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Southern Cross University

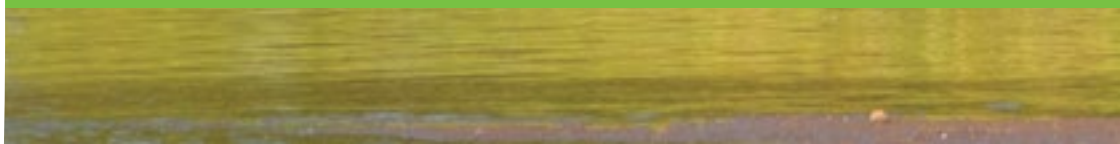
RICHMOND RIVER COUNTY COUNCIL
Floodplain Services

RURAL Landholder Initiative

BOOK.

04

Floodplain cropping



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This booklet has been produced by Lismore City Council in partnership with Southern Cross University and Richmond River County Council with assistance from the NSW Environmental Trust.

PART A: FARM HEALTH ASSESSMENT TOOL

Introduction to Book 4: Floodplain cropping

Book 4: Floodplain cropping is the fourth in a four-book series for the Rural Landholder Initiative. This initiative aims to help rural landholders achieve a number of social, environmental and economic benefits by **conserving and improving biodiversity** on farms and rural lifestyle properties.

Book 1: Healthy Landscapes and Waterways provides information relevant to **all** rural landholders across the Lismore Local Government Area (LGA), while Books 2, 3 and 4 are specific to the main agricultural industries in our region:

Book 2: Beef grazing and dairying

Book 3: Macadamias and other orchards

Book 4: Floodplain cropping

The book is in three parts:

Part A - Farm Health Assessment Tool

Part B - Summary of threats to biodiversity and orchard health

Part C - Management practices you can implement on your property to conserve and improve biodiversity.

Farm Health Assessment Tool

In each book there is a 'Farm Health Assessment Tool' that was developed by Southern Cross University in partnership with Council. The Tool is based on the 'ABCD management framework' first used by the Queensland sugarcane industry. Each book describes 5–10 land management practices that can benefit biodiversity. Each land management practice is scored as either:

A = Aspirational **B** = Best Practice **C** = Common **D** = Dated

The Farm Health Assessment Tool, which starts on page 7, highlights how you as a landholder can progressively adapt your land management practices to conserve and improve biodiversity and 'ecosystem services'. The importance of biodiversity and the current threats to biodiversity in our region are explained in more detail in Book 1: Healthy landscapes and waterways.

Table 1 below introduces the Farm Health Assessment Tool A, B, C and D classes. It includes a general description of practices; and a description of the property and regional scale effects that these practices have on native vegetation, wildlife and ecosystem services.

Table 1: Management classes and definitions for the Farm Health Assessment Tool

Class[1]	Description of practices	On-property effect of practices on biodiversity and ecosystem services	Regional effect on biodiversity and ecosystem services where practices are widely adopted
Aspirational	• New and innovative practices that go beyond best practice • Balance biodiversity and agricultural outcomes • Integrated farm management plans in place	• Self-sustaining, resilient and diverse native vegetation communities requiring minimal maintenance • Ecosystem services are strengthened and become more resilient to change	• Medium- to long-term benefits • Ecosystem services are improved at a landscape scale
Best practice	• Current 'best practice' • Manage for biodiversity with agricultural production benefits • Farm management plans incorporate biodiversity outcomes	• Diverse native vegetation communities requiring minimal intervention • Ecosystem services are enhanced	• Short- to medium-term benefits
Common	• Common practices meet only basic environmental expectations in the community • Farm management plans are focused more on agricultural outcomes	• Existing native vegetation communities are maintained • Unlikely to substantially improve biodiversity and ecosystem services	• Unlikely to achieve short-term benefits
Dated	• Superseded or unacceptable practices that do not meet current environmental expectations and community standards • No farm management plan in place	• Existing native vegetation communities are maintained or degraded • The condition of biodiversity and ecosystem services continues to degrade	• Likely to degrade the condition of biodiversity and ecosystem services

[1] Note: Over time, changes in knowledge, technology, costs and market conditions may result in an 'A' class practice becoming more widespread and accepted as a 'B' class practice.

What are benefits for landholders?

