



Norfolk Rivers
Drainage Board

Standard Maintenance Operations Policy Document



Version 1.0

Training, Revision and Amendment Register

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1.0 Introduction

The Norfolk Rivers Internal Drainage Board manages the water levels in agricultural and residential areas, on the tributaries and main stretches of seven rivers in North and South Norfolk; namely the Rivers Wensum, Bure, Upper Yare, Tas, Stiffkey, Nar and Ant. Since the creation of the Predecessor Boards, this has always been achieved by the regular desilting or weedcutting maintenance of stretches of these watercourses.

The Board has had a Standard Maintenance Operations Document since the year 2000. The aim of this document has always been to allow a procedure to be put in place for maintenance to be carried out to a uniform standard throughout all the Boards maintained watercourses. However, changes in legislation and key political drivers have resulted in a necessary review of maintenance practices with the emphasis being placed on the sustainable management of our natural resources within these catchments.

The rivers and tributaries within the NRIDB catchments are similar in many respects; they are all drained gravitationally, they are all affected by diffuse pollution and many have a hard bottomed, gravel substrate. However, it is also true to say that these rivers are not homogenous environments and many exhibit a variety of hydromorphological features ranging from artificial or heavily modified watercourses around mill structures, through to natural and physically diverse headwater streams. In general the more diverse the physical structure of a river with riffles, pools, wet berms and marginal vegetation, then the more diverse and rich the plant and animal community will be within the aquatic environment as a result.

It is important than that these features and habitats should be retained to preserve the plants and animals they support. The quantity and location of the physical features to be retained will vary from site to site depending on the nature of the river.

The sustainable targeted maintenance and restoration of these watercourses with the aim of maintaining or helping to achieve good ecological status or potential will help meet the requirements of the Water Framework Directive and play an important role moving toward the UK Governments aim to halt decline in biodiversity by 2020. A recent move toward utilising natural environmental systems (Ecosystem services), responding to climate adaptation and ensuring

the legislation surrounding the Water Framework Directive is adhered to, needs to be considered to ensure the sustainable management of these catchments. It is hoped that this can be achieved by process of modelling the watercourses and using this information to inform restoration or targeted maintenance after taking into consideration the operational needs and flood risk of the catchment served.

This document aims to utilise information from the Environment Agency's suite of environmental options, which have been assessed for compatibility with the requirements of the Water Framework Directive. These options have in turn been assessed for compatibility with the maintenance requirements of the NRIDB and NRIDB Standard Maintenance Operations. The documents have been merged to produce a WFD- friendly maintenance document, suitable for the maintenance needs of the NRIDB.

2.0 Legislation

As a Statutory Risk Management Authority, the NRIDB has various National and International legislative duties to comply with, regarding the aquatic environment, biodiversity and wildlife sites within the Norfolk Rivers Internal Drainage District. It should be noted that failure to comply with any of these statutory obligations, has the potential to result in both Personal and Corporate Liability being brought about to both individual Board Members and the Board, by the Enforcement Body. As a result, the Court may issue a fine dependent on the severity of the offence and insist on restorative works being carried out and paid for by the offender; some fines of which may be unlimited. Furthermore some offences may attract a custodial sentence.

The main legislative drivers are as follows:

2.1 European Legislation

- The Water Framework Directive (2000) – a statutory duty to ensure that reasonable actions are taken to improve the physical and chemical nature of the waterbodies under their management, with the aim of achieving good ecological status or potential of surface waters by 2015. This can be achieved by putting in place environmental improvements or mitigation measures where applicable and undertaking sensitive management of watercourses.

- The Conservation of Habitats and Species Regulations (2010)- a statutory duty in the exercise of any functions, to have regard to this EC Habitats Directive which provides for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

2.2 National Legislation

- Wildlife and Countryside Act (WCA Act) (1981) imposes a statutory duty to protect native species (especially those at threat), control the release of non-native species and protect SSSIs.
- The Countryside and Rights of Way Act (CROW Act) (2000) – this act amends the WCA Act and enforces a duty for Statutory Authorities to be responsible for conservation and enhancement of SSSIs. It also enhances Natural England's enforcement power.
- Natural Environment and Rural Communities Act (NERC) Act (2006) - a statutory duty to maintain and enhance the natural environment when carrying out flood risk management activities and meet objectives and targets set out in the Norfolk Rivers Biodiversity Action Plan.

2.3 Protected Species and Habitats and Other Considerations

There are networks of protected species and habits across the UK. Some of these species such as water voles, otters and bats are given full protection under the law for both the individual species and their habitats. Some habitats and species are identified in the UK Biodiversity Action Plan. Some habitats and species are covered by separate legislation; such as the Badgers Act, the Salmon and Freshwater Fisheries Act, Hedgerow legislation and Tree Preservation Orders. We need to ensure that this legislation is considered and complied with when undertaking our works.

2.4 Non Native Invasive Species

The spread or control of many of these species eg. Japanese Knotweed, signal crayfish or the Killer Shrimp, is illegal under the Wildlife and Countryside Act (1981)(as amended). We therefore must not cause these species to spread as a result of our activities.

2.5 Conservation Sites – Statutory and Non- Statutory

Where operational activities are to be carried out within or adjacent to statutory designated conservation sites such as SSSIs, SACs, RAMSARs or SPAs permission is required from Natural England before any work can start.

The NRIDB has an agreement with Natural England that any work carried out on any tributary of the River Wensum requires Natural England assent also.

Non-statutory sites such as County Wildlife Sites (CWS) do not require any formal written permission; however these sites are noted for their habitats and species, some of which may be protected. These sites have a significant value within the county and it is within everybody's interest to ensure that work does not impact on these sites. Where NRIDB are required to work on or near CWS, then the NRIDB will liaise with the Norfolk Wildlife Trust prior to starting works.

2.6 Cultural and Heritage Sites

Landscape, cultural and heritage sites may be present within work areas or adjacent land, some of these such as Scheduled Ancient Monuments and Conservation areas require permission to undertake work on or adjacent to them.

3.0 The Conservation of Natural Features and Seeking Opportunities to Enhance or Restore

Flowing watercourses have different ecological and physical characteristics to artificially created systems. They are extremely important for wildlife, particularly

fish, and are very sensitive to inappropriate management. In addition the management undertaken on the headwater tributaries has implications for the whole river further down the system.

However, sensitive, targeted maintenance or restoration of a watercourse can be beneficial for wildlife. The objective of restoration or sensitive management is to maintain or re-create a self-sustaining system using natural processes. However, planning and monitoring of this management is essential if maximum benefit is to be obtained from the operations to inform for future management opportunities.

Physical features will be conserved where they are found in situ and the Board will seek opportunities using information from the Flood Risk Model to liaise with landowners to undertake restoration of natural features where appropriate. The important physical features of rivers which can be restored or enhanced are as follows:

3.1 Pools and Riffles

Pools and riffles are natural formations in gravel-bedded channels. They are dynamic, changing form in response to flood events and are valuable features for the conservation interest of a river. The riffle sections oxygenate the water and provide a spawning ground for fish.

3.2 Bends and Meanders

Bends and meanders slow the river down and can be used to help the river spill out onto a natural flood plain and deposit its silt loading in high flow events. Where flood alleviation is required then they can be used in conjunction with the creation of flood relief channels (backwaters) to improve conveyance.

