Kedron Brook Riverine Recovery

Questions from participants during workshop 1:

1) Plants and Weeds

- **How do I find out what types of plants I should use for different conditions (e.g. what plants can tolerate water submersion)?**

The booklet included in the goodie bag from SOWN provides a great guide for planting across separate bank zones, i.e. in-stream, on the 'toe' or lower bank, within the riparian zone (corridor by the waterway) and on the overbank. Another great way to find out what species can tolerate different conditions is by taking a walk and seeing what is occurring naturally within the waterway. If you're still learning species, take a photo and ask your friendly native nursery staff.

- **Erosion is knocking out my native trees, how do I work around the lack of access limiting my ability to replant/replace on near-vertical banks?**

Your safety when walking and working near/ on/ above/ below steep banks is paramount: practise caution and common sense at all times.

It is important to acknowledge the foundation substrate and structure of your bank, the complex and underlying causes and types of erosion at play and the effects that are happening - and will likely happen in the future. Simply put, however, it is difficult to protect trees that stand alone without appropriate ground cover and mid-storey support. Trees can be protected with a diversity of mid-storey, lower storey/ shrubs, and scramblers/ vines/ groundcover species. A community of native riparian vegetation has excellent root mass, and so will ultimately hold soil and mitigate erosion, so strategically planting appropriate species upstream of, and around your trees is a great start. If you have non-native vegetation present, consider their roles, and if removing always employ the 'remove-replant' strategy (see below).

Generally, though, vegetation will not significantly establish and last long-term on steep banks without eventually becoming undercut or slumping. The most accessible and often most appropriate long-term option is to prepare for bank recession by thickly vegetating the overbank for ongoing stability. Using a diversity of local species will amplify the lasting effects. Similarly, planting 'flexible' local species (such as rushes and sedges) where safe and appropriate to do so along the foot of the steep bank can catch some of the soil/ sediment and help buffer against high-velocity water flow.

In some cases, battering and fill can be successful for rebuilding against steep banks but require permit/approval from state and local government and should be built to engineered specification to ensure it is not detrimental to the waterway or neighbouring properties.

- **What are the best temporary protections for young plants?**

During establishment, protecting young plants generally comes down to three things – water, predation protection and weed competition.

Water: ensure plant is well-watered in first weeks of establishment - for extra encouragement, boost their growth with seaweed solution or similar; ensure there is mulch around the stem to prevent scorching (and to minimise micro-erosion when watering); in the creek line ALWAYS firmly install a stake UPSTREAM of your young plant! On slopes install a stake uphill from plant.

Predation/ Scratching: Installing a biodegradable /cardboard/ wire tree guard or at least a few stakes (bush stakes will do) - is usually effective against browsing, digging and scratching animals. For added protection lightly place branches and stick lengths throughout a planted area. and something to stop the earth around the young roots from drying out are a good bet to help the establishment. This can be done with biodegradable /cardboard or wire tree guards, mulching around each plant and if you want an extra boost - encouraging their growth with seaweed concentrate or similar products.

Weed Competition: visit young plants regularly and tend to them by weeding gradually - 'let the rate of natural growth dictate the rate of weed removal'. Prevent smothering by rampant weedy growth of vines and grasses, especially in the warmer high-rainfall seasons.

- **Should I stick to native plants exclusively?**

Within the riparian corridor, it's really important to prioritise native plants that are appropriate for the area (not native to WA or northern QLD for example). Within the upper parts of your property boundaries, away from the waterway, of course, introduced or exotic plants will still be beneficial at trapping water in the landscape and providing habitat but please be aware of which non-natives have invasive tendencies or are prolific seeders that will likely spread across the land. Native species with local provenance are always the best.

- **What is the best way of disposing of weedy plants?**

Dealing with weedy vegetation will vary according to weed species and 'type', so it's worth learning which weedy plants reproduce 'vegetatively' i.e. can spread through leaf, root and stem matter (e.g. succulents) and which reproduce via seed/ seedbanks (e.g. grasses and woody weeds). Other considerations are season, site aspect and soil moisture.

