labour, equipment, sprays, etc between Landcare members, and from government agencies, as a matter of urgency. Use the following list as a starting point.

### **WHO PAYS? POSSIBLE FUNDING SOURCES:**

There needs to be money for the labour of erecting fences; for weed control; for site preparation for revegetation; and for off-river watering points. Other costs will undoubtedly arise along the way. Expecting the landholder to fund all of this privately is very inequitable, as the repair of the river is not only for their long-term advantage but also for all those downstream, and for the society at large.

What other sources of funds/resources are available?

- ACT Rural Trust Scheme, contact Bill Logan, Wildlife Research and Monitoring Unit, Environment ACT
- ATCV/Green Corps - labour resources
- Greening Australia Fencing Incentives - contact Owen Whitaker, ph 018 514 314
- Direct Seeding (fee for service), Greening Australia ACT.
- Gallagher Fencing. They have an arrangement with Landcare Australia for providing advice and at-cost materials. Contact Brian Gillies for information, advice and obligation - free quotes at Gallagher Electric Fencing.
- Team Poly (Water tanks, troughs, etc) have a 3-year National deal with Landcare Australia to provide cheaper materials.

A number of other options well worth investigating could be:

- rebates for these on-ground works to be adjusted for in the rates/rental
- agreements for sharing the costs with the government could be written into the individual Property Management Agreements in the ACT, and a similar arrangement with Yarrowlunla Shire Council. For example, the Upper Torrens River Board pays for fencing to the tune of \$1,100/km, all initial weed control and all revegetation, in return for the farmer undertaking all subsequent maintenance.
- NHT and Environment ACT funding rounds come up annually. Help in putting in applications for these can be sought from Jane Horniblow, your local Landcare Co-ordinator
- Bartering of skills, expertise and equipment between members of the Landcare Group, and between the Landcare Group and relevant Government agencies (eg ACT government, Department of Urban Services, Yarrowlunla Shire Council Weeds team, and environmental officers; DLWC; NSW RTA/Railways)



- 3. Weed control to begin NOW!** Weed control and ground preparation can begin in advance of fencing. With the active growth in spring, all weed species will respond well to herbicides. However, the window of opportunity to be most effective in your weed control is only a matter of weeks.

The generic herbicide 'ROUND-UP Bioactive' is the only herbicide permissible for use along water courses.

Contact spray teams from Yarrowlumla Shire council/RTA/Environment ACT/Railways, for quotes on spraying Blackberries, African Lovegrass, Saffron Thistle, St John's Wort.

Contact Simon Lang, Greening Australia, via DLWC office in Cooma, for advice and action on Willows and Poplars.

## **POPLARS, WILLOWS, AND THEIR REMOVAL.**

The following information is drawn, for the most part, from the UMCCC Willow Strategy, adopted by both ACT and NSW.

**IT IS CRITICAL TO NOTE THAT TO REMOVE  
POPLARS AND WILLOWS ALL AT ONCE WOULD  
BE AN ACT OF ENVIRONMENTAL VANDALISM.**

REMOVAL OF POPLARS AND WILLOWS SHOULD BE A GRADUAL, SITE SPECIFIC PROCESS. CONSEQUENTLY, WHILE THE FOLLOWING INFORMATION IS APPLICABLE TO ANY SITUATION, IT SHOULD BE APPLIED ANEW TO EACH SPECIFIC TARGET SITE.

Complete removal of willows without immediate replacement would cause a dramatic increase in erosion problems from flash or general flooding, and may decimate current habitats. Replacement plantings of local provenance native species must be initiated during the staged removal of exotic willows to maintain habitat and watercourse stability.

### **OTHER POINTS TO NOTE:**

- Record and map all the willows on site, and give a priority ranking for their removal. **THOSE WITH THE HIGHEST PRIORITY FOR REMOVAL** are species which are found midstream, have fragile parts, or contribute to seed production. particular attention needs to be paid to highly invasive species such as *Salix nigra*ns.(black willow), and *Salix fragilis* (crack willow)

Once these are killed, other willows in the area should then be successively killed and removed.