Each management practice in the Farm Health Assessment Tool in states what the benefits of implementing A and B practices are to landholders and agriculture. By looking after biodiversity and ecosystem services, you can reduce your property management costs. For example, restoring native riparian vegetation along river banks, creeks and drains, will reduce soil erosion and the need to retreat from cultivating near these areas.

What are the benefits for biodiversity?

The Farm Health Assessment Tool aims to improve biodiversity in the Lismore LGA, however, it is relevant across the entire Northern Rivers Region. Each management practice has a corresponding green leaf symbol which indicates the level of benefit that a particular management practice provides to biodiversity (see Table 2). The more symbols the larger the benefit for biodiversity.

Table 2: Biodiversity benefits scoring

Biodiversity benefit score	Benefit to biodiversity
	These management actions are the most beneficial to biodiversity as they improve habitat and native vegetation connectivity across the landscape, and increase resilience to change.
	These management actions have moderate benefit to biodiversity.
	These management actions have a small beneficial impact on biodiversity.

Land management practices for floodplain cropping

There are five management practices that relate to improving and conserving biodiversity across our floodplain cropping land. They are:

Practice 1: *Soil health and nutrient management*

Practice 2: *Trapping and filtering water runoff from paddocks*

Practice 3: *Managing surface drains to improve water quality and biodiversity outcomes*

Practice 4: *Constructing wetlands*

Practice 5: *Minimising the impact of pesticide applications on beneficial insects and wildlife.*

You may already be doing some or all of these practices on your property to varying degrees. The Farm Health Assessment Tool will give you an indication of which class your current management practices across the whole property fall into: Aspirational, Best Practice, Common or Dated.

Later in the book we provide you with an outline of the types of techniques you can build into your farm management activities over time to help you transition from one class to a higher class. There are also many more detailed resources and guides available to help you that are included in the Resources section, or you can talk to Council or other agencies (see Contacts list).

How to use the Farm Health Assessment Tool

When using the Tool consider three things:

- your vision and knowledge of your property
- your whole property – although not every management practice in the Tool will apply to all land uses and physical characteristics
- any project sites or individual actions you wish to highlight.

To use the Tool we suggest you do the following:

1. Read the numbered Management Practice in the left hand column and the way the practice can benefit agricultural production. Think about how the practice can improve productivity by improving and conserving biodiversity on your property.
2. Think about how and if these benefits are currently being achieved on your property. Are they relevant to you?
3. Look across the coloured columns and decide which of the property descriptions or types of practices apply to your property. There may be a few in each column that are relevant to your property. Place a tick in all the boxes that are relevant to your property.
4. Some sections may not apply to your property. You can make a note of this in the 'Your self-assessment notes' section of the table.
5. Make notes if there is a particular site to which a practice applies, or any conditions that influence your decision.

If you don't know enough to make a decision, make a note in the 'Your self-assessment notes' section of the table.

Certain terms in the Tool have certain meanings as follows:

Term	Meaning
Soil chemical tests	Chemical tests to determine nutrient levels for P, K, Ca, Mg etc.
Cultural control methods	Management practices to control pests or weeds that reduce pest establishment, reproduction, dispersal, and survival e.g. slashing or manual removal of weeds before seeding, and crop rotation
Headlands	Area at each end of a planted field, also known as the turnrow

Farm health assessment tool: ABCD for floodplain cropping

Land management practice	Dated	Common	Best	Aspirational
1/ Soil health and nutrient management **Production benefits of A&B practices:** • Improves crop productivity • Minimises waste of fertilisers and runoff of nutrients	☐ No soil chemical or leaf tests are carried out prior to planting ☐ Set rate of fertiliser for entire property using historical application rates ☐ No records are maintained of nutrient applications	☐ Soil chemical or leaf tests are seldom carried out (every 5–8 years) prior to planting ☐ Fertiliser rates for entire property determined using old soil tests or historical application rates ☐ Records are seldom maintained for soil tests and nutrient applications	☐ Soil chemical or leaf tests are carried out on a regular basis (every 2–3 years) for individual blocks prior to planting ☐ Rotational cropping with legumes for improved nitrogen ☐ Fertiliser, mill mud or compost rates for individual blocks are calculated using recent soil test results or the *Soil-specific Nutrient Management Guidelines for Sugarcane Production in NSW*, and stockpiles are located away from drains and waterways ☐ Records are maintained for soil tests and nutrient applications	☐ Soil chemical or leaf tests are carried out on an annual basis for individual blocks and soil types prior to planting ☐ Rotational cropping with legumes for improved nitrogen ☐ Organic fertiliser, mill mud or compost rates are calculated for individual paddocks and soil types using recent soil test results, and stockpiles are located away from drains and waterways ☐ Detailed records are maintained for soil tests and nutrient applications ☐ Controlled traffic zones to minimise soil compaction
Your self-assessment notes				

