



2008

Resource Kit for Rural Landholders

in the Nambucca, Macleay
& Hastings Valleys



Sustainable Forests



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Australian Government
Department of Agriculture,
Fisheries and Forestry
National Landcare Program



Northern Rivers

CMA CATCHMENT MANAGEMENT AUTHORITY



LANDCARE

A Resource Kit for Rural Landholders of the Nambucca, Macleay
& Hastings Valleys by Harry Rose

For further information and copies of this pack contact:

Tim Ryan

Nambucca Valley Landcare Community Support Officer
PO Box 239, Bowraville, 2449
p. (02) 65 647 838
e. tryan@nvlandcare.org.au

Jai Cooper

Macleay Landcare Network Community Support Officer
PO Box W48, West Kempsey, 2440
p. (02) 65 622 076
e. macleaylandcare@tsn.cc

Cathy Eggert

Hastings Landcare Inc. Community Support Officer
PO Box 126, Wauchope, 2446
p. (02) 65 864 465
e. hastingslandcare@midcoast.com.au

Designed by Furgerkanism Design studio
www.furgerkanism.com



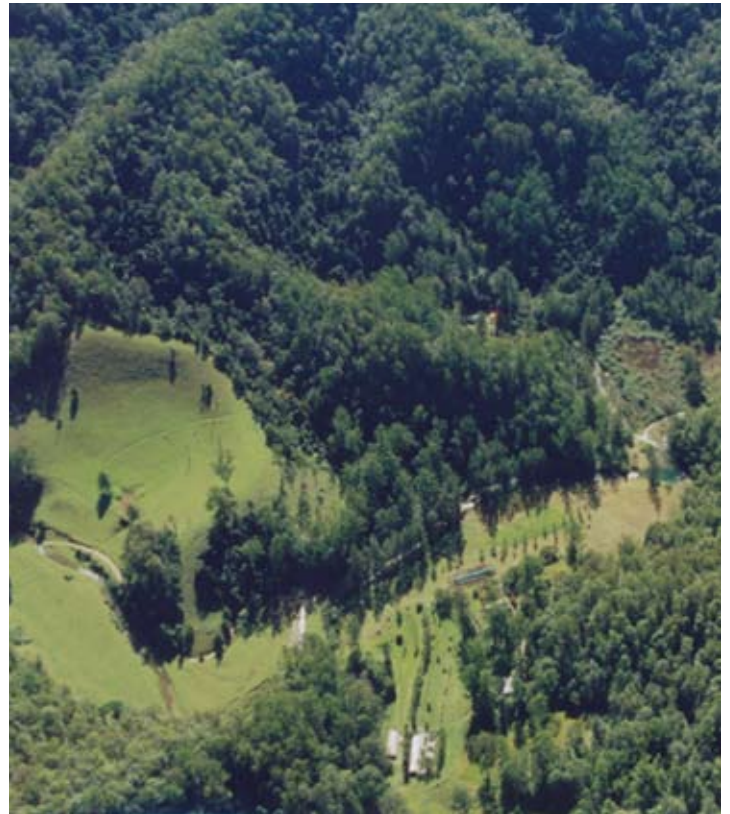
Introduction

Can I pump water from the river? Who can tell me why my cattle are doing poorly? What's that weed in my paddock? Do I need to control it? What is the Native Vegetation Act? Why has the Rural Lands Protection Board sent me a rates notice?

Whether you are thinking of taking up rural life on the mid-north coast of New South Wales, or have already done so, it is often hard to know where to turn to for such information. There is an enormous amount of material available but unfortunately it is scattered across many organizations and in many formats (eg. advisors' knowledge, training courses, books and web pages). The aim of this kit is to bring much of this information together in one easy to use guide for intending and existing landholders in the Nambucca, Macleay and Hastings valleys, and to direct them to where they can obtain further help.

The kit briefly describes the natural resources (soils, water; native vegetation and pastures) of the area and major factors that impact on them (climate, drought, flood, fire and weeds). These play major roles in determining the potential and limitations of rural land and thus, how the land needs to be managed. If you would like more detailed information on any of these topics, a supplementary pack that brings together some of the most relevant information sheets is available from the Landcare offices listed on the inside cover of this kit.