Ultimately it is best to leave weedy material onsite wherever possible, as this is future nutriment for assisted regeneration and building soil health and structure - think of it as a 'closed loop system'. Some herbaceous plants, most grasses and most woody weeds can be left as mulch i.e. 'pull'n'drop'or piled as habitat stacks. A safe way to compost most weedy plants in sunny sites is via 'compost solarisation'- piling quite high and then covering with a weighty material (sometimes a tarp or black builders' plastic

is appropriate but not in flood-prone areas). Otherwise, try cold compost: essentially weedy material is compounded in a pile or a large leaky tub (e.g. old lug or bathtub) and let time, earthworms and natural microbial processes do their magic! In the case of succulents, visiting regularly and turning the matter to encourage decomposition is necessary. Another technique is to nullify seed banks by making weed tea or cooking them on a black tarp.

As a last resort, dispose of the reproductive matter (vegetative or seeds) in a green waste bin for the council to compost—check with the council before putting certain species in the green bin.

- **Best plants as groundcovers?**

It depends on the area and what you're trying to achieve. A ground cover that spreads easily after disturbance is *Commelina diffusa* (make sure you are encouraging the native, not the weedy species https://www.lfwseq.org.au/native-vs-weedy-commelinas/). Also see bushtekniq's guide on planting Commelina: 'Blue Beats Hairy' (at the end of this document)

Further recommendations include *Oplismenus aemulus* (Creeping beard grass), *Ottochloa gracillima* (Graceful Grass), *Lomandra spp.* (Mat rushes), *Dianella sp.* (Flax Lilys), *Carex sp.* (Sedge), *Imperata cylindrica* (Blady Grass), *Viola hederacea* (Native Violet), *Tetragonia tetragonoides* (Warrigal Spinach).

Creepers and ferns are another option - especially around garden features – *Cissus antarctica* (Native grape), *Hardenbergia violacea* (Native sarsaparilla), *Smilax australis* (Barbed wire vine).

- **Best shade-tolerant plants?**

Which shade tolerant species thrive in your pocket will still depend on soil and other site factors. Species that wouldn't be out of place in the rainforest will do well in shady conditions. As a start, we recommend:

  - Groundcovers/climbers
    - *Geitonoplesium cymosum* (Scrambling Lilly) – gets very lush thick leaves when in shadier conditions.
    - *Alocasia brisbanensis* (Cunjevoi Lilly)- Native alternative to Taro, loves wet feet.
    - *Lomandra hystrix* (Creek mat rush)
    - Fern species (check local species with your native nursery)
  - Shrubs
    - *Backhousia citriodora* (Lemon myrtle)
    - *Melia azedarach* (White Cedar)
    - *Trema tomentosum* (Poison Peach)
  - Trees
    - Brachychiton discolor (Lacebark Tree)
    - Castanospermum australe (Black Bean)
    - *Stenocarpus sinuatus* (Wheel of Fire Tree)

- *Podocarpus elatus* (Brown Pine)

- **What is the best way to remove weeds?**

Depending on the weed, the best suited removal technique will differ. We recommend prioritising manual/mechanical control methods by removing as much of the plant as possible with as little disturbance to the neighbouring environment and native species. Woody weeds can be trimmed and mulched but other weeds need to be completely removed, roots and all. We'll be covering a variety of techniques in the Workshop 2 videos, but for more information, the following resources are also available:

- https://weeds.brisbane.qld.gov.au/
- https://www.lfwseq.org.au/wp-content/uploads/2022/05/LfW-Note-ENVIRONMENTAL-WEEDS-EW2_Weed-Control-Methods_WEB.pdf

- **How to safely and effectively manage 'nasty' weeds?**

It is important to mitigate negatively emotive language when discussing weedy plants, as often they hold ecological benefits such as bank stabilisation, rapid ground covering ability in tough conditions, habitat value and can be a food source, medicine source or other cultural or useful attributes. Painting a negative picture can also negate some of the great values and botanical learning potentials.