Farm health assessment tool: ABCD for floodplain cropping

Land management practice	Dated	Common	Best	Aspirational
2/ Trapping and filtering water runoff from paddocks **Production benefits of A&B practices:** • Improves in-drain and stream water quality • Lower fire risk • Prevents loss of soil and nutrients	☐ There are no filter strips or buffers around natural waterways or wetlands ☐ There are no grassed headlands or wide, shallow drains around paddocks	☐ There are small grassed filter strips adjacent to some natural waterways or riparian vegetation ☐ There are some grassed headlands and wide, shallow drains around paddocks ☐ Grass cover on filter strips is not maintained all year round	☐ There are grassed filter strips adjacent to the majority of natural waterways and riparian vegetation ☐ There are grassed headlands and wide, shallow drains around all paddocks ☐ Grass cover on filter strips is mostly maintained all year round	☐ There are large grassed filter strips adjacent to all natural waterways and riparian vegetation ☐ There are grassed headlands and wide, shallow drains around all paddocks ☐ Complete grass cover on filter strip, headlands and spoon drains is maintained all year round
Your self-assessment notes				

Farm health assessment tool: ABCD for floodplain cropping

Land management practice	Dated	Common	Best	Aspirational
3/ Managing surface drains to improve water quality and biodiversity outcomes **Production benefits of A&B practices:** • Improves in-drain water quality through trapping sediment • Stabilises drain banks & prevents erosion • Provides habitat for beneficial animals & insects	☐ Margins and edges of all existing drains are not grassed all year round ☐ Drain maintenance procedures outlined in the property's Drain Management Plan are not followed (sugarcane only)	☐ Edges of all drains are lined with a narrow strip of native grasses (e.g. Lomandra) ☐ Drain maintenance procedures outlined in the property's Drain Management Plan are implemented (sugarcane only)	☐ Natural creeks and larger drains are lined on one side with a strip of native shrubs and trees ☐ Smaller drains are lined with native grasses (e.g. Lomandra) on both sides ☐ Infilling of redundant deep drains to create wide, shallow drains has been carried out ☐ Drain maintenance procedures outlined in the property's Drain Management Plan are implemented (sugarcane only)	☐ Natural creeks and larger drains are lined on both sides with wide, continuous strips of native vegetation including a diverse range of trees, shrubs and groundcovers ☐ Smaller drains are lined with native grasses (e.g. Lomandra) on both sides ☐ Infilling redundant deep drains and improving remaining drains so they are wide and shallow ☐ Drains are kept well vegetated with native wetland plants to remove nutrients and trap sediment ☐ Drain maintenance procedures outlined in the property's Drain Management Plan are implemented (sugarcane only)
Your self-assessment notes				

Farm health assessment tool: ABCD for floodplain cropping

Land management practice	Dated	Common	Best	Aspirational
4/ Constructing wetlands  **Production benefits of A&B practices:** • Traps runoff containing sediments & nutrients etc. • Slows down water runoff & prevents erosion • Provides habitat for beneficial predatory animals including insects	☐ Suitable site for a constructed wetland (e.g. waterlogged, low productivity areas) is not identified and no wetlands have been constructed	☐ Suitable site for a constructed wetland (e.g. waterlogged, low productivity areas) is identified but no wetlands have been constructed	☐ Suitable site for a constructed wetland is identified and wetland has been constructed and integrated into drainage plans ☐ The size and depth of the constructed wetland suits the catchment area, runoff and farming operations and is vegetated with native wetland plants	☐ Suitable site for a constructed wetland is identified and wetland has been constructed and integrated into drainage plans ☐ The size and depth of the constructed wetland suits the catchment area, runoff and farming operations, and incorporates wildlife habitat (e.g. partially submerged logs and rocks) and various native wetland species
Your self-assessment notes				