Other factors that will smooth the transition to rural life (including the multiplicity of legislation) for intending and new landholders are described in the section "Rural Life".



The kit also provides a selected guide to resources that will help you better understand your land and the enterprises you work with. While all attempts have been made to provide up to date information, this kit only provides general information as the rules and regulations affecting rural life are constantly changing. Hence, you should always seek professional advice for your specific situation. To aid your search for advice, the contact details of a range of government and non-government organizations are listed at the back of the kit.

General Disclaimer

Information contained in this publication is provided as general advice only. For application to specific circumstances, professional advice should be sought. Views of individuals do not necessarily reflect New South Wales Government policy. The author has taken all reasonable steps to ensure the information contained in this publication is accurate at the time of publication. Readers should ensure that they make appropriate inquiries to determine whether new information is available on the particular subject matter.

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Abbreviations used in this document are:

- DECC = Department of Environment and Climate Change
- DWE = Department of Water and Energy
- NRCMA = Northern Rivers Catchment Management Authority
- NSW DPI = NSW Department of Primary Industries
- Qld DPIF = Queensland Department of Primary Industries and Fisheries
- RLPB = Rural Lands Protection Board



Rural Living

INTENDING LANDHOLDERS

ARE YOU CURRENTLY SEARCHING FOR A RURAL PROPERTY?

Many people who haven't come from rural communities may not realise what it is like to live in a rural area. Rural areas are not always peaceful: sometimes they can be noisy, smelly and dirty. To better understand what you might expect, and what is expected of you, read the "Living in a Rural Area" information sheets in the supplementary pack. If any of these issues concern you, talk to advisors in your local NSW Department of Primary Industries (agriculture) office.

If you have read these sheets and still want to live in a rural area, you need to decide just what you want from a rural lifestyle.

Some things you may want to consider are:

- Do you want a bush block where you can relax or a production property?
- What type of rural industry do you want to be involved in (e.g. horticulture, beef cattle, cropping)? Remember, that if you are not happy with what you are doing, the undertaking is less likely to be successful.
- How long can you wait before earning an income? Some rural enterprises take 3 or more years before they generate income (e.g. Tree crops)
- How much do you need to earn from the farm: many properties on the mid north coast are not large enough to support a family without a supplementary income?
- Where can you earn off-farm income?
- How far are you willing to travel between the farm and off-farm job?
- Do you want to live on the property or do you want a rural property, but live in town?
- How much time and energy do you have? Many enterprises involve long hours and require a lot of energy (e.g. dairying)
- Where will the kids go to school?

Comboyne landscape. © NSW DPI.



Once you've made these basic decisions you will need to gather information to help refine your ideas. For example, if you want to run an agricultural enterprise:

- What types of enterprises are undertaken in the area (e.g. beef cattle - store weaners, steer fattening or stud)?
- How profitable are the different enterprises in both the short and long term? All rural enterprises go through ups and downs in the market. Where in the pricing cycle, is the enterprise you are considering?
- Which parts of the valleys are best suited to your chosen enterprise?
- What types of soils or pastures are suitable for your chosen enterprise?
- Is irrigation required?
- What infrastructure and machinery outlays will be required to start the business? This can run into large amounts for some enterprises.
- What skills do you have and what are needed?

The best way to start gathering the knowledge you need is by reading through this kit and following its pointers to further sources of information. All this will take time, but patient, detailed planning will save money and heartache in the end. As you amass information, don't be surprised if you need to reconsider what you want from your rural lifestyle. Rural living is usually a compromise between what you desire and what is practical and affordable. With the information you've amassed, you will be better placed to provide real estate agents with a list of your requirements

When inspecting properties, take a spade and pH kit and dig some holes to see what the soil is like. Also, take notes on the vegetation, water supplies, infrastructure and what enterprises are being conducted on adjacent properties. This will help you compare the properties that interest you. If you wish, use the "Property Checklist" to assess and compare properties.