There is plenty of information and notes in the handbook, on 25 of the most commonly observed weedy species in this local waterway, so becoming familiar with this tabulated list will really enrich your creek regeneration experience - remember to be patient with yourself when learning, and remember it is a long-term game!

Let's discuss some examples of managing some of the 'toughest weeds' i.e. weedy plants that have the ability to continue reproducing even after being removed or weeded.

- Succulents and fleshy plants: collect carefully and compost solarise (i.e. create a heap onto direct ground, and cover with a heavy material - or revisit pile regularly and turn it to accelerate decomposition).
- Spikey plants and plants with toxic sap - handle with care, using correct PPE e.g. gloves and eyewear.
- Vines - initially, cut low, around ankle height, and high, above head height. This removes strain from the tree and will often halt the reproductive ability/ seeding season. be careful to preserve any local vines being entangled during this process, wherever practical. After this initial cut, set about removing the roots of the weedy vine, using digging tools, a small kama or tree-popper. It is usually not necessary to pull vine vegetation from canopy.
- Plants with prolific seed, fleshy tubers - remember that chances are there is already a significant seed bank all around you so don't panic! If feasible, collect seeds/seeded material and either compound in a pile that you will regularly inspect and turn over or try liquid composting in a

tub with a secure and porous lid (to prevent mozzie breeding yet promote naturally aerobic composting processes).

- **What to do about Khaki weed?**

Manual removal of Khaki weed is the most effective. Try to remove in clumps before the seed heads get a chance to distribute. It is time-consuming, but that way you're removing the entire plant with its seed. Khaki weed is often confused with some native joyweeds, so if you can't ID, let it be.

Foliar spray is also possible for this herbaceous weedy plant. While we don't recommend using herbicides or chemicals, especially close to any waterways for its impacts on wildlife and neighbouring plants that may be more sensitive than the target, if you do feel the need to use chemical controls, head to https://weeds.brisbane.qld.gov.au/control-methods/foliar-spray for more information and options regarding chemicals.

- **How do I determine whether a weed is good or bad?**

When we say 'weeds' we mean vegetation that has pest-like tendencies in the local environment. Generally, weeds are pests because they're highly adaptable to environmental conditions and are very efficient at reproduction, creating an imposition on local native species that were traditionally in balance within that ecosystem. It's the level of invasiveness that is normally an indicator of which weeds are the good the bad and the ugly, but even pests can serve a purpose. It's up to your observation and discretion which weeds are 'bad' in your backyard, but things to look for include:

  - Quantity and frequency of seeding/fruiting and extent of reproduction.
  - Smothering tendencies (vines that kill off older growth by blocking light).
  - Extent and condition of neighbouring vegetation.
  - Suppression of other species around their root systems.
  - Negative impacts on wildlife/toxins.

If you want an official guide or to dig deeper, there's the list of Weeds Of National Significance (WONS) in addition to species that are 'restricted' or 'significant' listed in categories for priority management under the Queensland *Biosecurity Act 2014*.

  - www.qld.gov.au/environment/plants-animals/plants/herbarium/weed-spotters/
  - www.business.qld.gov.au/industries/farmsfishing-forestry/agriculture/land-management/health-pests-weeds-diseases/weeds-diseases/identification

2) Erosion

- **How to manage vertical, eroded banks?**

Vertical, eroded banks are problematic as they are highly susceptible to ongoing erosion and difficult to plant. Engineering interventions, using nature-based solutions, can be used to restabilise vertical banks – for example, pile fields, toe protection, and coarse woody debris to protect the bank and encourage sediment deposition. They may require reprofiling of the bank to reduce the batter angle to one that is more stable to enable planting, ideally with deep-rooting ground covers.