Land management practice	Dated	Common	Best	Aspirational
5 Minimising the impact of pesticide applications on beneficial insects and wildlife **Production benefits of A&B practices:** • Reduces impact of spraying on beneficial insects, birds and pollinating species • Minimises potential spray drift • Saves cost of chemicals	☐ Applying pesticide when pest damage causes crop loss and using the same rate and strategy across whole property ☐ Spraying broad-spectrum pesticides with no knowledge of impact on beneficial insects	☐ Applying pesticide when pest damage causes crop loss and using a variable rate and strategy between different paddocks ☐ Spraying broad-spectrum pesticide with some knowledge of impact on beneficial insects	☐ Alternatives to pesticide use are considered (e.g. biological control and companion planting) ☐ Applying pesticides only when pest damage causes economic loss and using variable rates and strategies within a paddock ☐ Substituting broad-spectrum with selective or alternative environmentally lower risk pesticides to reduce impact on beneficial insects	☐ An Integrated Pest Management Plan is developed incorporating biological and cultural controls, rotational crops, as well as implementing preventative measures such as creating habitat for beneficial insects and birds (e.g. diverse native tree plantings and T perches for owls to predate on rats)
Your self-assessment notes				

PART B: THREATS TO BIODIVERSITY FROM CROPPING ON FLOODPLAINS

Impacts of floodplain cropping on biodiversity and catchment health

The Lismore and Richmond River area has a long history of floodplain cropping, with cane and maize two of the first commercial industries established in the 1860s. The Richmond produces an 800,000 tonne cane harvest annually with an average farm of 56 hectares producing around 4,000 tonne. Across the Lismore Local Government Area, 34% of land is used for cropping, mostly sugarcane, but also tea-tree and soya beans.

In *Book 1: Healthy Landscapes and Waterways,* the threats to biodiversity and catchment health across the Lismore landscapes were outlined. To recap, these threats include:

- very high levels of nutrients washed into waterways from adjacent lands
- low dissolved oxygen in waterways
- native vegetation being smothered by weeds including exotic vines
- Coral trees, Camphor, Lantana and Privet inhibiting native regeneration
- soil erosion from cultivated and grazed land
- bank erosion.

Shin sticking cane onto a barge c.1900, Tuckurimba (photo George Hunt).

One seventh of the Richmond River catchment area is floodplain or estuarine, an unusually high proportion compared to other coastal catchments. This can be explained by the extreme weathering by rain and floods which shaped a very flat catchment, easily cleared and modified for farming. Combined with intensive agriculture and local soil characteristics, modifications and conversion to pasture and cropping have impacted heavily on river health and aquatic habitat. The clearing of the flood adapted native vegetation and the draining and filling of wetlands left only small remnants of wetland and riverbank vegetation. These remnants have continued to decline in quality and area due to the ongoing impacts of grazing, weed invasion and cane burning. Grazed, weedy or sparsely vegetated drains, creeks and river banks are susceptible to erosion, resulting in substantial loss of top soil.

Cropping in marginal low-lying areas can be converted to native vegetation with little impact on production (photo Richmond River County Council).

The floodplain is also a source of acid sulphate soils which are 'activated' when exposed, for example when drains are constructed and cleaned to remove sediment and weed build up. Exposed acid sulphate soils create acid water and monosulfidic black ooze or MBO (an anoxic, organic sludge, rich in highly reactive iron monosulfides that forms in the base of drains).

During storms and flood events, acid water combined with black water (deoxygenated water created by inundated floodplain pasture or MBO) impact on water quality by lowering dissolved oxygen levels in waterways. Prawns are especially susceptible to acid water during moulting while fish can develop Red Spot disease. In recent decades summer floods following dry periods have caused major fish kills as black water production is greater due to increased groundcover vegetation or biomass, and an increase in bacterial activity. During dry periods, dryland grasses spread into drained swamps, and fish migrate further up catchments, so become trapped by black water.

Soil and crop health

The loss of soil through erosion is a major problem that can affect future crop yields and ultimately limit the sustainability of sugarcane cultivation by redistributing or removing soil organic matter and nutrient rich material. At the property level, poorly managed paddocks and drains will impact on crop quality and yield and can create risks for the farmer, for example;

- losing soil through erosion of fields, drains and river banks will slowly reduce cultivation area and require stabilisation works such as revegetation
- cultivating to the edge of deep drains, or steep creek and river banks create a serious risk for the operation of machinery
- stockpiling mill mud or compost in areas where it may leach into drains or creeks means a wasted resource and poor water quality
- allowing weeds to grow in drains will require ongoing control with herbicides and further increase soil erosion
- cultivating marginal low-lying areas produce low yields in wet years.