When it finally comes to purchasing a property, it is a case of buyer-beware. You must fully assess its suitability for the purposes for which it is intended. This can include features which might not be readily evident and that vendors are not legally obliged to disclose; and which routine conveyancing enquiries may not uncover. See the checklist in "Some Precautions When Buying Agricultural Land" in the supplementary pack. Be aware that government agencies can only provide information and advice about matters over which they have authority. They cannot break the confidentiality agreement they have with the current landholder and supply specific property advice to the buyer. It is the responsibility of the purchaser and the conveyancer to carefully inspect the property, examine the contract and ask all the right questions.

PROPERTY CHECKLIST

Property address:

Asking price:

Property size (hectares):

Nearest town:

Distance to town:

Condition and suitability of the residence:

Is a residence permitted to be built on property? Y/N

Condition and suitability of other buildings:

Condition and suitability of the stock handling facilities:

Condition and suitability of the fences:

Number and sizes of paddocks:

Services to property: electricity Y/N town water Y/N garbage service Y/N town sewerage Y/N

Type, quantity and quality of domestic water supply (tank, bore, dam, creek, river):

Type, quantity and quality of stock water supply (tank, bore, dam, creek, river):

Type, quantity and quality of irrigation water (bore, dam, creek, river):

Does the property come with an irrigation license? Y/N

Size of license:

Condition and suitability of irrigation equipment:

Land types: wetlands% alluvial flats% gentle slopes% steep slopes%

Soil description (depth, colour and pH):

Vegetation:

cleared % forest % pasture % crops% wetland%

Main forest types or species

Suitable shade for stock?

Condition of riparian vegetation poor/fair/good Condition of bush poor/fair/good

Main pasture species (collect grass flower heads if not sure):

Crops:

Degradation Issues
(weeds/feral animals/erosion)

Other Notes:

NEW LANDHOLDERS

I'VE BOUGHT A PROPERTY!
WHAT SHOULD I DO NOW?

Read this kit and know where to go for information. But first, a warning! Organizations and advisors will always try to answer your questions, but it often won't occur to them to tell you about things you haven't asked about. Hence, always ask,

- What information and services do you provide?
- What training, workshops, field days are available and how can I find out about future events that might be held?
- Are any funding opportunities available for training or on-farm works?
- Who else should I contact?
- Is there anything else I need to know about?

Let the Rural Lands Protection Board (RLPB) know that you have bought the property (if 4 hectares or more), so that they can start providing services to you. If you intend to own livestock, ask them about the National Livestock Identification Scheme (NLIS) – you'll need a property identification code and identification tags. Also, find out about any pest animal programs being run in your area

Contact your local Landcare community support officer and join the catchment network, so that you can receive regular updates on funding, workshops, field days and other events for rural landholders in your catchment.

Start planning by buying an aerial photo of your property (see Map Sales in the Department of Lands). First, talk to NSW Department of Primary Industries (agriculture) (NSW DPI (agriculture)) and Northern Rivers Catchment Management Authority (NRCMA) to see if there are other ways to obtain an aerial photo (e.g. Landscan course – NSW DPI (agriculture) or property vegetation plans – NRCMA).

Ask NSW DPI (agriculture) or NRCMA about how to use the aerial photo for mapping your properties' resources, problems and management.

Find out if you are in a bushfire prone area by contacting your Rural Fire Service. If so, ask how to prepare your property for bushfire and prepare a bushfire action plan (what to do when a fire comes). Become a Rural Fire Service volunteer to learn how to fight bushfires and manage fire on your property. Be aware of fire legislation.

Find out if you are in a flood prone area by contacting your local council. If so, ask if there is a local flood action plan. Obtain information from your local State Emergencies Service on how to prepare a flood action plan for your property. If your property is on a floodplain, ask your local council about the extent and level of acid sulfate soil risk on your property (they have acid sulfate soil risk maps).

Map and assess your properties resources. Determine how to manage them and what funding opportunities are available

- Soils – NSW DPI (agriculture)
- Pastures – NSW DPI (agriculture)
- Native vegetation - NRCMA
- Water – NRCMA and Department of Water and Energy

Map and assess your properties problems. Determine how to manage them and what funding opportunities are available

- Weeds – NSW DPI (agriculture)
- Pest animals – RLPB
- Erosion – NRCMA and NSW DPI (agriculture)

If you are involved in a rural enterprise, ask advisors in NSW DPI (agriculture) about the issues relating to your industry (e.g. best management practices, regulations, training opportunities, etc).

