Repairing lateral connectivity: what to do at the site and in the catchment

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CRC for Water Sensitive Cities

Strategy 1. Protect floodplain land and riverine wetlands

Suitability of strategy: suitable where the catchment includes low-lying land with a meandering channel.

Action	Explanation	Conditions where action is most likely to be suitable andeffective	Other references recommending action	Guidelines for implementation
1a. Protect low-lying floodplain areas from development	Low-lying parcels of land adjacent to the waterway are important sites of lateral connectivity. These sites should be protected from urban development.	All areas	[1]	None
1b. Protect/ create floodplain wetlands and other depressions	Floodplain wetlands and other depressions are important habitats for biota, and important sites of nutrient processing on the floodplain. Protecting and creating these habitats is important for the ecological health of the waterway.	Low-lying parcels of land that are prone to flooding. This action is most important to waterway health where floodplains are highly productive and are generally sinks rather than sources of nutrients.	[2-5]	

Strategy 2. Improve water flow between the channel and floodplain

Suitability of strategy: most suitable where channel incision, levees or regulators have disconnected the river from its floodplain. This strategy is particularly important for stream health where the floodplain is well developed (i.e. lowland river sites) and supports diverse productive aquatic habitats (i.e. permanent and temporary wetlands/ponds). Suitable only where overbank flows do not pose a significant risk to people or urban infrastructure.

Action	Explanation	Conditions where action is most likely to be suitable andeffective	Other references recommending action	Guidelines for implementation
2a. Daylight a buried stream	Buried (piped) streams are totally disconnected from their surrounding environment. Daylighting these streams by removing the pipe and exposing them to the light allows water in the channel to interact with the surrounding land.	Where the channel is buried inside a stormwater pipe. Where the channel is heavily incised. Where grading the bank won't destroy valuable shade trees or other important habitat features.	[1, 6]	[7] See WSUD manuals

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Action	Explanation	Conditions where action is most likely to be suitable andeffective	Other references recommending action	Guidelines for implementation
2b. Grade the bank	Grading the bank to create a gentle slope between the riparian land and the urban waterway will improve the likelihood of high flows going out into the riparian buffer.	Where the channel is heavily incised. Where grading the bank won't destroy valuable shade trees or other important habitat features.	[8-10]	[11]
2c. Lower the floodplain	Channel incision associated with urbanisation prevents river/ floodplain hydrologic interaction. Reconfiguring the channel and lowering the floodplain can improve the lateral hydrologic connection. Note: the new floodplain can be shaped as a terrace (narrow or wide) below the current floodplain.	Where the channel is heavily incised. Where urbanisation has caused the watertable to fall. Where scouring urban flows persist – given these are likely to detrimentally affect action 2c of this factsheet. Where earthworks don't pose a significant risk to the existing riparian vegetation (e.g. new greenfield development or highly degraded brownfield site).	[6, 9, 12, 13]	
2d. Raise the channel by adding coarse sediment (e.g. cobbles, gravel)	Channel incision associated with urbanisation prevents river/ floodplain hydrologic interaction. Adding coarse sediment (gravel) can raise the floor of the channel and improve lateral hydrologic connection.	Where the channel is heavily incised. Where urbanisation has caused the watertable to rise. When scouring urban flows have been repaired so as not to wash the added bed material downstream and out of the site. Where gravel is a natural bed substrate. Where the addition of gravel or cobbles won't lead to a noticeable unnatural reduction in baseflow. Take care that the addition of gravel does not smother important instream habitats. Most suitable for high value sites.	[6, 13-15]	
2e. Create artificial structures (e.g. pond and plug, cross-vanes, w-weirs, check dams)	Artificial instream structures can be created that partially block flow and promote overbank flow.	Where the channel is highly incised. Where scouring urban flows persist. Where actions 2a, 2b or 2c are inappropriate. Where the ecology of the site is highly modified. Where overbank flows do not pose a significant risk to people or urban infrastructure. Care needs to be taken so that artifical srtructures do not reduce connectivity, e.g. fish passage, or cause other environmental issues downstream.	[15, 16]	[17]
2f. Reroute the waterway	Rerouting a heavily incised channel to an adjacent piece of land that is less erodible will reduce future incision and promote greater overbank flow. Rerouting may also be effective if the soil type is similar but urban flows have been managed. The abandoned segment may be used as a wetland.	Where there is enough space, such as in a greenfield development. Channel rerouting is encouraged if the new channel pathway contains soils that are significantly less erodible or if management has markedly reduced the velocity of instream flows.	[15]	

Action	Explanation	Conditions where action is most likely to be suitable andeffective	Other references recommending action	Guidelines for implementation
2g. Remove floodplain levees and regulators	Levees and regulators provide a barrier to the flow of water from the main channel to the floodplain. Barrier removal repairs natural flow paths.	Where levees and regulators exist. Where overbank flows do not pose a significant risk to people or urban infrastructure. Do not reconnect the wetland to the main channel if doing so would facilitate the spread of invasive species.	[10, 14, 18-20] but see [18, 21] for caution	[22]

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Strategy 1. Protect floodplain land & riverine wetlands

Strategy 2. Improve water flow between the channel & floodplain

In the catchment

Jen Middleton

1b

protect flooplain wetlands

protect low-lying floodplain land

1a

Source unknown

2a

daylight pipes

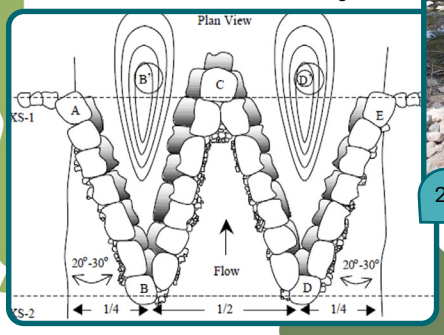
at the site

Source unknown

2e

use artificial structures that promote overbank flow

Image: Rosgen 2001



grade the bank

Glen Byleveld, Dept, Biodiversity and Conservation

riparian vegetation

lower the floodplain

2c

wetland

water table

base flow

feeder creek

w-weir

2f

reroute the waterway

2b

2d

infill part of the channel

Leah Beesley

2g

remove regulators or levees

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