3.3 Backwaters

Backwaters are important features in rivers as they provide a wide range of different habitats. Backwaters in continuous connection with the main flow are particularly valuable. They can act as a flood bypass channel at times of high flow and provide refuge for fish in times of flood or other adverse conditions.

3.4 Natural Marginal Berms and Islands

Marginal berms and natural islands are formed by natural sediment transport processes in the channel bed. Both are dynamic and change in size and form in response to flood events. These natural structures add diversity to the river and will cause an increase in the current velocity around them, so creating silt free zones.

3.5 Installation or Maintenance of Woody Debris

Woody debris is an important mechanism for increasing diversity of flow and habitat and as such is an essential element of watercourse ecology. Possible options for leaving, repositioning or reintroducing woody debris in a water course should be considered on a site by site basis.

3.6 Channel Narrowing

The practice of channel narrowing within a stream or river increases velocity and diversity of flow along a watercourse. This naturally restores a cleansing dynamic to the watercourse and should thereby reduce maintenance requirements into the future.

3.7 Channel Capacity

Flowing watercourses will not be deepened. A deepened channel may change the natural fluvial process, increase siltation and destroy the hydrological connectivity of river and floodplain. Channel capacity can be increased by the use of two stage channels to increase inbank capacity during flood events.

3.8 Riverbank

Straight batters within a watercourse are not necessarily the best solution from an engineering or an environmental point of view. The preferred approach is to encourage natural processes and diversity. A variety of features can be encouraged or created particularly in the margins such as low level berms, holes, ledges, variations in height and slope etc., together with the natural vegetation. These variations in water depth and cover offer niches to a variety of plant and animal species, increasing biodiversity.

The Board will look to conserve the physical features of the waterbodies it manages and seek opportunities to restore or enhance them elsewhere where appropriate.

4.0 The Targeted Maintenance Approach

The retention or restoration of the diverse physical nature of the watercourses is key to the requirement of the Water Framework Directive and the biodiversity of the aquatic environment. These Standard Maintenance Operations aim to provide guidance by way of a series of **Environmental Options** on the appropriate standards to be achieved where restoration cannot be achieved or where maintenance is critical. The watercourse itself, site specific Health and safety and environmental (protected sites and species) implications will all need to be considered when choosing the appropriate targeted maintenance activity from this document. Targeted maintenance works can then be carried out sympathetically, and with biodiversity interests and the physical nature of the watercourse kept firmly in mind.

Those **Environmental Options** highlighted in **red** have the greatest environmental impact, whereas those highlighted in **green** have the least impact. There is a selection of **red**, **amber** and **green** options to choose from. Where possible the option with the least environmental impact should be selected.

Diagrams pertaining to each Environmental Option are illustrated in Appendix I.

4.1 How the Standard Maintenance Operations will work in practice

This document will be called the Standard Maintenance Operations Policy Document and will be used to inform outside bodies of the way in which the NRIDB intend to carry out all future maintenance practices. and will act as the basis from which all maintenance practice will initiate. The document will be subject to review on an annual basis. Version control will allow any changes to be recorded.

A further document “Illustrations and Descriptions of Environmental Options: Field Notes for Operatives and Contractors” (Field Notes) will be used by operatives, and contractors on site. This will be a more concise document, tailored to the relevant needs of the operative. This document will be used to

inform a robust Maintenance Worksheet. . Version control will allow any changes to be recorded.

The Field Notes and Maintenance Worksheet will be used in conjunction with one another to ensure specific environmental options are carried out on targeted stretches of watercourse. The Field Document will be subject to review following any amendments to the Standard Maintenance Operations Policy Document.

All Operatives, Contractors and Supervisors asked to carry out maintenance for NRIDB now and in the future, will undertake a Training session based on the Standard Maintenance Operations Policy Document. Training needs will be reviewed in line with any future amendments to the Standard Maintenance Operations Policy Document.

Prior to initiating any Maintenance job, operatives and contractors will receive a job specific tool box talk, All watercourse maintenance will receive close supervision by a trained Supervisor.

5.0 The Environmental Options

5.1 Mowing of Bankside Vegetation

The aim of mowing is twofold:

1. it allows unimpeded visibility for the driver
2. it prevents the establishment of trees and scrub along the nearside waters edge.

Mowing of the bankside vegetation will be carried out by a tractor and flail or a side mounted flail on a 360 hydraulic machine. In some areas where access cannot be achieved or is considered inappropriate for a machine, then strimmers and hand tools will be utilised.

Mowing of bankside vegetation will be undertaken throughout the year, though in bird breeding season works will only take place where necessary in low risk environmental areas, such as open grazing marsh. However, prework checks will take place between March to September to ensure nesting birds are not present, prior to maintenance and at all times consider the Boards statutory responsibilities set out in the Wildlife and Countryside Act (1981) (as amended).

A choice of two **Environmental Options** can be employed:

5.1.1 Environmental Option M5

Visibility for the driver is crucial in being able to carry out targeted maintenance. However, appropriate visibility to carry out operations may be achieved by applying a, “Health and Safety Cut” to the batter and bank top.

- A 1m vegetated zone above the watercourse is left uncut but the remaining batter and one cut is taken from the nearside banktop, to determine the edge of the watercourse and help prevent the machine from falling in the water. The flail height will be set to 75 -100mm.
- Where there is less freeboard and the batter is less than 1m, the remaining vegetated zone will be left and one cut will be taken along the bank top. The flail height will be set to 75 -100mm.

No WFD assessment required prior to instigating this method

5.1.2 Environmental Option M4

Where Environmental Option M5 is deemed inappropriate due to access issues, flood risk or more serious site based Health and Safety factors then mowing should take place down the nearside batter only to the waters edge and one cut along the nearside bank top.

The flail height will be set to 75 -100mm.

No WFD assessment required prior to instigating this method

5.2 Tree and Bush Management

Bankside trees and shrubs provide shade and keep water cool. Instream branches improve the ecology of the watercourse by providing food and substrate for invertebrates and cover and food for fish. Over time, instream branches add natural diversity to the surrounding aquatic environment by altering

the physical hydraulic function of the watercourse, which may result in scours and pool and shoal formation.

With the high ecological benefits attributed to the aquatic environment by trees, the first consideration prior to any tree, bush or branch removal should be, does it really need removing? (See Woody Debris Matrix)

The aim of tree management is threefold:

1. To allow unimpeded access for machinery into a site and prevent damage to the machine eg. Hydraulic pipework becoming caught up in branches.
2. To prevent the sides of watercourses becoming overgrown and in some instances, overshadowed.
3. To prevent instream blockages occurring in areas of high flood risk.

Tree and bush work can be undertaken between August – March. Prework checks are recommended between August to September and Mid-February to March to ensure nesting birds are not present, prior to maintenance. It is an offence under the Wildlife and Countryside Act (1981) to recklessly disturb a breeding bird or its nest during the bird breeding season.

Veteran trees may be subject to a Tree Preservation Order or may provide roosting sites for bats. Fallen trees or root systems may also act as couches or holts for Otter. The root systems may provide cover for White Clawed Crayfish. It is crucial then that trees are not cleared without prior investigation by the Operations Manager or Technical and Environmental Assistant as this may constitute an offence under the Habitats Directive (2010).

Dead trees should be left in situ as ecologically they can provide niches for a rich diversity of species, ranging from invertebrates to birds and bats. These should be left and not be touched without prior investigation by the Technical and Environmental Assistant as this may constitute an offence under the Habitats Directive (2010).