For new and emerging rural industries (e.g. garlic) and organic agriculture, contact the Mid North Coast Regional Development Board to find if there is a local producer network or discussion group are available for your industry.

Join a producer association and learn from others in the industry. Find these groups through NSW DPI (agriculture), other producers or the internet (type "industry + association" into a search engine e.g. Alpaca association).

Determine if you are eligible for primary producer business status (this can provide tax savings) by contacting the Australian Tax Office or your local accountant or by typing "Australian tax office primary producers' essentials" into any internet search engine (to access the ATO's primary producer web page).

Remember to always check with your local council and NRCMA before undertaking any development on your property (no matter how small), as approvals are needed in many circumstances.



LEGISLATION

There are a number of pieces of legislation that affect rural land and rural enterprises. The following is a very brief outline of the Acts and where to go for more information.

Apiaries Act 1985
Controls keeping bees, identification and use of hives, importation of bees and disease control of bees. Contact local NSW DPI (agriculture) for more information

Companion Animals Act 1998
Makes provision for registration of dogs and cats (working dogs are exempt) and rights of landholders to destroy dogs and cats. Contact your local council for more information

Crown Lands Act 1989 and Crown Lands (Continued Tenures) Act 1989
Covers the lease and use of crown land. Established local land boards, who deal with dividing fences. Contact the crown lands division of the Lands Department for more information

Dividing Fences Act 1991
Covers dividing fences and fencing disputes. Contact the crown lands division of the Lands Department for more information

Environment Protection and Biodiversity Conservation Act 1999
Provides for the protection of the environment, especially in relation to matters of national significance (e.g. RAMSAR wetlands). Also lists threatened species and prohibits the export of native species without a permit. Contact the federal Department of Environment and Heritage

Environmental Planning and Assessment Act 1979
Controls the extent and conditions of development on all land in NSW. Administered by local councils. Contact your local council if considering any type of development (buildings, intensive enterprise, etc)

Exotic Diseases of Animals Act 1991
Any animal suspected of having an exotic disease must be reported to the Rural Lands Protection Board or police as soon as possible. Contact the RLPB for more information

Firearms Act 1996
You must be licensed to own or use firearms and firearms must be registered and suitably stored. Contact the Firearms registry at www.police.nsw.gov.au/firearms for more information

Fisheries Management Act 1994
Permits are required to carry out aquaculture. Contact the fisheries division of the Department of Primary Industries for more information



Impounding Act 1993
Animals straying off (or onto) your property may be impounded. Charges incurred to have animals released. Contact your local council for more information

Inclosed Lands Protection Act 1901
Deals with trespassers on your property, but common law remedies are more commonly used in rural situations. Trespass in a recreation vehicle is covered by the Recreation Vehicles Act 1983. Contact your local police station for more information

Kangaroo Management Plan
No kangaroo can be shot unless the shooter has a licence from the National Parks division of the Department of Environment and Conservation. See them for more information

Local Government Act 1993
Councils must levy lower rates for farmland than for other uses (e.g. residential). If you disagree with your rating contact your local council

National Parks and Wildlife Act 1994
All vertebrate fauna is protected, except for some imported species. It is an offence to harm any protected fauna without a permit. Landholders may pick native plants on their property, except if they are protected (as listed in Act). Contact the National Parks and Wildlife for more information.

Native Vegetation Act 2003
Native vegetation can only be cleared as part of a defined routine agricultural management activity or in accordance with a property vegetation plan (PVP) or development approval (Environmental Planning and Assessment Act 1979). Contact the Northern Rivers Catchment Management Authority for more information.

Noxious Weeds Act 1993
Occupiers must control the spread of noxious weeds on their land, whether private or public lands. Contact your local council for more information

Occupational Health and Safety Act 2000
Every employer must ensure the health and safety of all employees. Contact Workcover for more information

Pesticides Act 1999
Controls the use of pesticides. It is an offence to harm people or property or non-target plants and animals. All users of pesticides must be licensed. See the EPA division of the Department of Environment and Conservation for more information.

Plant Diseases Act 1924
Notifiable plant diseases and pests must be reported to NSW DPI (agriculture) inspectors within 24 hours. Regulatory Officers can make orders to landholders for the prevention, control or eradication of plant pests and diseases. Contact your local NSW DPI office for a list of notifiable diseases

Plantations and Reafforestation Act 1999 (Code 2001)
Plantations greater than 30 hectares must be authorised and must apply with the Code. Plantations 30 hectares and less are exempt. See the Department of Natural Resources for more information

Rural Fires Act 1997
Sets out landholders' responsibilities in relation to fire. Permits are required to light fires during the bush fire danger period. Contact the Rural Fire Service for more information

Rural Lands Protection Act 1998
Established the Rural Lands Protection Board, whose functions include providing animal health services, managing travelling stock and travelling stock routes, controlling pest animals, stock marking and administration of drought and disaster relief schemes. Landholders must control declared pest animals. Sets out rules for movement of stock. Contact the Rural Lands Protection Board for more information.

Soil Conservation Act 1938
Landholders can be served with, and must comply with, soil conservation notices where soil erosion or degradation is likely to occur and the effects can be mitigated. Contact the Northern Rivers Catchment Management Authority for more information.

Stock Diseases Act 1923 (Regulations 2004)
Covers the reporting and control of endemic diseases. Landholders must acquire a property identification code, use approved stock identification tags, report all property-to-property movements and any stock suspected of suffering from a proclaimed endemic disease. Contact the Rural Lands Protection Board for more information.

Threatened Species Conservation Act 1995
It is a criminal offence to harm a threatened species or its habitat, sell a threatened species or have one in your possession. National Parks has the power to issue stop work orders if any activity is considered likely to harm threatened species or their habitat. Contact the National Parks division of the Department of Environment and Conservation for more information

Water Management Act 2000
"Obligations regarding water use and soil disturbance close to (or near?) waterways". Sets out landholders' entitlements and obligations regarding water use, covering streams, lakes, dams, bores and harvesting runoff. Contact water licensing in the Department of Natural Resources or the Northern Rivers Catchment Management Authority for more information.

