

## Section 4: Priority Waikato ecosystems

### Streams, rivers and lakes

Streams, rivers and lakes are an integral part of the Waikato landscape and help form part of the region's identity with several iconic waterbodies. Four types of naturally-formed lakes are recognised in the Waikato region - peat, riverine, volcanic and sand dune. The region's 14 riverine lakes are part of an extensive wetland system that includes lakes Whangape, Waahi, Waikare and the internationally important Whangamarino Wetland. There are 31 peat lakes in the Waikato including Lake Rotoroa (Hamilton Lake), Lake Ngaroto and Lake Kainui (Lake D).

These lakes form the largest collection of this ecosystem type in New Zealand, whereas volcanic Lake Taupo is the largest lake in New Zealand. The freshwater ecosystems are inhabited by a range of aquatic life, from tiny zooplankton and phytoplankton, to crayfish and mussels, fish such as eels and galaxiids, and birds that rely on freshwater for all or part of their lives.

Most of the region's waterway length (more than 95 per cent) is made up by smaller streams, and these in turn are fed by small springs and seepages that support important components of aquatic biodiversity. Headwater streams drain a wide range of geologies and rise at various altitudes and from a variety of sources, providing a highly diverse range of stream habitats throughout the region.



Lake Rotopounamu  
Image courtesy of Tongariro Natural History Society

Most shallow riverine lakes in the region are now murky and unable to support submerged plants. The hydrology and chemistry of peat lakes, that naturally support specialised plants and animals, have been substantially altered, and riparian and instream habitats of most lowland streams and rivers are degraded. The region is fortunate in having scattered areas of protected mountains and hill country which support relatively pristine headwater streams and have a halo effect on waterways immediately downstream.



Banded Kokopu



### Threats to streams, rivers and lakes

Forest clearance and drainage along with subsequent land use intensification and the spread of pest species have substantially altered the condition of most lowland waterbodies in the Waikato. These ecosystems are adversely affected by:

- high nutrient levels and turbid waters
- weed invasion including willow, oxygen weed and hornwort
- animal pests including koi carp and catfish
- bank erosion and sedimentation by farm animals
- loss of connections to streams, other wetlands, and estuaries for migratory fish, shrimps and wetland birds
- drainage of associated wetlands and channelisation
- abstraction and damming.

### Which type of streams, rivers and lakes are the most degraded in our region?

- Lowland waterways in the Waikato catchment and the Hauraki area.
- Riverine lakes such as Waikare and Kimihia in the Waikato district and peat lakes such as Lake Ngarotoiti in the Waipa district.

### How do I know what to do, and when?

Use the table overleaf to help you prioritise your management actions. The actions are listed in roughly the priority order, though each site is different and will require its own assessment.

## Streams, rivers and lakes hot tips

- Call Environment Waikato's Freephone 0800 800 401 or visit their website for information on Clean Streams and streamcare groups: [www.ew.govt.nz](http://www.ew.govt.nz)
- Visit NIWA's website for more information identifying freshwater plants and animals and read "Restoring streams for freshwater fish" by R. Richardson and I Jowett: [www.niwa.co.nz/pubs/st](http://www.niwa.co.nz/pubs/st)
- Visit the New Zealand Landcare Trust website for information on stream monitoring, the Biodiversity Restoring the Balance self-help kit and for community group information and resources: [www.landcare.org.nz/shmak](http://www.landcare.org.nz/shmak)
- Visit the Landcare Research website, read their factsheet on how to prioritise weeds and do a search for "stability" for information on riparian planting: [www.landcareresearch.co.nz](http://www.landcareresearch.co.nz)
- Visit the Waikato Catchment Ecological Enhancement Trust for information on funding to enhance the sustainable management of the ecological resources in the Lake Taupo and Waikato River catchments: [www.wceet.org.nz](http://www.wceet.org.nz)
- Visit the Waterlink website for information on stream health assessment: [www.waterlink.org.nz/teachers](http://www.waterlink.org.nz/teachers)
- Visit the Wai Care website for information and guidance about water care: [www.waicare.org.nz](http://www.waicare.org.nz)
- Visit the Weedbusters website: [www.weedbusters.org.nz](http://www.weedbusters.org.nz)

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### Choosing Actions: Streams, rivers and lakes

#### Assess needs/plan

Do this before anything else! Seek professional advice if you need to identify the management issues for your site. Write up a plan of action.

#### Seek funding

Complete this table to determine what actions are needed and how much each will cost before you apply for funding. You may need to obtain funding before you can start on the work. Call 0800 BIODIV for advice.

Action and Priority	Comments
<b>Reduce pollution</b> 1 <sup>st</sup> Point sources 2 <sup>nd</sup> Diffuse run-off	<p>If your lake or stream has a point source (e.g. pipe) discharge flowing into it, contact your local council for advice. Diffuse run-off is harder to control but suitable riparian management such as fencing and dense planting can help. See your local council for advice and funding opportunities.</p>
<b>Water levels and flow</b> 1 <sup>st</sup> Maintain levels 2 <sup>nd</sup> Reduce variability	<p>Aquatic life needs water, all year round for most species. Fluctuating water levels beyond the natural range of variation can adversely affect aquatic life, and minimum flows need to be sustained. Note intermittent flowing streams have value too. Check with Environment Waikato if you need to divert or dam water - you will probably need resource consent.</p>
<b>Control stock</b> 1 <sup>st</sup> Fence margins 2 <sup>nd</sup> Install troughs 3 <sup>rd</sup> Bridge stock crossings	<p>If grazing animals can enter your site they may trample and erode banks, and their dung and urine will pollute the site when they enter the water. Heavier animals like adult cattle and horses are generally more damaging than lightweight animals such as sheep and calves. Even a hot wire will be a good start to keep cattle out. If the water body is used by stock for drinking, provide an alternative stock water supply. Build stock crossings using bridges or appropriate culverts (not perched) to keep stock out of water at crossing points. Fence off springs.</p>
<b>Control weeds</b> 1 <sup>st</sup> Regional plant pests 2 <sup>nd</sup> Riparian plants 3 <sup>rd</sup> Macrophytes	<ul style="list-style-type: none"> <li>Deal with weeds you are legally obliged to. See the plant and animal pests section in Environment Waikato's website.</li> <li>Be vigilant for weeds in nearby sites that are not in your stream or lake - yet! Riparian willows may invade streams and lake edges and cause clogging of the channel and bed; restored riparian sites may initially be invaded by weeds that need control. Replace riparian weeds with suitable native plants to stop the weeds coming back.</li> <li>Shade can reduce troublesome growths of macrophytes (large aquatic plants) - plant appropriate shading vegetation and limit spread around lakes and waterways (e.g. on boat propellers).</li> <li>If water weeds are present they are difficult to control, specialist advice is required to identify methods to control water weeds. Contact your local Department of Conservation (DOC) office or Environment Waikato for advice.</li> </ul>
<b>Control pest fish</b> 1 <sup>st</sup> Limit spread 2 <sup>nd</sup> Seek help to control pest fish	<ul style="list-style-type: none"> <li>Pest fish such as koi carp, catfish, rudd and <i>Gambusia</i> can cause water turbidity leading to collapse of macrophyte communities, erosion of banks and margins by their feeding activities and eat native life.</li> <li>Don't transfer eggs/adults on equipment to other areas or waterways. Make sure you thoroughly clean boats, trailers and any fishing gear before you leave any waterbody. Refer <a href="http://www.biosecurity.govt.nz/pests-diseases/plants/didymo/cleaning-methods.pdf">www.biosecurity.govt.nz/pests-diseases/plants/didymo/cleaning-methods.pdf</a>.</li> </ul>

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<b>Riparian planting</b> 1 <sup>st</sup> Buffer 2 <sup>nd</sup> Enhance 3 <sup>rd</sup> Connections 4 <sup>th</sup> Maintain	<ul style="list-style-type: none"> <li>First you should consider planting the edges of streams to provide shade. This is not so effective for larger rivers but riparian planting can still help with bank stability and have other ecological benefits. For riparian zones around lakes, divide into three plant zones: moist soils that flood often, wet soils that flood sometimes and standing, open water. Next, identify the appropriate plants for your site (planting guides can be obtained from Environment Waikato, the Department of Conservation or call 0800 BIODIV).</li> <li>Even narrow riparian zone widths (around 5-10 metres) can deliver many benefits to adjacent waterbodies by providing shade, bank stability, organic matter and filtering overland flows.</li> <li>If your site is isolated from other natural areas, riparian zones may provide additional opportunities as corridors of vegetation to encourage animals to move between them.</li> <li>Keep your plantings pest free until the plants are well established. Small plants can be smothered by rank grass. Protect from rabbits, hares and stock.</li> <li>Plant ecosourced plants which are characteristic of the area you are planting (natural plant populations are placed back in their natural range). Check nearby areas for clues to the appropriate vegetation of the area.</li> </ul>
<b>Increase habitat diversity</b> 1 <sup>st</sup> Meander 2 <sup>nd</sup> Floodplains 3 <sup>rd</sup> Retain wood 4 <sup>th</sup> Reduce sediments	<ul style="list-style-type: none"> <li>Channelisation and stopbanking limit the natural interaction of rivers with their floodplains and reduce habitat diversity. Where possible, retain an area adjacent to rivers where natural floodplain interactions can occur and that allows floodflows to move through quickly without channelisation. Bends in streams and rivers increase the area and diversity of habitat for aquatic life.</li> <li>Large pieces of wood that fall into streams, rivers or lakes and remain stable there can provide important cover for fish, roosts for birds, and habitat for invertebrates - don't remove stable wood pieces. Consider putting some in where you can be sure it will remain stable without choking the waterway.</li> <li>Deposition of sediment onto stream and lake beds can reduce habitat for bottom-dwelling species. Prevent sediment inputs by using sediment traps and stabilise severely eroding banks, preferably with appropriate plantings. Not all undercut banks are bad - some provide cover for fish and crayfish.</li> </ul>
<b>Fish access</b> 1 <sup>st</sup> Downstream 2 <sup>nd</sup> Upstream	<p>If the waterway connections to the sea are broken by poorly designed culverts, dams without fish passes or other barriers, talk to your council. Focus on downstream barriers first, so your fish can get to the sea and back to your stream or lake. Upstream connections help other waterway neighbours share your fish. These actions may also provide access for pest fish species if not already present - see Pests above.</p>
<b>Monitoring</b> 1 <sup>st</sup> Watch for new pests 2 <sup>nd</sup> Monitor stream health	<ul style="list-style-type: none"> <li>Watch out for pest species such as <i>Salvinia</i>, water hyacinth, and the new invasive algae <i>Didymosphenia</i> - report outbreaks to the Ministry of Agriculture and Forestry (MAF) and get good advice on management. See <a href="http://www.biosecurity.govt.nz">www.biosecurity.govt.nz</a> for more information (use the search box to find factsheets on these plants).</li> <li>Check for stream health by, for example, identifying and counting fish on annual basis and checking clarity of the water.</li> <li>Use the New Zealand Landcare Trust stream monitoring kit at <a href="http://www.landcare.org.nz">www.landcare.org.nz</a></li> </ul>