Where board's operators have found it necessary to remove or trim overhanging trees or shrubs, then trees and bushes can be cut up as wood piles or left on the banktop to enhance the terrestrial habitat.

Waste timber may also be chipped and spread where the landowner is happy for

this to occur and where no detriment will be caused to the surrounding environment. Alternatively the chippings or waste timber can be removed from site.

A choice of four **Environmental Options** can be employed:

5.2.1 Environmental Option TB4

Where a tree or bush has a trunk only growing in the water and there are other trees behind, offering shade, then the tree can be removed where necessary. Cuttings should be removed from the channel.

No WFD assessment required prior to instigating this method

5.2.2 Environmental Option TB3

Where a tree or a bush has branches overhanging the watercourse but not actually within the water, then overhanging limbs can be removed upto the height of the banktop only. The remaining tree remains in situ.

No WFD assessment required prior to instigating this method

5.2.3 Environmental Option TB2

Where a tree or a bush has overhanging branches trailing in the water, then these can be removed up to bank height and the rest of the tree left in situ.

Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

It may then be possible to install the removed branches in a more appropriate position. This should be a consideration to lessen the ecological impact of removal.

5.2.4 Environmental Option TB1

Where trees or bushes are standing away from the watercourse but access is required or flood risk is an issue, then trees can be felled near the watercourse.

Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

5.3 Woody Debris Management

Woody debris (eg. Branches, entire trees or root balls) often fall into rivers. Historically we have removed woody debris to maintain flow conveyance and prevent downstream blockages. It is good practice however to either retain or introduce new woody debris into river channels as it is a cheap and effective means of enhancing rivers for wildlife.

When deciding whether to retain or introduce new woody debris to a watercourse, full consideration must be paid to whether it would be suitable in that particular location. There are four risk factors to be taken into consideration:

- Flood Risk – is the site a low medium or high priority system?
- Risk of obstructing a structure downstream – is the site close to a bridge or culvert that could block if woody debris was dislodged.
- River channel depth – is the channel deeper than the height of the woody debris?
- Setting – is the site in an urban, parkland or rural location?

The matrix in the table below can be used to help decide whether woody debris should be retained/introduced into a river channel. In general, **if two or more risk factors are coloured red then consideration is needed as to whether woody debris should be installed or retained, and how it can be designed to minimise risk.**

Woody Debris Risk Matrix

	Low Risk	Medium Risk	High Risk
Flood Risk	Low risk FRM system	Medium Risk FRM system	High Risk FRM system
Channel Depth	Woody debris is half the height of channel depth or less	Woody debris is the same height as the channel depth	Woody debris is higher than the channel depth
Site Setting	Rural	Parkland	Urban
Risk of obstructing a structure downstream	Low	Medium	High

5.3.1 Retaining Woody Debris

Three environmental options have been created to encourage retention of woody debris. The table above should be used to decide whether to retain woody debris. In general, woody debris should not be removed when there is no evidence that it is causing flood risk or that it could cause a blockage.

5.3.2 Introducing New Woody Debris

When removing woody debris in one location, you are encouraged to keep the woody debris as it may be installed at a different lower risk site. However, when moving woody debris from one site to another, check that the source material is free of disease and non-native invasive species.

Best Practice

When retaining or installing woody debris, the following best practice should be followed:

- Selective (rather than wholesale) removal of woody debris.
- Realigning the woody debris so that it is pointing in a direction to alleviate the risk of obstruction.
- Repositioning the woody debris away from culverts and bridges which are at risk of blockage.

- Pegging the woody debris securely into the channel bed. This can be used using ground anchors to secure the woody debris in place.
- Ensuring that the woody debris' height is equal to or no greater than half the channel's depth.

Once the assessment of on site risk has been made to retain or introduce woody debris to a site then three environmental options should be assessed:

5.3.2.1 Environmental Option WD3

This option involves leaving in or introducing woody debris to a site by securing it to the banks and or bed of the channel.

5.3.2.2 Environmental Option WD2

This option involves the selective removal of some woody debris and the reorientation of the material to enable conveyance through the middle of the channel.

5.3.2.3 Environmental Option WD1

This option involves the complete removal of all woody debris from the channel.

5.4 Emergent and Instream Weed Control

The Board removes vegetation from watercourses mechanically, using a weed cutting basket attached to a 360 hydraulic machine. Where this is not practical, due to the size of the watercourse or impeded access, then manual clearance is employed using hand tools, such as a chrome.

Emergent and instream vegetation clearance will be undertaken throughout the year, though in bird breeding season works will only take place where necessary in low risk environmental areas, such as open grazing marsh. However, prework checks will take place between March to September to ensure nesting birds are not present, prior to maintenance and at all times consider the Board's statutory duties set out in the Wildlife and Countryside Act (1981) (as amended).

The main aim of emergent and instream weed control is to allow unimpeded water flow within the banks of the watercourse and improve downstream conveyance. However, weed control can also be manipulated to allow water to flow between features, speeding water up in some areas and leaving other areas available for silt deposition and marginal berm creation

The weeding basket should always be set to ensure no gravels are removed or deepening of the watercourse occurs during the process of weed cutting.

Instream weed control will work in conjunction with the mowing regime specified in Section 3.0.

A choice of four **Environmental Options** can be employed:

5.4.1 Environmental Option W7

This option allows an uneven margin to be created on the opposite bank, leaving 10% of the wet width vegetation left in situ. The nearside margin will have patches of vegetation left in a random uneven manner also. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible and wet material or mud should not be let slip down bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the section and that no deepening of the section takes place.

No WFD assessment required prior to instigating this method.

5.4.2 Environmental Option W3 a, b, c

This option allows for 50% of the instream vegetation to be removed in a sinusoidal manner to allow instream diversity to be maintained. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible and wet material or mud should not be allowed to slip down the bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the section and that no deepening of the section takes place.

5.4.3 Environmental Option W2 a, b, c

This option allows for 80% of the instream vegetation to be removed in a sinusoidal manner to allow instream diversity to be maintained. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible and wet material or mud should not be allowed to slip down the bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the section and that no deepening of the section takes place.

Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

5.4.4 Environmental Option W1

This option allows for all of the instream vegetation to be removed. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible and wet material or mud should not be allowed to slip down the bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the section and that no deepening of the section takes place.

Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

5.0 Herbicide Use for Weed Control

Chemicals are rarely used to control growth in the Norfolk Rivers Internal

Drainage District, as this can reduce species diversity of both aquatic flora, fauna and may have the potential to impact on water quality, thus affecting the whole drain ecosystem. Herbicide use in general is counter to the Water Management Alliance's Conservation Policy. This states that chemical control will only be considered where weed growth cannot be effectively controlled by mechanical means, notably in the case of alien invasive species, e.g. Japanese Knotweed and Giant Hogweed or in other inaccessible areas.

Where species which like to grow in slow moving riverine environments, such as Branched Burr Reed, then consideration must be paid to the cause of the problem with the aim of looking toward a more sustainable solution, moving forward. Restoration of the stretch will provide a better solution to the problem of weed control than continual herbicide application. For example, herbicide may be applied to create a pseudosinusoidal pattern in the weed to improve central flow but encourage silt deposition and berm formation at the edges of the watercourse. This should in turn speed up central flows and discourage future infestations.

Before any herbicides can be used in or near watercourses, written consent must be obtained from the Environment Agency in the way of a Herbicide Licence. Consultations with Natural England must also take place before the licence can be issued, where the chemicals may have an impact on SSSI or SAC rivers or land parcels.