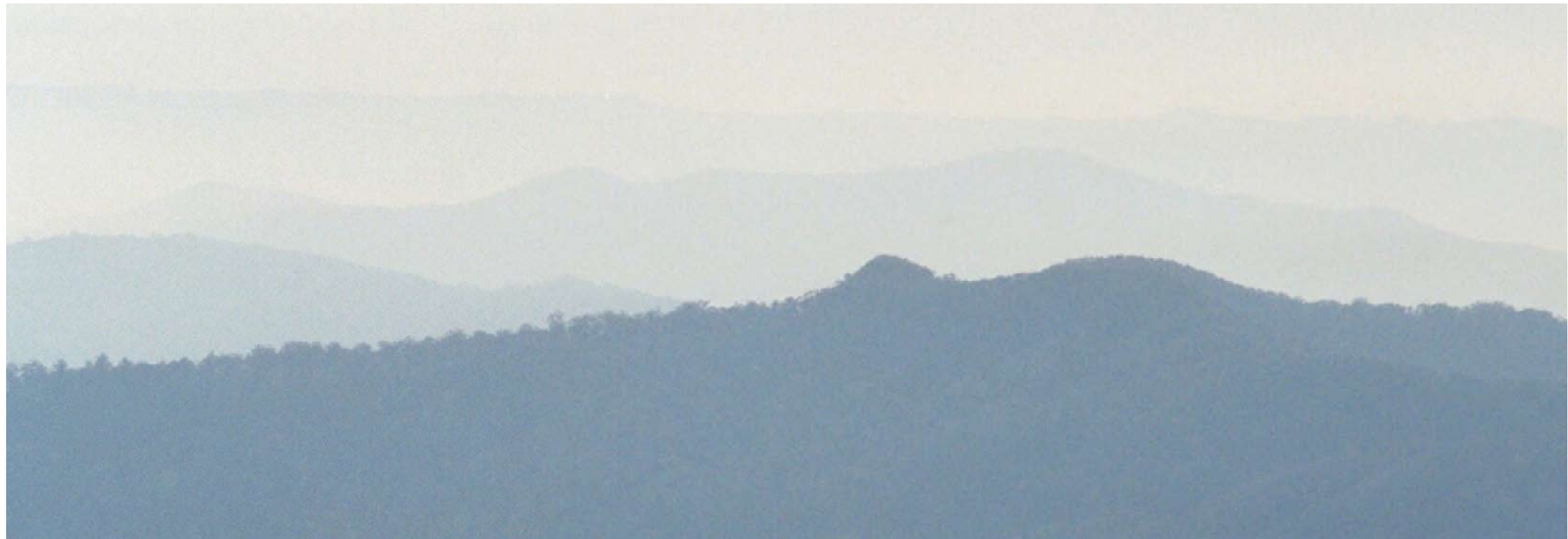
Climate

TEMPERATURE

The mid-north coast has a warm temperate to sub-tropical climate. Locally, the climate is strongly influenced by distance from the coast. Near the coast temperatures are moderated by ocean influences. Maximum temperatures typically range from 25-27°C in summer to 18-20°C in winter on the coast. Minimum temperatures typically range from 17-20°C in summer and 8-12°C in winter.

Greater temperature extremes are experienced further inland, with maximum summer temperatures tending to increase by 1-2 °C for every 20km from the coast. For example, at Kempsey and Wauchope, only 20km inland, median summer maximums are up to 2°C higher and median winter minimums to 5°C lower (Figure 1). In summer, extremely hot drying conditions can be experienced throughout the valleys due to hot north-westerly winds from the inland.

Temperature is also strongly influenced by elevation, with higher elevations having considerably lower winter temperatures. For example, Cameron's Camp (altitude 840m) has a mean maximum winter temperature that is 6°C cooler than Kempsey and Wauchope (altitude 10m).



Dunggir National Park, Nambucca Valley. © Joy van Son.

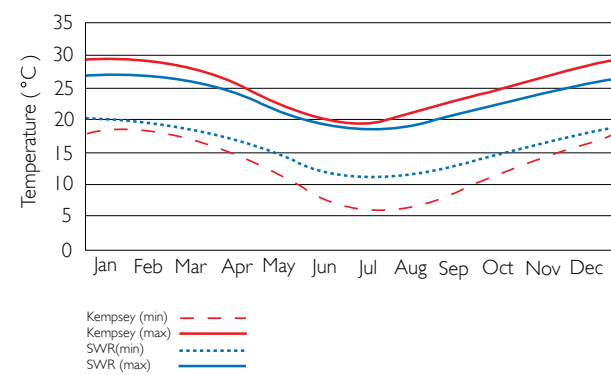


Figure 1: An example of the moderating coastal influence on maximum and minimum temperatures. South West Rocks (coastal fringe) and Kempsey (20km inland).

Frosts are infrequent in coastal areas and when they do occur, are not usually severe (i.e. 0 °C). Frost frequency and severity is highest further inland, with frosts rarely occurring within 1km of the coastline. For example, Kempsey experiences an average of 8 frosts a year between June and August, all generally 0 °C.

Southern facing hillsides experience more frequent and severe frosts than do northerly facing slopes. Low elevation areas, subject to cold air drainage also have higher frequencies of frost and fog than surrounding areas.

RAINFALL

Annual rainfall typically ranges from 1100 - 1400mm at low elevations. However, annual rainfall may exceed 3000mm in wet years and there is the possibility of 300mm in any month.

Rainfall tends to be highest along the coastal fringe and to decrease with distance from the coast (Figure 2). Local differences may also occur due to the steep terrain altering the movement of clouds, in places creating rain shadows.

Higher elevation sites also tend to receive significantly more rain. For example, Comboyne (640m) receives some 550mm more than the coastal average.