Cultivating to the edge of drains impacts on water quality and is a risk for the operation of machinery (photo Richmond River County Council)

PART C: MANAGEMENT PRACTICES FOR FLOODPLAIN CROPPING

If the majority of your land management practices fall within the Dated or Common class there are ways you can improve your management practices over time to transition into the Best practice or Aspirational classes. The types of techniques that can help you improve practices are outlined in this section of the book. More detailed resources are listed in the Resources section and are available from Council or other agencies. Many of them are available online as downloadable documents.

The following five land management practices from the Farm Health Assessment Tool are relevant across all floodplain cropping properties.

1. Soil health and nutrient management

Monitoring soil health and determining fertiliser requirements can be a relatively simple and cost-effective management strategy to help optimise profitability and correctly identify opportunities for soil improvement. This has been made easy by the *Soil-specific Nutrient Management Guidelines (6 Easy Steps)* for New South Wales (see Resources) which outlines how to determine the ideal fertiliser blends and rates for each field. It advocates minimal cultivation, matching row spacing to your machinery to minimise soil compaction and avoiding burning crop residues.

Regular soil testing can help identify the correct amount of fertiliser to satisfy the nutrient requirements of the crop. The use of organic fertilisers (such as manure, green trash waste, mill mud, ash mixtures and composts) as well as legume break crops, increases the available nutrients for plants and improves the soil structure. This in turn reduces the chance of soil erosion, improves drainage and increases soil water retention.

Reducing the use of chemical fertilisers reduces landholder costs and the chance of fertiliser runoff and waste entering local waterways. It is important to always stockpile mill mud or compost well away from drains and waterways.

2. Trapping water runoff from paddocks

Trapping surface drainage in the fields and managing runoff water can minimise erosion and maintain water quality. Filter strips, headlands and spoon drains can filter sediments and nutrients from both overland and groundwater flows, and should be established around all fields. Planting and maintaining grasses in these drainage areas can trap and prevent the loss of nutrients, as grass roots can assist microbial breakdown of nutrients and pesticides. Native tree, shrub and groundcover plantings also provide conditions suitable for denitrification, provided the banks are not too high above the prevailing water table.

Grassed filter strips along the tops of drains require special design and management to achieve the best results. The key design principles include:

- strips are a minimum width of 5–10 metres for most crop fields with low slope
- dense plantings of medium-height native grass species, such as Lomandra, native vetiver or couch that are found in your area
- do not spray headlands and spoon drains with herbicide as this creates erosion and defeats the purpose of the grassed filter strip
- maintain the grass at a height of at least 10–15 cm, if kept too short, the grassed filter strip will be much less effective in trapping sediment containing nutrients and pesticides.

Ideally grassed headlands and wide, shallow drains should be present around all fields. These should have 100% grass cover throughout the year to minimise erosion and maintain water quality.

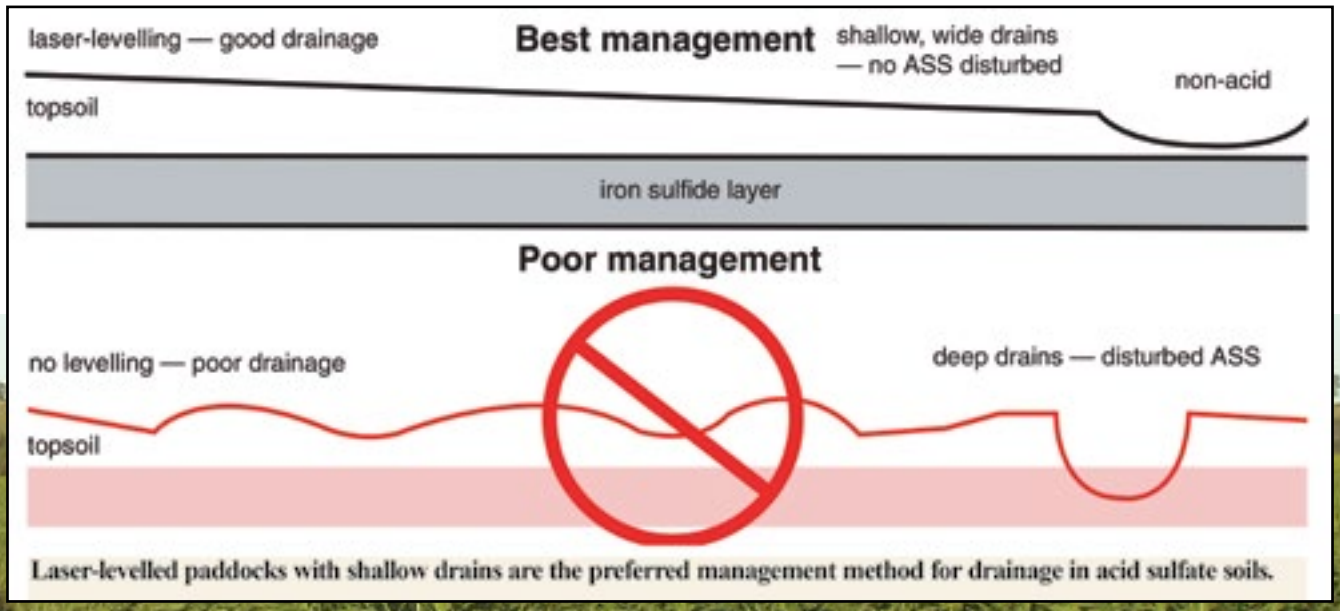
3. Managing surface drains to improve water quality and biodiversity outcomes

Well-managed drains help regulate surface water flow and groundwater levels, trap and filter runoff, and minimise loss of top soil. This improves overall farm productivity and sustainability.

Vegetating larger drains with a diverse range of trees, shrubs and groundcovers (especially focusing on the northern side of the drain) helps to bind the soil with a mat of roots that extends below the waterline. This limits slumping and in-stream scouring, traps sediment and enables uptake and retention of nutrients. The vegetation also shades the water which can help reduce invasion by weeds and can regulate water temperature. It also provides better habitat and corridors for fish, turtles, frogs, lizards, dragonflies, birds and many other beneficial animals. Smaller drains can be vegetated with native grasses and sedges to help with sediment and chemical filtering.

Surface drainage can be improved by using laser levelling to regrade flat land to give it some slope. This improves drainage, reduces soil compaction caused by harvesting machinery during wet periods, and also allows better driving conditions for farm machinery. Laser levelling can also help reduce the amount of acid runoff entering the waterways from fields with acid sulphate soils.

While laser levelling is invaluable in improving surface drainage, for every cubic metre of ponded water removed, a similar corresponding storage should be provided to mitigate increased downstream flow rates. Installation of constructed wetlands or reinstatement of degraded wetlands is a means of achieving this (see practice 4 on following page).



▲ *Image courtesy of NSW Department of Primary Industries*

4. Constructing wetlands

A wetland is any area of land that can be inundated with water either temporarily or permanently and may provide a number of important functions and values;

- add value in terms of productivity and catchment health
- provide opportunistic grazing and cropping
- slow and capture flood waters, helping reduce erosion
- provide recreational opportunities and scenic amenity

Purpose-built silt traps and artificial wetlands are becoming increasingly popular on cane and other farms as a means of improving farm environmental performance, increasing farm productivity and enhancing the amenity of farms.

If your land has low lying areas or historically filled or drained wetlands, these are the perfect locations to reconstruct a wetland plant community. Wetlands will attract waterbirds and other wildlife which can add to the beauty, amenity and value of your property. Book 1 contains a species lists for wetland and dam edge plantings, as well as an extensive list of trees and shrubs.

It is important that wetlands be designed to suit farm conditions (e.g. soil type, runoff rate and volume) if the purpose of the wetland is to manage nutrient retention and sediment trapping. These wetlands should be incorporated in the property's Drain Management Plans.

Nuisance species and pests (e.g. aquatic weeds and pest fish such as carp) will need to be monitored (see Book 1). An additional benefit could be diversification or creating an additional income source from wetlands, such as eel trapping to supply the Sydney Fish Market and live export to China.