If chemicals are to be used, then only herbicides and adjuvants cleared for aquatic use will be used in or beside water ie Glyphosate (Roundup BioActive) and Topfilm.

These chemicals will only be used in accordance with the Control of Pesticide Regulations 1986 and the Food and Environment Protection Act 1985. The storage and use of these substances will also comply with the Control of Substances Hazardous to Health Regulations 1988. It should be noted that the use of herbicides within the Board's drainage district is also affected by agri-environment scheme requirements.

No WFD assessment required prior to instigating this method.

6.0 Instream Silt Removal

The environmental risk involved in this activity in Norfolk Rivers IDB catchments, is deemed high and as such each operation will be looked at on a case by case basis.

The Board has powers under Section 15 of the Land Drainage Act, 1991 to deposit material arising from the maintenance of a watercourse on the banks.

Deposits will be spread on one side, the working side of the channel only and particular care will be taken to avoid floristically rich areas or low wet areas.

Material cleared from a channel is usually spread thinly 5-10m distance from the water course to prevent spoil being washed back into the drain and reduce further nutrient enrichment of the watercourse.

No gravels will be removed from the watercourse and no deepening of the watercourse will take place.

A WFD assessment will be required prior to any desilting operation taking place and mitigation measures put in place as required.

7.0 Bank Reprofiling

The environmental risk involved in this activity in the Norfolk Rivers IDB catchments is deemed high, particularly to water vole whose habitat and the welfare of the animal itself now falls under protected species legislation of the Wildlife and Countryside Act (1981) (as amended).

No bank reprofiling should be undertaken without first receiving strict instruction from the Technical and Environmental Assistant. Appropriate mitigation measures may be required prior to any reprofiling work.

A WFD assessment will be required prior to work of this nature being carried out.

8.0 Culvert Installation or Repair

Any culvert installation or repair will need prior assessment by the Technical and Environmental Assistant as a WFD assessment may be required depending on the location and the length of the culvert to be installed.

9.0 References

Environment Agency (2012). Delivering consistent standards for sustainable asset management. Maintenance Standards Version 3, March 2012.

Kings Lynn Consortium of Internal Drainage Boards (2000). Standard Maintenance Operations.

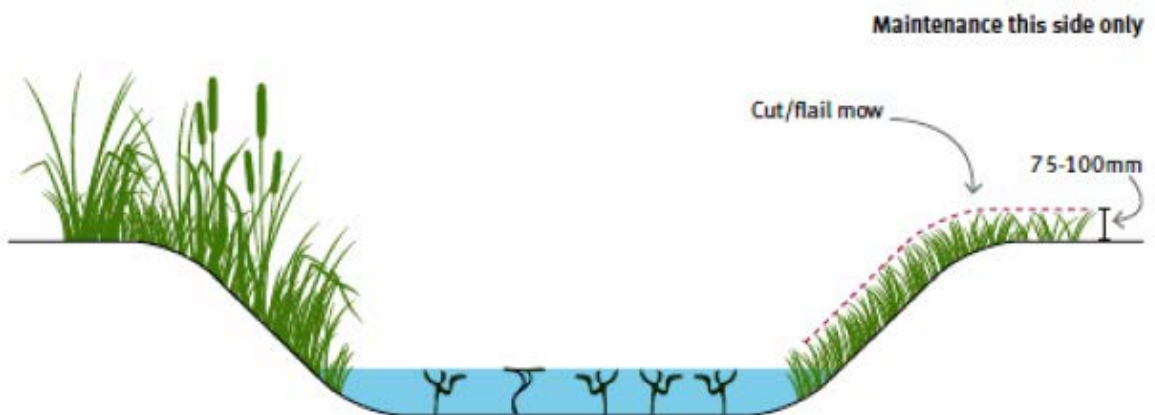
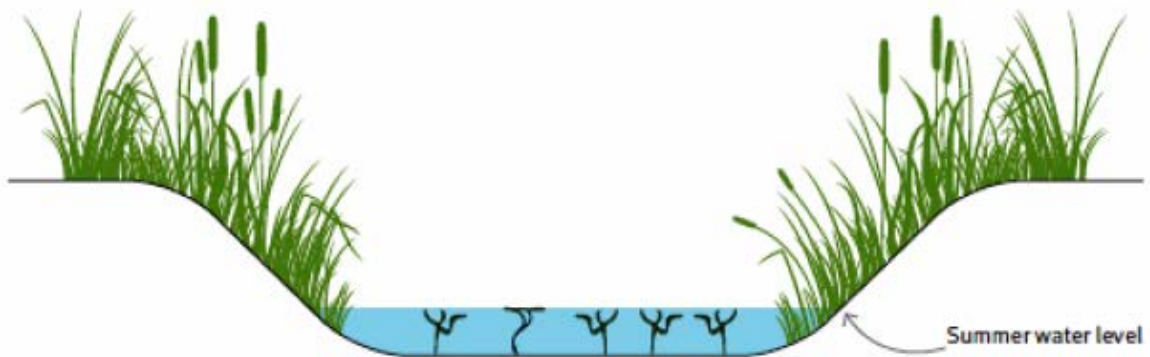
Norfolk Rivers Internal Drainage Board (2008). Standard Maintenance Operations for Rivers. Water Management Alliance.

10.0 Appendix I

All Environmental Options described above are illustrated in Appendix I below:



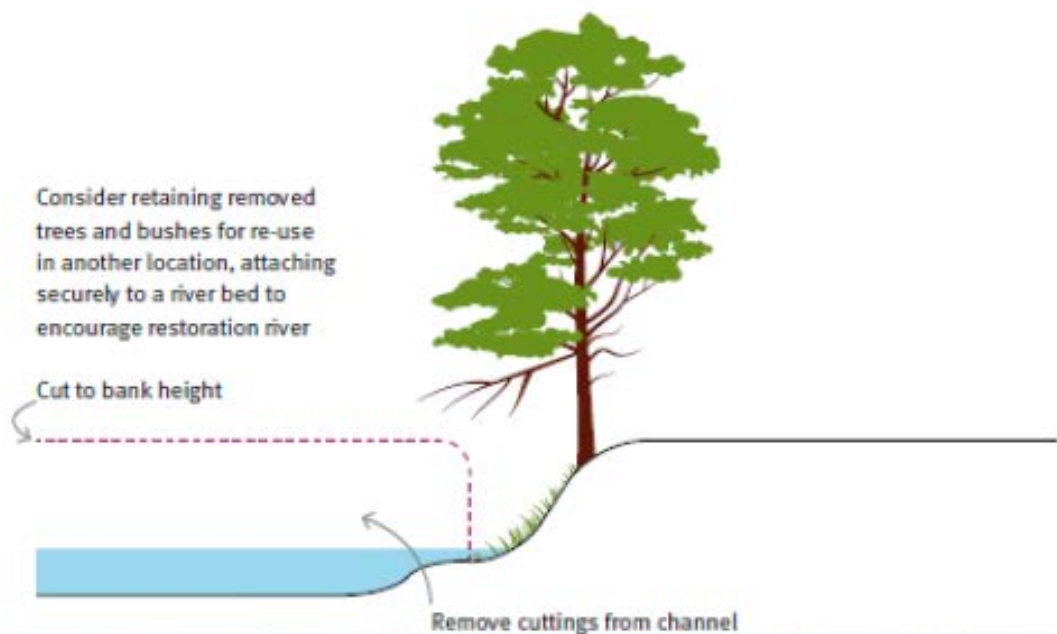
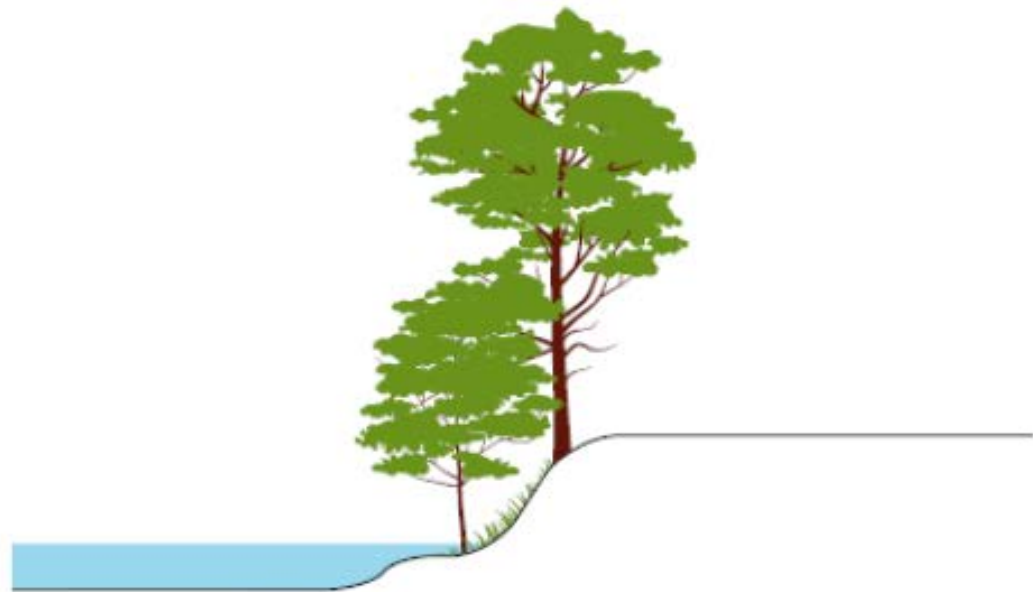
M4 Grass control





TB4 Tree and bush management

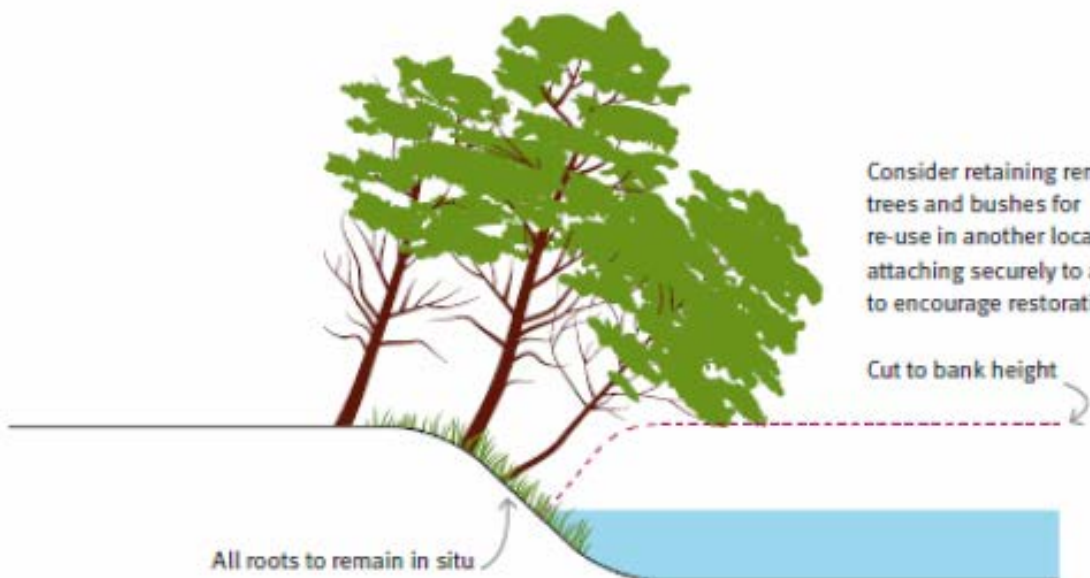
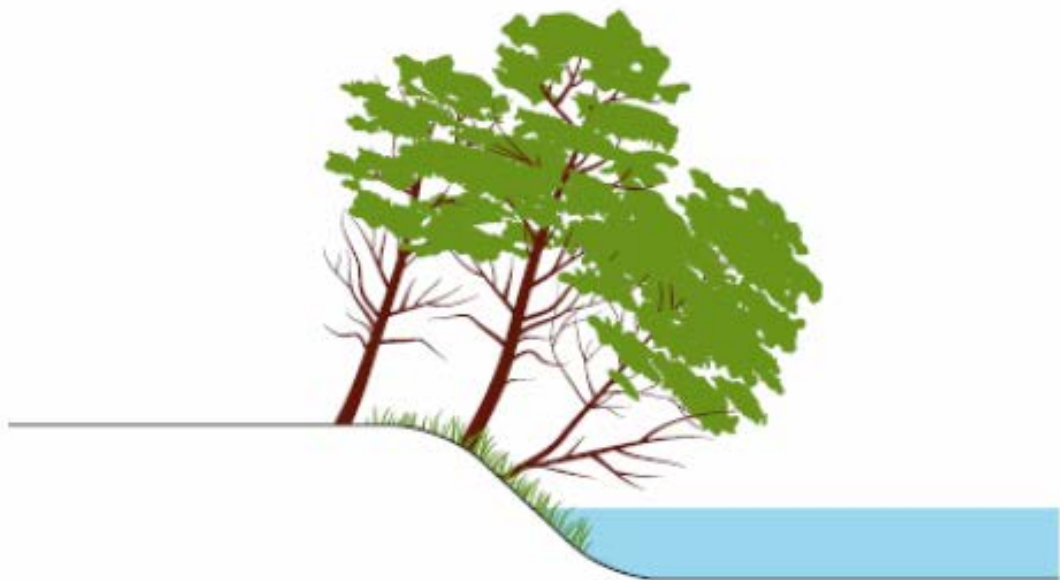
Tree and bush work can usually be undertaken between September and Mid-February, unless nesting birds are present.





TB3 Tree and bush management

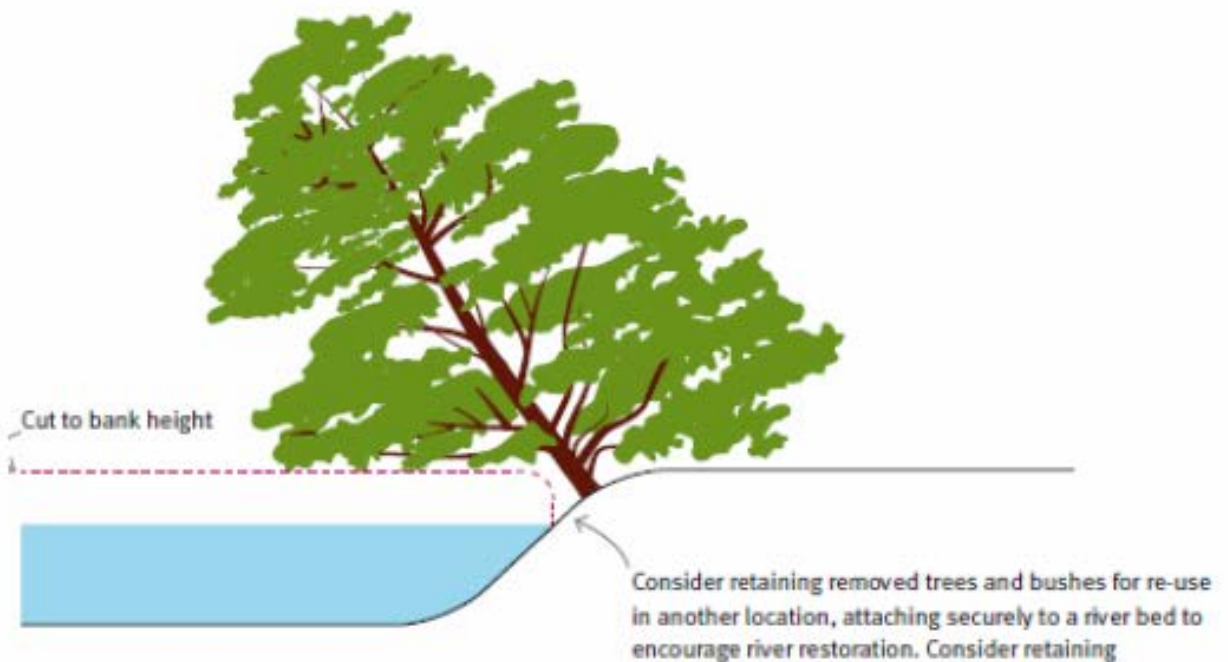
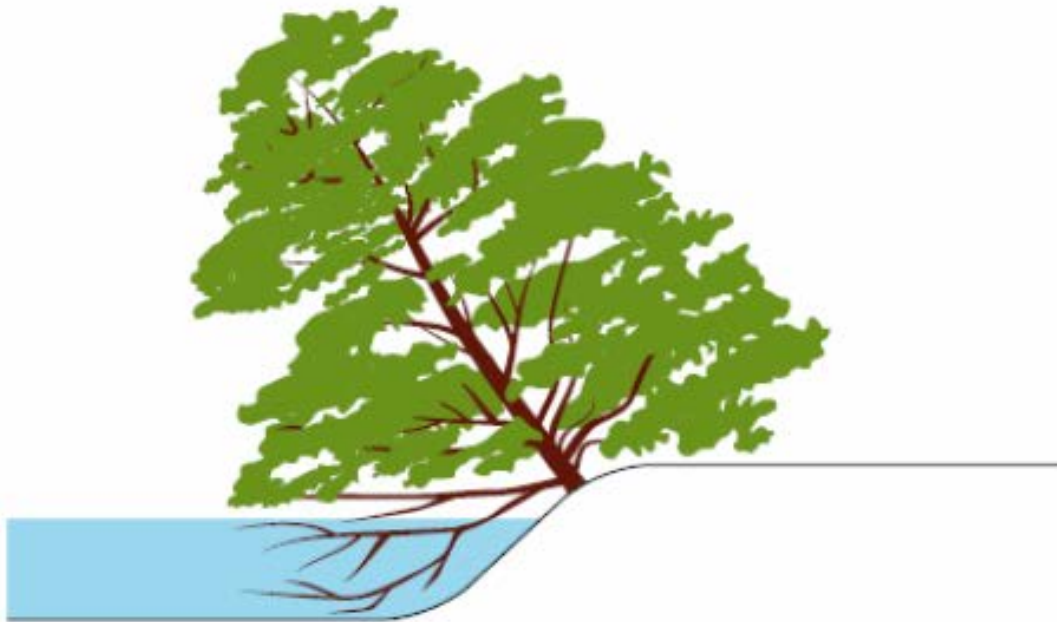
Tree and bush work can usually be undertaken between September and Mid-February, unless nesting birds are present.





TB2 Tree and bush management

Tree and bush work can usually be undertaken between September and Mid-February, unless nesting birds are present.

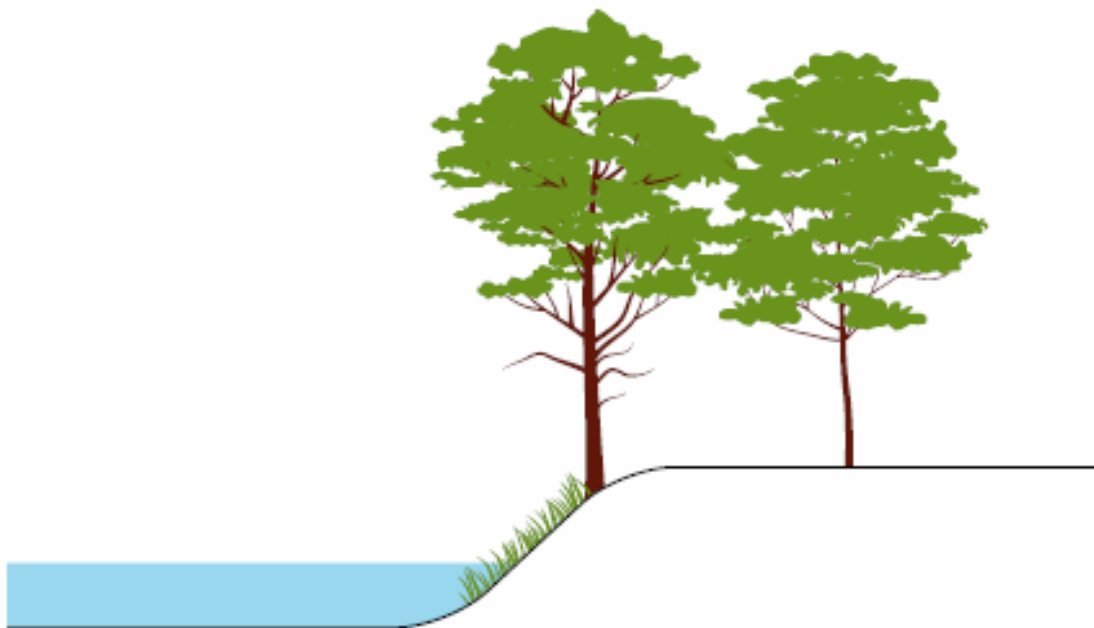




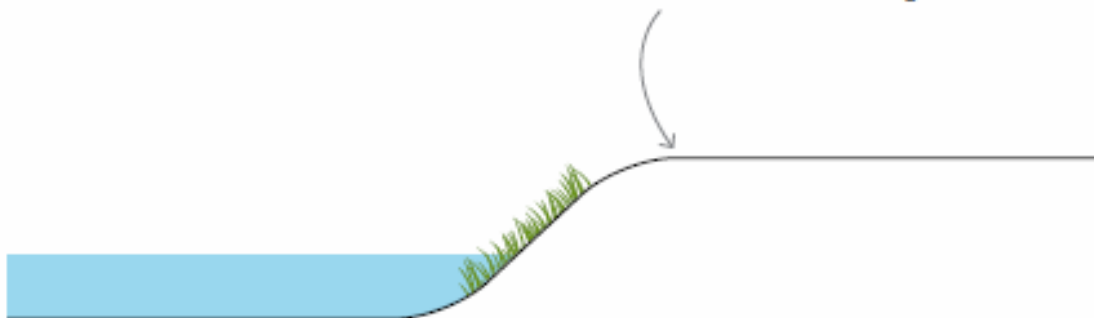
TB1 Tree and bush management

Tree and bush work can usually be undertaken between September and Mid-February, unless nesting birds are present.