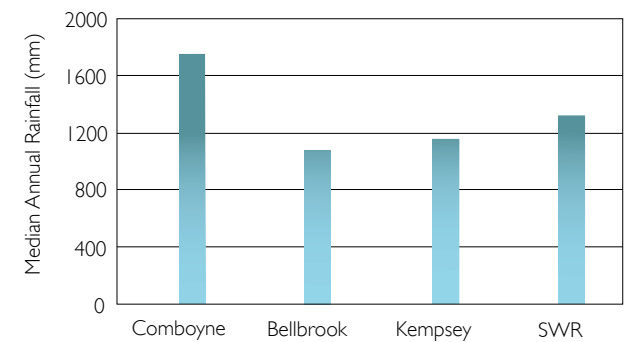


Figure 2: The influence of distance from the coast and elevation on annual rainfall. South West Rocks (low elevation coastal fringe), Kempsey (low elevation 20km inland), Bellbrook (low elevation 60km inland) and Comboyne (high elevation inland)

There is a marked pattern of a dry winter-spring (35% of rainfall) and a wet summer-autumn, with monthly averages ranging from minimum of 30-55mm in July-August to 110-190mm in February-March. Rainfall in the spring to autumn months is often associated with thunderstorms which build up over the mountains during the day and move eastwards in the afternoon.

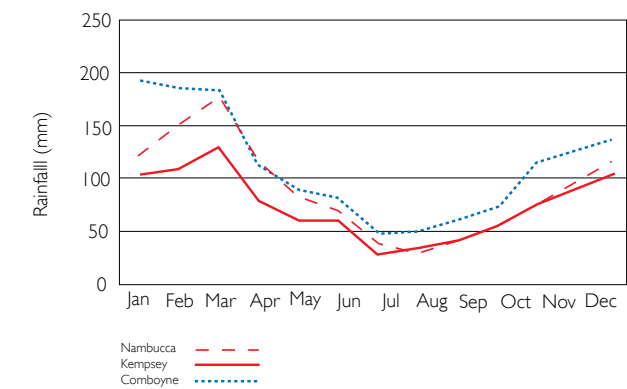


Figure 3: Rainfall patterns across the region, as influenced by distance inland and elevation. Nambucca (low elevation coastal fringe), Kempsey (low elevation inland) and Comboyne (high elevation inland)

Evaporation usually exceeds rainfall from July to December, but the reverse occurs from January to June. The combination of warm temperatures and good reliable rainfall usually provide excellent growing conditions over summer to autumn.

Drought

WHAT IS DROUGHT?

Drought is a prolonged period of lower than average rainfall, which results in insufficient feed (feed drought) and/or water in streams and dams (water drought).

From the tablelands and westward, drought is usually associated with bare and browned-off pastures. However, on the coast many pastures remain green during drought, although ground cover and feed availability may be low.

WHAT ARE THE EFFECTS OF DROUGHT?

On the coast, there is typically a minor drought every 10 years and a major drought every 15-20 years. Droughts can be short and sharp or long and sustained. The last drought on the coast lasted from 2001 to 2004; this was a long and severe drought that caused both feed and water shortages.

During drought, pastures often become overgrazed and stressed; plant energy reserves are reduced and plants more easily succumb to pressures that they would normally survive in good times. Hence, it is essential to reduce stocking rates before pastures become overgrazed, and when coming out of drought, to carefully manage pastures to allow energy reserves and seed banks to rebuild.

Ground cover is reduced during drought and overgrazing exacerbates this. If management decisions are solely made on animal condition, drought strategies will be implemented too late. Serious pasture and soil degradation can then occur through wind erosion or water erosion.

Excessive erosion of manure and soils into water supplies may make it unsuitable for use. This is made worse by shallower, warmer and slow flowing water common in drought; nutrients or pest organisms (e.g. Algae) are not diluted and the warmer waters are ideal for algal growth.

Animals are obvious casualties of drought, not only through starvation, but through disease during and after drought. During drought illnesses are often related to supplementary feeding (e.g. Grain feeding) and/or the weakened condition of animals. Animals are also more likely to suffer plant poisoning as feed becomes scarce. Wet cold conditions are often associated with drought breaking rains (even in summer) and this will badly affect animals in poor condition. Stomach upsets and plant poisonings are also common after drought. Sudden changes in feed are associated with pulpy kidney, enterotoxaemia and other diseases.