5. Minimising the impact of pesticide applications on beneficial insects and wildlife

Integrated pest management can complement current chemical control methods by introducing non-chemical options, such as cultural and biological control.

The first step in integrated pest management is to identify and understand the lifecycle of the weeds, pests and beneficial insects and wildlife present on your property. A plan can then be developed to manage the populations of both beneficial and pest species. Careful and ongoing monitoring and record keeping is required to ensure that populations of beneficial species are maintained and that pests and weeds are actively controlled. Introducing a 'break crop', such as a legume fallow crop, can reduce pathogens and pests and produce healthier cane stools, decreasing the need for herbicides and pesticides.

Barn Owl

Preserving beneficial species when using chemicals is often difficult because most pesticides used are broad-spectrum and kill beneficial species as well as the pests. Impacts on natural predators can be reduced by using a selective pesticide that has the least impact, and by minimising the number of applications.

Five different species of owl are known to hunt rats in Australian cane fields and are natural predators of rats. Owls can be encouraged by providing nesting boxes and perching trees, or artificial perches while trees are established. Several companies sell nest boxes and instructions to make them are available on some websites (see contacts).

Planting riparian areas, vegetating drains and creating wetlands can also provide habitat for beneficial insects, birds and other animals.

RESOURCES

Industry guidelines:

- McGuire, P (2014) NSW Sugar Industry – Farming code of practice, Sunshine Sugar, Ballina.
- Schroeder, B, Calcino, D, Hurney, A, Smith, R, Panitz, J, Cairns, R, Wrigley, T & Allsopp, P (2008) SmartCane Principles of Best Management Practice, BSES Limited Technical Publication TE08006.

Drain management:

- Eldridge, S (2014) Soil Management for sugarcane, NSW Department of Primary Industries
- Johnston, S, Kroon, F, Slavich, P, Cibilic, A & Bruce, A (2003) Restoring the Balance: Guidelines for managing floodgates and drainage systems on coastal floodplains, NSW Agriculture, Wollongbar.
- Lovett, S & Price P (2001) Managing Riparian Lands in the Sugar Industry: A guide to principles and practices, Sugar Research and Development Corporation, Land & Water Australia, Brisbane.
- Drainage Feature - Sugar Research Australia, www.sugarresearch.com.au.

Wetland construction:

- Smith, R (2008) Riparian and Wetland Areas on Cane Farms, SmartCane Best Management Practice Booklet produced by WetlandCare Australia.
- Department of Employment , Economic Development and Innovation (2011) Wetland Management Handbook: Farm Management Systems (FMS) guidelines for managing wetlands in intensive agriculture, Queensland Wetlands Program, Brisbane, QLD http://wetlandinfo.ehp.qld.gov.au/resources/static/pdf/resources/reports/fms/fms_025_handbook_web.pdf
- Department of Employment, Economic Development and Innovation, 2011, 176 pp, Queensland Wetlands Program, Brisbane QLD. http://wetlandinfo.ehp.qld.gov.au/resources/static/pdf/resources/reports/fms/fms_025_handbook_web.pdf

Soil health:

- Panitz, J, Schroeder, B, McGuire, P, Aitken, R. Beattie, R & Wood, A (2013) Soil-specific Nutrient Management Guidelines for Sugarcane Production in New South Wales, BSES Technical Publication TE13001.
- Tuckombil Landcare Inc. (no date), Northern Rivers Soil Health Care Card: A soil management tool developed by farmers for farmers, Developed by in partnership with NSW Agriculture and the Natural Heritage Trust.

CONTACTS

Department of Environment and Heritage http://www.environment.nsw.gov.au/

Office of Water, Department of Primary Industries, Phone: 02 6676 7380 Fax: 02 6676 7388,
135 Main Street Murwillumbah

http://www.nestingboxes.com.au/

North Coast Local Land Services http://northcoast.lls.nsw.gov.au/ Phone: 02 6623 3900, 79 Conway Street Lismore

Richmond River County Council Floodplain Services http://rrcc.nsw.gov.au
Email: floodplain@rrcc.nsw.gov.au Phone: 02 6623 3891

Richmond Landcare Inc. http://www.richmondlandcare.org Phone: 02 6619 0115

Wetland Care Australia http://www.wetlandcare.com.au Phone: (02) 6681 6169, PO Box 114 Ballina NSW 2478

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