- **For areas along the banks with severe erosion, are there negatives to rock walls?**

Rock should be used generally only where appropriate for bank protection and/or grade control. The placement of rock should respond to areas of high shear stress where flows have more energy. Placement should also consider whether the rock may have unintended consequences on opposite or downstream banks – generally recommend that the placement of introduced large rock protection is by exception and requires an understanding of the channel dynamics/flow velocity.

3) Permits and governance

- **I am concerned about the use of creek water for field irrigation.**

See below.

- **Pumping permits + flow in low rainfall?**

Water licences are required under the *Water Act 2000* for taking or interfering with surface water. These licences include limits and conditions on what can be taken and there are often additional rules that must be followed under the Water Regulation 2016, water plan or water management protocol. Healthy Land & Water is not able to investigate or enforce water resource compliance, but if you're concerned, you can raise your concern or complaint to the Water Regulator at the QLD Department of Local Government, Water and Volunteers on 13 74 68 or WaterServicesSouth@rdmw.qld.gov.au.

Additionally, your local councillor and state member will be best positioned to consider this concern when prioritising water, drainage and park upgrades and sporting facilities.

- **Do we need riverine permits?**

Kedron Brook is a state-mapped waterway for waterway barrier works, meaning any work undertaken within the waterway should be in accordance with accepted State guidelines for the appropriate class of waterway to prevent works which could impede fish passage. Works within the waterway overlay or flood hazard overlay may also trigger Council development approval or Natural Asset Local Law (NALL) permits to undertake earthworks or vegetation removal. If in doubt, check via **Council's online planning scheme mapping** prior to undertaking works.

Riverine Protection Permits are required for any work involving cut or fill material in or near the channel. For non-tidal watercourses, you do not require a permit to undertake non-structural maintenance work within the riparian corridor or to clear pest/weed vegetation. Therefore, as long as it is done without negative impact on surrounding native vegetation:

- The registered owner of the land adjoining such non-tidal watercourses has a riparian right to maintain that part of the watercourse adjoining their land, including vegetation management and non-structural bank stabilisation.
- Low-risk and low-impact bank stabilisation that may contribute to improved bank condition and reduce the risk of future erosion and subsidence within the watercourse includes the installation of jute fibre matting and planting the bank with appropriate local provenance native shrubs and ground cover plants.
- Any works proposed within non-tidal waterways may be authorised under the *Water Act 2000* which is administered by the Department of Local Government, Water and Volunteers.
- A riverine protection permit may be required for the proposed works to be undertaken within the watercourse (this applies to any in-channel alterations or mitigations).
- The Water Services team in DRDMW should be contacted at WaterServicesSouth@rdmw.qld.gov.au with regard the requirement for a Riverine Protection Permit or if the required works meet the Riverine Protection Exemption Guidelines.
- Any engineered solutions to stabilise the bank of a watercourse must be undertaken fully within the boundary of the adjoining freehold land.

- **What to do about treefall on private / shared land?**

A tree-keeper is the registered owner of the land the tree is 'wholly or mainly situated on'. If a tree on your property falls on your property, you're responsible for its clearance and any damage. Check with your insurance for cover of clean-up costs and conditions that may be covered. However, if a tree is unhealthy (rotted, etc.) or someone unskilled (not an arborist) has treated the tree and it falls causing damage, you may not be able to claim against insurance.

If a tree from a neighbour's property falls, for example on a shared fence, it is your neighbour's responsibility to clean up.

If a tree on public property falls and causes damage, council is generally responsible for cleaning up, but your homeowner's insurance would cover damage to your property.

When planting, it's good to consider whether a tree's position is likely to impact:

- Your neighbour's solar panel function.
- Obstructs a view from a dwelling that existed when the neighbour took possession of the land.
- Creates a substantial and ongoing accumulation of tree litter in their yard (doesn't include leaves, flowers, fruit, seeds or small elements of deadwood).