- **STAGE THE REMOVAL OF WILLOWS AT EACH SITE TO APPROXIMATELY 20% TO 30% PER YEAR.**



- Select the Best Management Practice willow control method available. This is usually a combination of physical and chemical methods. It is generally believed to be more practical to cut down a green tree, then carefully poison the stump, than try to bring down a dead tree. There has been mixed success with biological controls of willows. *Melampsora* rust will infect willows, and Crack willows are susceptible to leaf gall from *Potania proxima* (willow leaf sawfly). Further info can be obtained from the CRC Weeds, and NSW Dept. Agriculture, and Simon Lang from Greening Australia.. Further research into this is urgently required. Groups involved in the Willow removal need to agree on the removal methods to be used, as well as the costs incurred, the maintenance required, the potential impacts, and the timing of the project. There also needs to be agreement regarding the disposal of the timber, species to be used for revegetation, and the revegetation techniques to be used.
- Great care needs to be taken to protect the Health and Safety of all people involved in the project, and to protect the water from chemical and physical contamination.
- Trained personnel must undertake all willow removals. There is an opportunity here for members of the landcare group to become training providers.
- Begin removal as close as possible to the headwaters of the catchment. Always remove the trees from between control points (e.g. Rock beds, culverts, gabions, etc) to minimise bed and bank erosion. Monitor the stream bed/bank for erosion effects, and act quickly to control any erosion that occurs as you go along.
- Decide on the most appropriate use of willow parts after you have removed them. EG. mulched on site and used on new plantings; sold or auctioned as timber and funds reused; recycled through MuggaTip; use willow leaves as fodder during drought.
- Where appropriate, mulch the area you have cleared. Revegetate as you go with native riparian species including wetland macrophytes on the banks.
- Do not allow the willows you have cut down/poisoned/etc to resprout. Vigilance over the next 1 to 3 years is critical. Similarly, don't leave cuttings of apparently dead willow parts on the ground nearby to "decompose". Many parts will resprout!
- Record in detail the sequence of activities, time taken and costs involved as you go.
- Monitor and maintain the site intensively for the 3 years after removal.
- Seek advice throughout the project
- Design Action Plans for weed removal that are consistent across the catchment. For example, coordinate herbicide spraying programs in spring. Recommended applications are using the cut and dab technique of 1:1 Roundup. A licenced chainsaw operator needs to be employed, with the requisite OH&S knowledge. All stockpiled cuttings are best chipped, and used on-site for mulch.
- Coordinate weed removal and revegetation projects to link-up into corridors

#### **4. EROSION CONTROL & STOCK EXCLUSION: *FENCING and REVEGETATION***

Although fencing is not yet urgently needed for vegetation protection, it IS urgently needed for creek bank and water quality protection. With the exception of properties running no stock, and the one property( Greg Dalla) where the creek has recently been fenced out, this applies to every other landholder in the catchment.



Every property has hot-spots of active bank erosion, especially on the up-hill banks. Excluding stock from these banks will immediately halt further erosion, with the exception of the already weakened loose soil falling away in a downpour.

Most properties also contain tributary gullies into the Creek, albeit very small. Most of these are actively undergoing tunnel erosion at their head. It is very important to include these in the fencing, of the creek.

There were some farmers who marked erosion and salt-seepage hot-spots on their properties which were away from the creek area. Although outside the brief of this report, the advice remains the same as that given for the creek.

Each erosion spot in a paddock that I saw was being consistently, and in places heavily, grazed. Placing a temporary fence around the trouble spot is the first step, and excluding stock for at least three seasons. If the site is bared, and/or a weed invasion haven waiting to happen, then weed-control and re-vegetation need to be undertaken simultaneously.

Revegetate with either hardy, deep-rooted perennial pasture grasses, or other species which will provide all year ground cover, will then halt erosion, and salt seepage. Stock can be occasionally grazed across the site once the vegetation has fully re-established.

It is stating the obvious to recommend each farmer looks at their unique land-management situation, (the stock type and numbers they are running, their seasonal adjustments to this, their finances and other relevant resources to cope with new fencing arrangements, and their ability to water their stock off-creek) before deciding on riparian fencing strategies. It is also commonsense to make fencing decisions as neighbours and as a Landcare group, as time, money and energy costs can be defrayed by doing this.

If the farmer decides to have occasional, well-controlled watering points for their stock here and there along their section of the creek, working these spots out according to creek morphology and neighbours needs would be helpful.

Apply for assistance through Greening Australia's Upper Murrumbidgee Fencing Incentive Scheme for funding assistance with fencing materials. To qualify for assistance, the landholder needs to have a fairly high-conservation remnant of native vegetation in their riparian area.

I strongly suggest that the following farmers, if interested, may qualify here: Fred Pfitzner with the Chain- of-ponds section of the creek; the lower sections of Andrew Goodall's creek frontage with the rocky substrate downstream from the house paddocks, and most of Winston McDonalds' creek frontage land. The sites need assessing for the quality of remaining native vegetation before a final decision on funding is made.

Contact Owen Whitaker on 018 514 214 for further advice.

The remaining landholders, who on my walk along the creek appeared to have less native vegetation remaining in their riparian areas, need to seek advice from their Landcare Coordinator about other forms of assistance available for their fencing.



## **5. OFF-POINT WATERING FOR STOCK EXCLUDED FROM THE RIPARIAN ZONE:**

The most expensive and difficult issue is off-point watering for excluded stock. Farmers with established dams for their stock have only the cost of fencing. Others need to consider the options already outlined in this report. The landcare group to discuss options for this at their next meeting, and discuss funding with every funding/government agency listed earlier in this report.

See Appendix for a range of options.

## **6. RE-VEGETATION OF THE RIPARIAN ZONE:-**

- See Diagrams and notes in the Appendix.
- Begin seed and plant collection NOW, both as individuals, and as a Landcare Group. Check the need for licences if going onto public land such as National Parks. Alert local. Licenced seed collectors as to your needs, and take collecting advice from them.
- Contact government agencies responsible for the TSR/Roadsides/Railways sidings, for weed control of African Lovegrass, Blackberry, Poplars, Phalaris, St. John's Wort.
- Decide on a central storage point, and collection strategy.
- Choose a propagation nursery for your seed.
- Begin site preparation this spring, for tubestock planting next autumn(if the site is ready, and if the season has soil moisture in the ground), or the following spring.
- Contact labour forces such as Green Corps for assistance with ground preparation, fencing, and tubestock planting for the following spring. This needs to be organised almost a year in advance.
- If a contractor is hired to rip the sites/spray the weeds, it may be cheaper to be able to hire the contractor across a number of adjoining properties.

The Buffer Zone: preparation of a strip of land above high water mark OF AT LEAST 30M either side of the creek. This is a 3 to 5 year process.

This Spring: where-by the ground needs to be appropriately prepared in the first year by spraying out weeds and Phalaris, and ripping the soil where tubestock will go.

If the grass/weed growth is very tall, slashing is the first option, if the ground beneath permits. If you decide to direct seed, ripping is not necessary. Repeat the spraying in late summer, and a third spray just before planting/seeding, early next spring, 2000, with accompanying fencing built to exclude stock. Then follow-up maintenance with weed control, an occasional watering if there is a drought, a replacement of plants that didn't survive, for the next 2 to 3 years, depending on the growth rates of the plants. Phalaris to be shock-grazed if not too thick and dry a thatch, and/or slashed along the riparian zone. It can then be sprayed with Round-up Bioactive in metre-wide strips, wherever the riparian zone is going to be re-vegetated. This can also be undertaken with saffron thistle.

### The Toe of the Bank:

In places where there is active erosion and under-cutting of the bank occurring, a number of options are available. The main purpose is to slow and divert the flow of water away from the bank. If the erosion is large, then rock groynes may need building. (see Appendix) There was no sign that this was necessary in this creek system. More appropriately, the sheer absence of stock trampling pressure, and grazing the tender green shoots of the water plants



trying to re-establish in this zone, will be sufficient to halt this erosion under normal seasonal flow conditions, within a year. As always, in a catastrophic flood event, erosion will occur no matter what measures are undertaken.

#### Natural Re-vegetation in all areas of the Riparian zone.

Refer to Appendix 2 for a Tasmanian story about this. For nearly all sections of this Creek, there are remnants of native water plants, wetland plants, and streambank riparian species surviving. These species range from millfoils, waterlilies, and water ribbons in the water, to reeds, rushes, and grasses in shallower water, and taller grasses, shrubs and trees along the banks. Wherever the riparian areas are unimproved, (ie. not full of Phalaris, weeds, etc), then very often just the action of excluding stock for 2 or 3 growing seasons will allow the native plants an opportunity to grow from the existing seedbank. Farmers are often concerned that by doing this they will only get a severe weed infestation. However, this won't occur if the area is already populated with mostly native pasture grasses, and the soil remains undisturbed.

### **7. FUNDING APPLICATIONS:**

- begin to prepare for NHT and Local Government and ACT Government funding grants. Seek advice from your Landcare Coordinator as to the most likely applications to succeed, and direct yours accordingly. Being aware of all the ins and outs in advance gives you the chance to be more adaptive, and therefore more successful, when last minute changes arise. Use the outcomes of this report to lobby from.

#### **SUMMER, 2000**

- Apply second dose of herbicide (Round-up BioActive) to weeds/Phalaris in riparian areas targeted for re-vegetation.
- Apply a second dose of herbicide to poplars and willows already dosed, but apparently still alive.
- Do not plant out tubestock, nor undertake slashing, for obvious reasons!
- Continue with fencing if appropriate.
- Collect seed from desired species. Speak to licensed and experienced seed collectors, and see if they can get seed of desirable but difficult to find species such as the Pomaderris genus.
- Complete funding applications. Seek advice from those in the game throughout the preparation of the funding submission.

#### **AUTUMN, 2000**

- Possible time to plant out appropriate tubestock, given sufficient soil moisture, and a run of warm weather. Dry ground and cold conditions will inevitably kill the plants.
- A good, cooler season for fencing, and for testing your electric fencing.
- Continue seed collecting, and send off all seed to the nursery of your choice, (speak to the nursery as to when they prefer to receive the seed)
- Ensure you have all official labour assistance, such as Green Corps, organised for spring.



- Continue with weed control wherever necessary
- Book in direct seeding contractor for next September/October.

## **SPRING, 2000**

- Continue to refine and radjust your plans as a group, in the light of inevitable changes, new information and priorities.
- Fencing nearing completion.
- Control weeds before they start to get away
- Ensure stock watering systems are adequate for their needs.
- Give rip lines/direct seeding lines one last spray as the plants begin to grow again.
- Ensure tubestock is in excellent condition, and try to time plantings before the next rain!

The remaining seasons are just more of the same!

**GOOD LUCK!**