Work should be phased over a number of years.

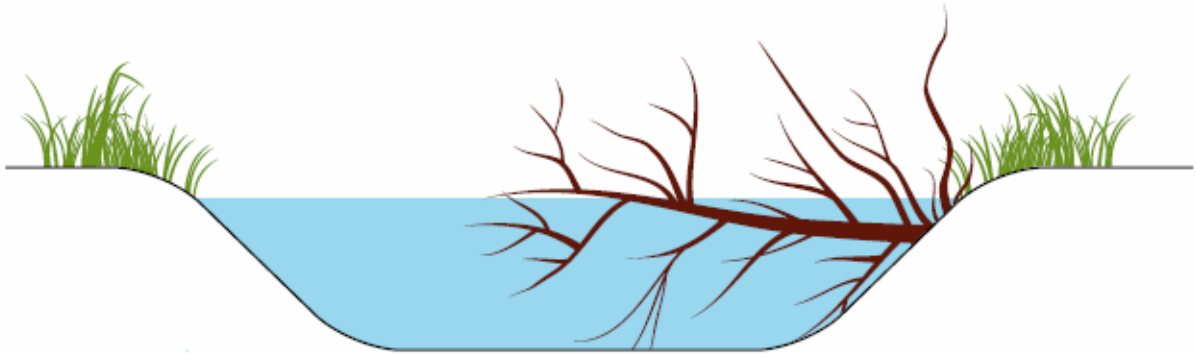
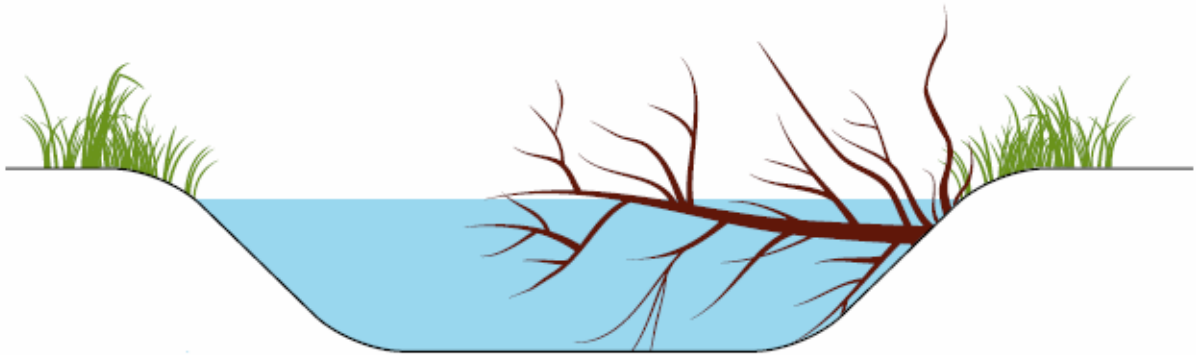


All trees and bushes to be removed from banks. Consider retaining trees and bushes for reuse in another location, attaching securely to a river bed to encourage river restoration



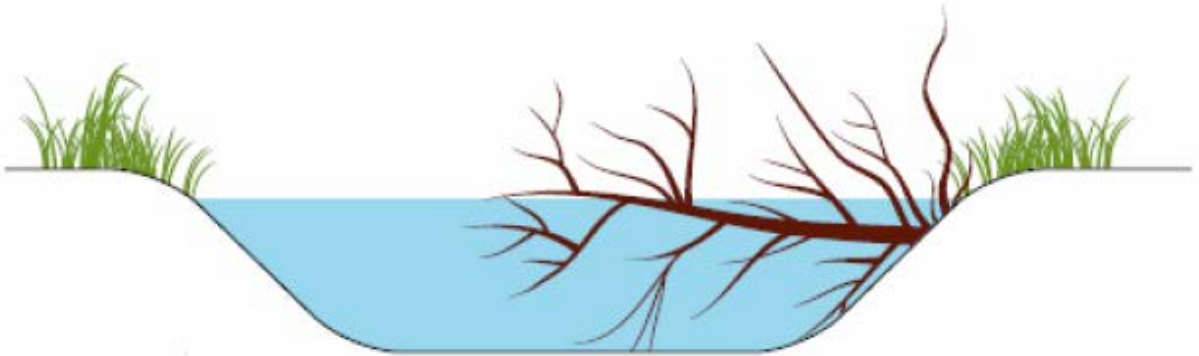


WD 3 Leave in all woody debris, and peg to the banks and bed of the channel



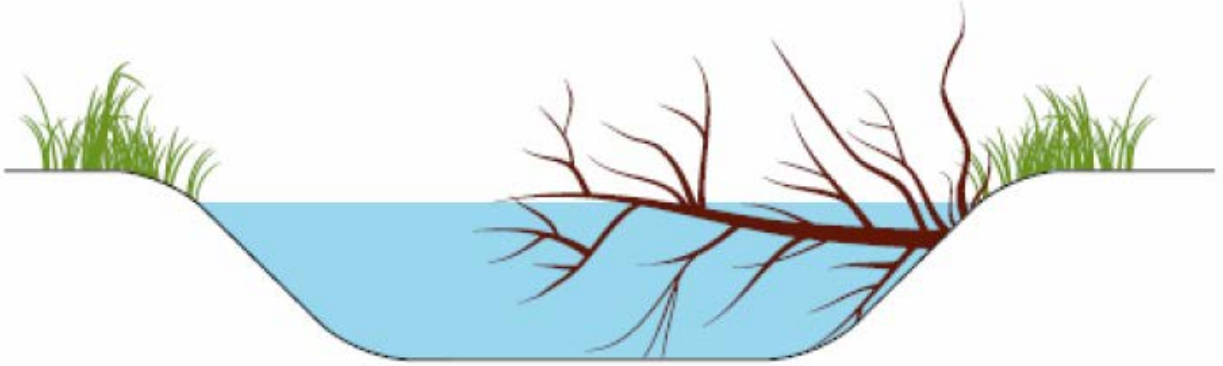


WD 2 Selective removal of some woody debris and reorientation to enable conveyance through middle of channel





WD1 Remove all woody debris





W7 Weed control



No cutting or spoil on this side

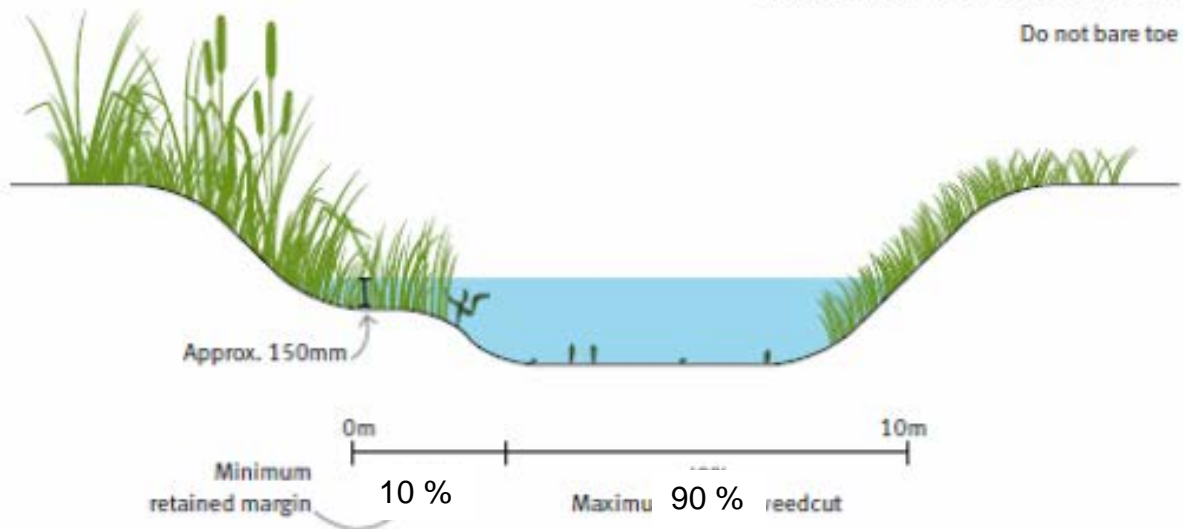
Channel width $\le 10\text{m}$ – min, 10% of retained margin

THIS SIDE ONLY Annual maintenance access

Weedcuttings to be placed as far from the channel as possible

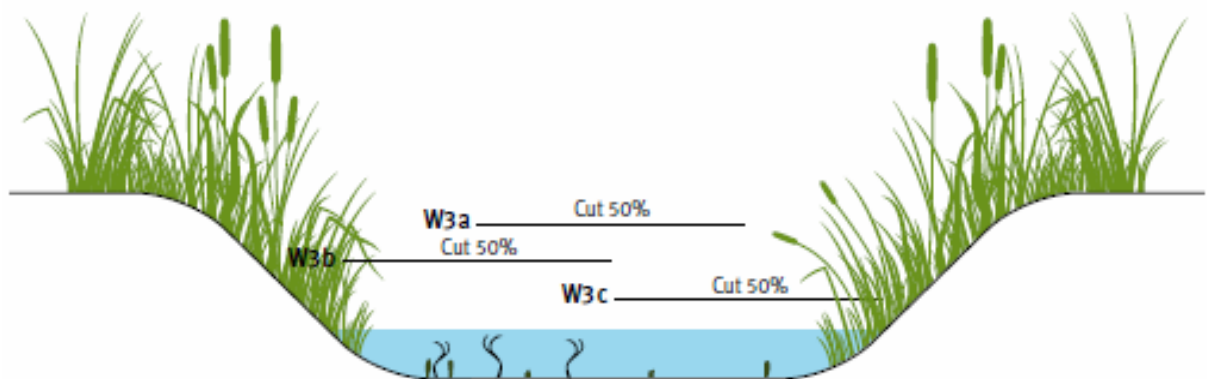
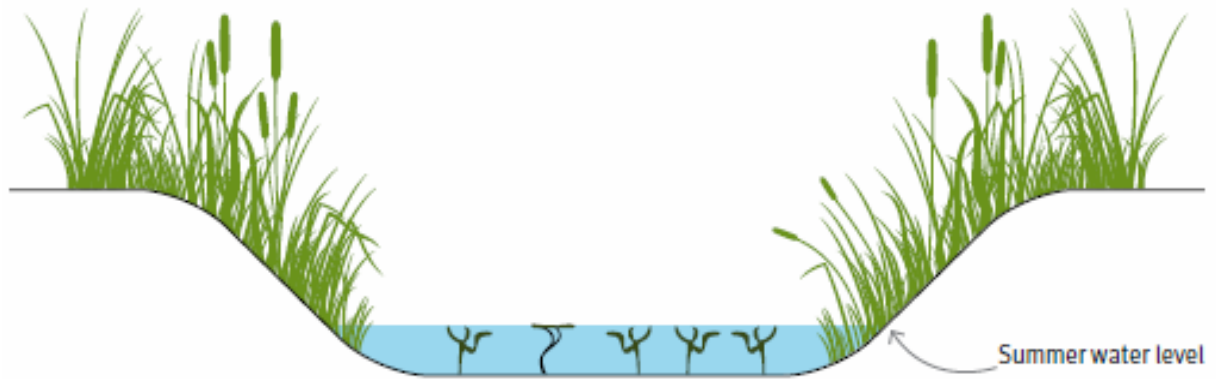
Cut using a reciprocating blade on basket

Do not bare toe



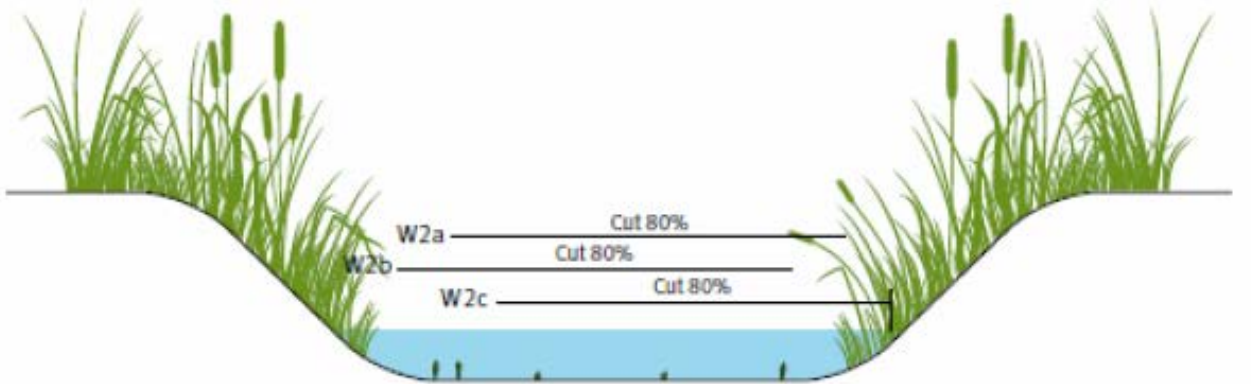
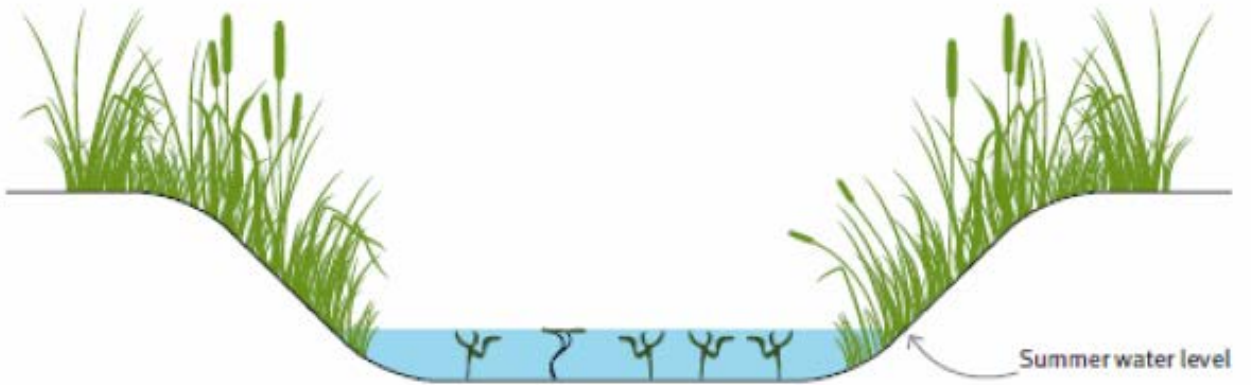


W3 a, b, c Weed control





W2 a, b, c Weed control





W1 Weed control