Trees considered a natural asset can be protected by a Vegetation Protection Order (VPO). Contact your local council for more about VPOs. Finally, trees protect trees! If you think an isolated mature tree may become dangerous in later years, protect it by supporting the roots with good ground cover and by planting around it for windbreak. If it's stood for the last 100 years, the best way to encourage it to stand for another 100 is by increasing its community.

- **Public land easements – How and what?**

Easements give someone other than the landowner rights to use the land for a specific purpose. Commonly in relation to access, drainage, sewerage and gas/water supply. You can apply for an easement over state land (over a reserve or unallocated state land) or, to continue an easement over freehold land that's been granted for public utility (if you are the land holder). This easement will become public use land and various conditions to/from the public utility holder (grantee). Land adjacent to a non-tidal waterway (e.g. creekbanks) is not unallocated state land but is controlled by state under the *Land Act 1994*. Easements / leases may still be issued depending on circumstances and adjacent freehold tenure permissions.

More information around easements can be found on the QLD Government website (https://www.qld.gov.au/environment/land/state/easements).

4) Hydrology

- **Regarding material such as a tree in the creek, how does this affect stream processes and biodiversity?**

Fallen trees or timber can have positive and negative impacts on stream processes and ecology. Fallen timber creates shading and refugia for fauna in the stream corridor. It will also typically trap sediment, causing the formation of a bar or island in the channel, which will over time support plant growth. Depending on the orientation and position of the fallen timber, it can assist in protecting eroding banks by trapping sediment and reducing shear stress on exposed banks, although it may also cause a flow constriction or local eddy, potentially leading to scour.

- **Why was there more sediment left after the 2022 floods?**

Sediment deposition is linked to both flow velocity and sediment availability/mobility. Large flood events such as 2022 convey sediment from the catchment but also from the waterway channel itself. As water spreads out over the flood plain when it exceeds the main channel, larger sediment may be deposited as the average velocity decreases across the flood plain. Large sediment (gravels, sand) will drop out first, with fine sediment such as silt being conveyed downstream.

BLUE BEATS HAIRY!!

How to establish Blue Commelina (*Commelina diffusa*) as a local groundcover, habitat and a living mulch. AND to beat Hairy Commelina (*Commelina benghalensis*)

A step-by-step guide in harvesting runners from your Blue Commelina 'bank' and planting these with a ground-layer technique, wherever you have areas of Hairy Commelina, or bare/ unplanted zones. The planted runners will die back to their nodes, but then should take root as your new groundcover!

SIX EASY STEPS:

1. **Prep:** prepare an area by thoroughly weeding out Hairy Commelina/ *C.benghalensis*, *Dyschoriste*, grass runners and other weeds - it is worth being very particular, as once the planting has happened there will be watering - we don't want to be looking after the unwanted species!
Alternatively choose an area where it is bare/ mulch only

2. **Collect:** take handfuls of *Commelina diffusa* runners from where it is thriving or, with care, from around natural regen/ planted species (to give these plants space); collect in a bucket (you can add a seaweed soak solution if you have available) - can you see roots at the nodes?

3. **Dig:** using mini mattocks, hori hori or weed knives, dig a generous trench about 40cm in length and about 10cm deep, into real dirt or well-broken down mulch - deeper is better than shallow

4. **Transplant:** Lay a small handful, say 3-6 lengths of C.diffusa into the trench, and cover well with the freshly dug material. In the end, a covering of 80-90% of the plant is sufficient

5. **Water:** water well, particularly in dry soil, allowing for a good soak. Tend to these areas with further water for about 3 months, or play it by ear with rainy weather

6. **Protect:** mark with bush stakes and lay branches across the planted areas, to protect from digging creatures - bush turkeys may be attracted to the smell of freshly turned and moistened earth

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Photo Reference: