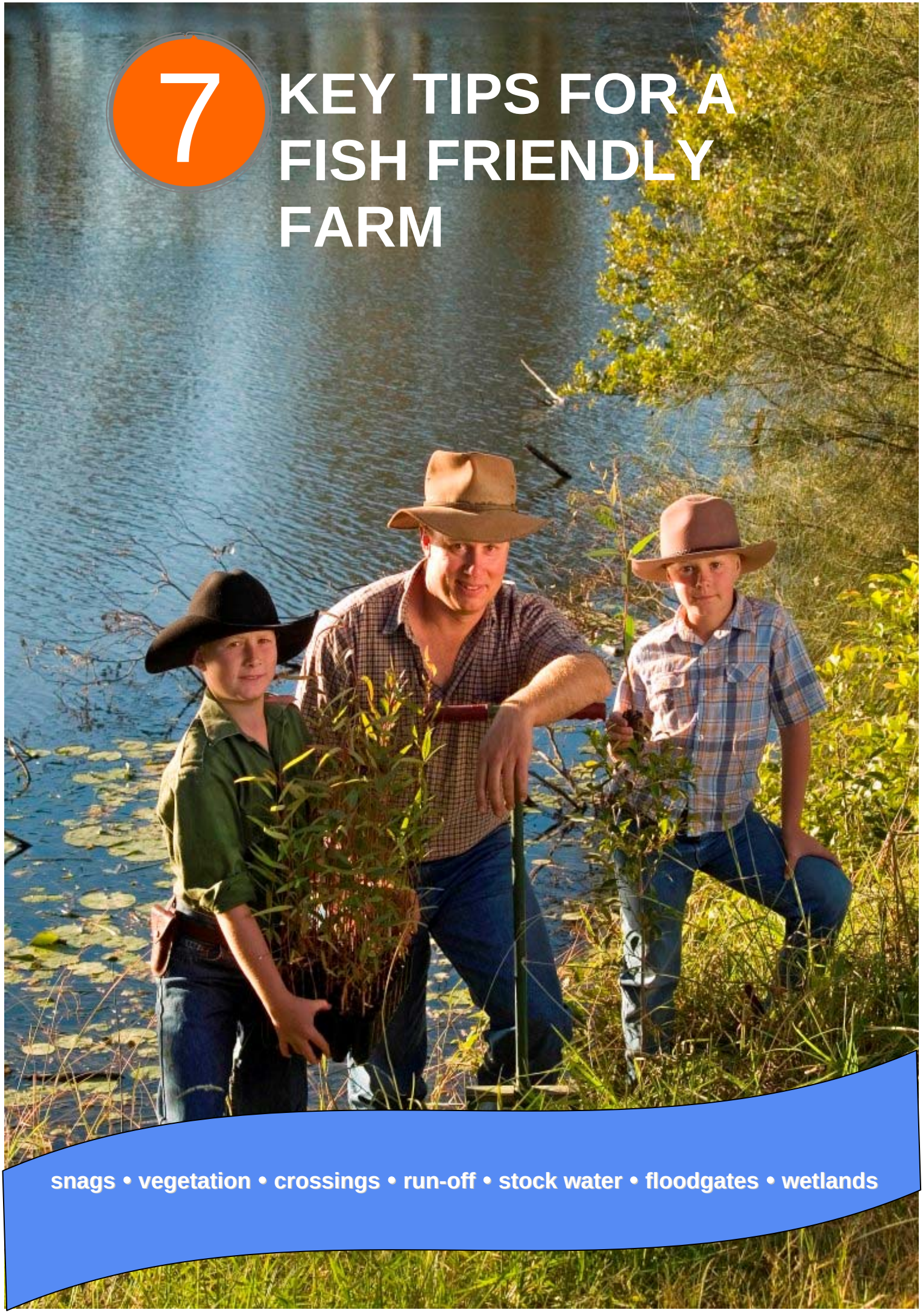
# 7 KEY TIPS FOR A FISH FRIENDLY FARM



**snags • vegetation • crossings • run-off • stock water • floodgates • wetlands**

*Native fish need shelter, clean water, food and room to move. Below are seven actions you can do to benefit native fish life in the streams on or near your farm. When performed in association with each other they can also improve water quality, stabilise streambanks and reduce erosion increase farm productivity, improve farm infrastructure, reduce stock loss, increase stock health and improve the value of your farm.*

## 1 Have large woody debris (snags) in **your streams**

Large woody debris provides one of the most important habitats for fish within a river or creek. In some cases, numbers of native fish in a waterway are often directly related to the amount of wood. Large woody debris provides protection from predators, shelter from direct sunlight, resting areas out of the main channel flow, territorial markers, breeding sites and foraging sites. Large wood in streams can also increase bank stability and reduce waterway erosion.

### What you can do

- Let 'sleeping logs lie' wherever possible
- Seek advice from NSW DPI if a large piece of wood is causing a problem
- Modify wood by lopping, realigning or moving in preference to removal
- Consider 're-snagging' if your waterway is free of large woody debris, because the wood can provide immediate benefits to fish. Consult with NSW DPI
- Re-establish native riparian vegetation to ensure a future source of large woody debris

Photo: Large woody debris and healthy riparian zones provide a range of habitat for terrestrial and aquatic animals

## 2 Grow native vegetation on the stream banks (riparian area)

Fish and other aquatic species prefer streams with good riparian vegetation because the plants:

- provide food in the form of fruits and terrestrial insects, shelter, shade, fine organic material
- are a source of large woody debris and filter sediment, phosphorus and organic nitrogen from run-off.

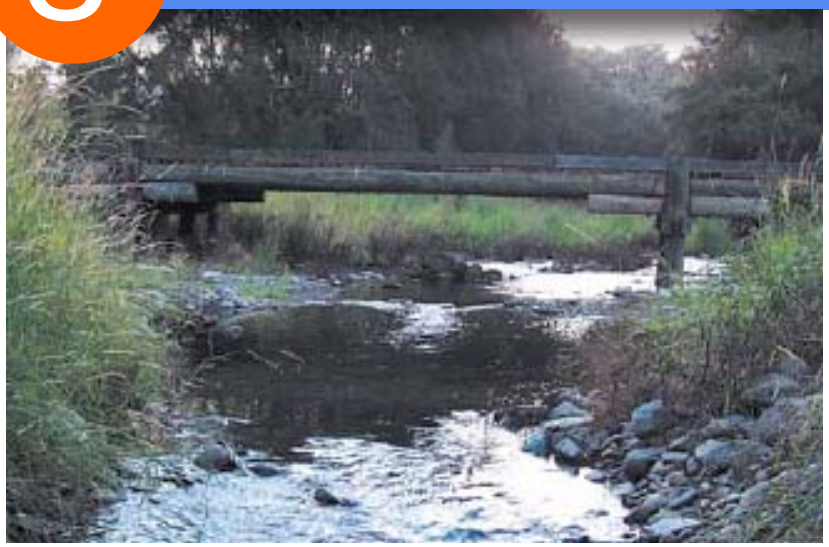
Exotic vegetation such as willows, invade stream banks and exclude native vegetation, changing the structure and function of the riparian zone, creating a poor habitat for native fish. Willows are deciduous, dropping their leaves all in one go. This alters the timing and quality of organic inputs in the stream, causes wide temperature variations and reduces the amount of shade and protection.

### What you can do

- Control stock access to waterways and limit grazing in riparian areas
- Revegetate riparian areas in layers with a mix of species native to your area
- Control weeds during regeneration
- Maintain a well-vegetated buffer area (grass margin) between cropland and riparian areas
- Eradicate willows and other exotic plant species
- Work with your neighbours to prevent re-infestation from an upstream source

Photo: Densely vegetated stream banks shade the waterway and help to control water temperature

# 3 Install fish friendly crossings



Many freshwater fish species are migratory and must move between a variety of habitats to complete essential life history stages. Even a small structure such as a concrete causeway or a pipe culvert can create a barrier such as a small waterfall or shallow flow depths and restrict fish movement.

Vehicles and stock traversing waterways on ford-type 'wet crossings' can stir up sediments, cause erosion and increase turbidity. Cows are 50 times more likely to defecate when crossing a stream in-stream than on a raised crossing[1]. Manure increases organic nitrogen, suspended solids and pathogens, and reduces water quality.

1 Davies-Colley, R.J., et al. (2004) Water quality impact of a dairy cow herd crossing a stream. New Zealand Journal of Marine and Freshwater Research 38: 569-576.

## What you can do

- Always seek advice from NSW DPI on fish friendly designs and permits
- Modify or remove structures which are barriers to fish
- Include a fish ladder or suitable passage for fish (bridges and arch structures have the least impact) in new crossing designs
- Minimise the use of causeways
- Set culverts at bed level and include a low flow channel. Cells should have a minimum water depth of 0.2-0.5 metres
- Avoid locating bridge foundations and piers within the main waterway channel
- Remove debris from around the crossing

Photo: When this timber bridge replaced a concrete causeway it improved fish passage and water flow, and provided a safer, more reliable crossing for local residents.

# 4 Control or treat agricultural run-off

Run-off from agriculture is a source of sediment and nutrients. Chemicals such as pesticides are suspected of causing 8% of fish kills in NSW over the past 20 years (NSW Fishkill Database). Pesticides can affect fish by:

- reducing reproductive success and life expectancy
- increasing the incidence of abnormalities
- causing skeletal defects and growth reductions

Suspended sediments in waterways (turbidity) can smother fish eggs, clog gills, and increase stress levels and disease.

Deposited sediment can smother whole stream beds, filling in important breeding and refuge sites such as deep holes, reducing available habitat and increasing the input of sediment bound toxins.

## What you can do

- Ensure riparian areas are well planted with native vegetation
- Use chemicals conservatively, and apply with care especially near waterways
- Support the use of biologically sensitive herbicides and pesticides (ask NSW DPI for options)
- Protect riparian zones and buffer margins from stock and vehicles
- Retain and protect wetland areas as they play a valuable role in filtering run-off
- Establish a series of filter ponds for horticultural and nursery run-off
- Use sediment traps, drop boxes or artificial wetlands to filter or 'polish' run-off from cleared or disturbed land
- Consider sealing gravel roads and unsealed tracks

Photo: This farmer ponds and distils farm run-off, before spreading the 'polished' by-product on the paddocks

# 5 Provide water for stock offstream

When stock drink directly from streams they reduce water quality, cause bank and stream bed erosion, destroy riparian vegetation, stir up sediments and cause the loss of habitats for fish and other wildlife.

Cattle defecate 25% of the time when drinking, 1kg of phosphorus from manure can result in the growth of up to 500 kg of algae[2]. These algal blooms can choke waterways and may be toxic to fish, other aquatic life, livestock and people.

2 Fitch, L.B., et al. (2003). Caring for the Green Zone: riparian areas and grazing management - 3rd Edition. Lethbridge, Alberta: Cows and Fish Program

## What you can do

- Provide a number of off-stream watering points. Studies have shown that even without fencing, stock prefer to drink clean water from a trough even if they have access to stream water[1]
- Pipe from an existing supply or pump water from a bore or waterway to troughs in the paddock.
- If complete restriction is not viable, manage stock access with limited, carefully considered drinking points

Photo: Animal waste contaminates waterways and transmits disease-causing bacteria to livestock, humans and fish. Clean water is vital to the health of your stream

# 6 Control the opening of floodgates

Floodgates prevent flood waters and tidal water inundating low lying coastal floodplains. However, permanently closed floodgates can:

- reduce water quality and encourage in-stream weeds
- prevent fish passage to important breeding and feeding grounds
- fragment and alienate aquatic populations
- create stagnant conditions favoured by pests such as mosquitoes
- enhance the effects of acid sulphate soils, increasing water acidity

Acidic drainage water can:

- directly cause fish kills
- damage fish skin, increasing invasion from infections and diseases such as ‘red spot’
- cause juvenile fish to avoid certain habitat
- damage fish gills, reducing oxygen intake and regulation of salt and water
- stunt the growth of oysters and cause their shells to breakdown
- fragment and alienate aquatic populations

## What you can do

- Modify floodgates to allow exchange with estuarine water during nonflood periods. Designs include sluice gates, tidal floodgates and winch gates. Consult with NSW DPI for advice and approvals
- Make the opening as large as possible to maximise fish passage and reduce the force of the current flowing through the opening
- Use automatic gates operated by tidal flow wherever possible as these maximise fish passage
- Make your drains shallower; shallow dish drains (0.3 m depth) minimise the potential of disturbing acid sulfate soils. Seek advice from NSW DPI

Photo: “User-friendly” tidal floodgates reduce drain management time, improve water quality and enhance fish passage

# 7 Protect your wetlands

Wetlands are low-lying areas inundated with water on a temporary or permanent basis. These areas have many important ecological functions. They filter sediments and toxic materials from water before it drains into the main waterway.

Wetlands also provide essential feeding, breeding and nursery habitats for many fish species and release nutrients and stored carbon, the basis of aquatic food chains.

## What you can do

- Revegetate wetland areas that have been cleared, using native species
- Fence stock out of wetland areas, and only use them for grazing in droughts
- Modify water retention devices (eg floodgates) to mimic natural flow regimes
- Identify acid sulfate soil areas and seek advice on their management
- Use re-established wetlands as a filter for farm run-off

Photo: Healthy wetlands support a diverse ecosystem, and provide essential habitat for migratory birds, juvenile fish and other animals

**Do you need some help in making your farm fish friendly?**

The NSW DPI Aquatic Habitat Rehabilitation team can provide additional advice:

| Region | Catchments covered by region | Postal Address | Phone | Fax |
|---|---|---|---|---|
| **North West** | Border Rivers, Namoi, Gwydir, Barwon-Darling | Conservation Manager, AHR PO Box 3047, Tamworth, NSW 2340 | (02) 6765 4591 | (02) 6762 1993 |
| **Central West** | Macquarie, Castlereagh, Lachlan | Conservation Manager, AHR PO Box 865, Dubbo, NSW 2830 | (02) 6881 1284 | (02) 6881 1295 |
| **South West** | Murrumbidgee, Murray, Lower Darling | Conservation Manager, AHR Unit 3/556 Macauley Street, Albury, NSW 2640 | (02) 6042 4205 | (02) 6021 0113 |
| **North Coast** | Coastal catchments from QLD border to Macleay River | Conservation Manager, AHR 1243 Bruxner Highway, NSW 2477 | (02) 6626 1107 | (02) 6626 1377 |
| **Central Coast** | Coastal catchments from Hastings to Brisbane Water | Conservation Manager, AHR Private Bag 1, Nelson Bay, NSW 2315 | (02) 4916 3817 | (02) 4982 1107 |
| **South Coast** | Coastal catchments from Hawkesbury Nepean to Victorian border | Conservation Manager, AHR PO Box 1 Sydney Markets, Flemington, NSW 2129 | (02) 9764 3067 | (02) 9746 3409 |

# Funding for making farms fish friendly

*There are several sources of funds available to help make your farm fish friendly, below are just a few of them. Contact your nearest NSW DPI office for up to date funding opportunities.*

**Envirofund**: Community groups and individuals can apply for grants of up to $50,000 (GST inclusive) when undertaking projects aimed at conserving biodiversity and promoting sustainable resources.
*Further info: www.nht.gov.au/envirofund*
*free call 1800 065823*

**Australian Government Community Water Grants**: $200 million has been made available over the next 5 years for community grants of up to $50,000 to save and protect water resources through practical on-the ground work. *Further info: www.communitywatergrants.gov.au*
*free call 1800 780730*

**NSW Fish Habitat Grant Program**: Grants of up to $30,000 from the recreational fishing licence fee have been made available for individuals, clubs, community groups and local councils for the rehabilitation of fish habitat in freshwater and saltwater environments.
*Further info: www.fisheries.nsw.gov.au/recreational/general/Call for applications phone 67654591 freshwater or 66261107 saltwater*

**Landcare operations**: A tax deduction is available for primary producers and rural businesses for expenditure incurred on landcare operations, such as, erecting fences to keep animals out of degraded land.
*Further info: www.ato.gov.au Phone: 132866*

# More information

*Technical information on improving habitat in streams and riparian zones is available from your nearest NSW DPI office and on the internet.*

Land and Water Australia technical guidelines *www.lwa.gov.au/products.asp*

1 **Designing filter strips to trap sediment and attached nutrient** (May 2001)

2 **Managing nutrients in floodplain wetlands and shallow lakes** (July 2002)

3 **Managing wood in streams** (June 2003)

4 **Development & application of a method for the rapid appraisal of riparian condition** (February 2004)

5 **Managing high in-stream temperatures using riparian vegetation** (October 2004)

Land and Water Australia River and Riparian Land Management Fact Sheets *www.lwa.gov.au/products.asp*

**1 Managing riparian land**
**2 Streambank stability**
**3 Improving water quality**
**4 Maintaining in-stream life**
**5 Riparian habitat for wildlife**
**6 Managing stock**
**7 Managing woody debris in rivers**
**8 Inland rivers and floodplains**
**9 Planning for river restoration**
**10 River flows and blue-green algae**
**11 Managing phosphorus in catchments**
**12 Riparian ecosystem services**
**13 Managing riparian widths**

## NSW DPI Primefacts and Fishnotes

*www.dpi.nsw.gov.au/aboutus/resources/factsheets*

**Wetlands and floodplains** (Fishnote DF91, September 2001)

**Water quality (pesticides)** (Fishnote DF93, September 2001)

**Barriers to fish passage** (Fishnote DF94, September 2001)

**Cold water pollution** (Fishnote DF95, September 2001)

**Policy and guidelines for fish friendly waterway crossings** (NSWF 1181, November 2003)

**Instream structures and other mechanisms that alter natural flows** (Primefact 10, June 2005)

**Removal of large woody debris from NSW rivers and streams** (Primefact 11, June 2005)

**Degradation of native riparian vegetation along NSW water courses** (Primefact 12, June 2005)

**Introduction of fish to freshwater within a river catchment outside their natural range** (Primefact 13, June 2005)

## Other publications


Fairfull, S. and Witheridge, G. (2003) **Why do fish need to cross the road? Fish passage requirements for waterway crossings** NSW Fisheries, Cronulla. 16 pp. www.fisheries.nsw.gov.au/publications/aquahab.htm

Johnston S, Kroon F, Slavich P, Cibilic A and Bruce A (2003) **Restoring the balance: Guidelines for managing floodgates and drainage systems on coastal floodplains** (NSW Agriculture: Wollongbar, Australia). www.fisheries.nsw.gov.au/publications/aquahab.htm

Brouwer D (1997). **Managing waterways on farms** (NSW Agriculture: Tocal, Australia).



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