During drought, river pumping restrictions are often necessary; this limits water supplies for irrigation, stock and domestic use, just when it is most needed. For information on river pumping restrictions, contact the resource access officer in the Department of Natural Resources at Grafton.

Animals are less likely to be properly cared for during drought. If you see an example of animal cruelty (starvation or lack of water), contact the Royal Society for the Prevention of Cruelty to Animals, who will try and rectify the problem with the owner of the animals.



Wildlife injuries, and hence the number of orphans, increases as animals are drawn to roadsides looking for food. If you find an injured or orphaned native animal, contact FAWNA/WIRES, who are experts in their management.

HOW DO YOU KNOW WHEN A DROUGHT IS COMING?

Unlike floods, droughts can sneak up on you. Sometimes it is obvious when a drought is developing; its hot, dry and short and long-range forecasts predict no useful rains. However, at other times the development of drought is very gradual. Periods of rain, interspersed with long dry periods, can make it appear that drought has been averted, but water and feed supplies are showing a longer-term downward trend.

HOW DO YOU PREPARE FOR DROUGHT?

Action plans for drought should be developed for properties as surveys of producers who survived the 2001-2004 drought reasonably well had plans that incorporated de-stocking, feeding and financial budget strategies. Most importantly, they stuck to their plans. For more information on this read "Lessons from the drought – North Coast report" at www.agric.nsw.gov.au/reader/drought-lessons/north-coast-report.htm. Secondly, constantly monitor feed and water supplies and know how many days supply you have available if no further rains come.

HOW DO YOU DEVELOP A DROUGHT ACTION PLAN?

To develop a drought action plan for livestock producers, know how to assess your pastures and livestock, know the likely diseases to watch for and how to undertake supplementary feeding of animals by participating in a Prograze course. Prograze is run by the agriculture division of NSW Department of Primary Industries (NSW DPI (agriculture)) at Kempsey and Taree.

NSW DPI (agriculture) also has extensive information on planning for drought, and managing during and after a drought, including:

"Managing Drought". A free book for NSW farmers covering most aspects of drought, including planning, feeding, farm management and assistance. See the drought section in the NSW DPI publications catalogue in this kit.

"The Drought Recovery Guide 2005". A free book for NSW farmers that helps producers develop drought recovery strategies a make other important management decisions. See the drought section in the NSW DPI publications catalogue in this kit; and The NSW DPI (agriculture) web site at www.agric.nsw.gov.au/reader/drought.

For horticulture crops, discuss the likely affect of drought and drought preparedness with your horticulture officer; NSW DPI (agriculture) at Coffs Harbour.



WHERE CAN YOU GET MORE INFORMATION?

To better understand weather and climate and managing risk, NSW DPI (agriculture) runs a 1-day course called a "Farmer's Guide to Weather and Climate in Farming". For more information contact Paul Carberry on (02) 6763 1132.

The Australian Bureau of Meteorology provides weather forecasts and radar images on its website (www.bom.gov.au) to help determine short-term weather patterns.

More information on animal health issues can be obtained from the booklet "Beef Cattle Health for the North Coast", available from the Rural Lands Protection Board at Kempsey; the dairy officer at Kempsey; beef cattle officer at Taree; or by visiting the NSW DPI (agriculture) web site at www.agric.nsw.gov.au/How to manage pastures and crops.

Information on pasture and crop management during and following drought is available from agronomists in NSW DPI (agriculture) at Kempsey and Taree or from private agronomists (produce stores).

If your area is drought declared by the Minister for Agriculture, drought relief may be available to primary producers. The main forms of drought relief are transport subsidies for stock and water. This and other forms of assistance can be found on NSW DPI's (agriculture) web site www.agric.nsw.gov.au/reader/drought or by visiting your local NSW DPI (agriculture) office.

To help determine if you are eligible for drought relief, for help with processing of drought subsidies and to provide support information, contact the Rural Financial Counselling Service at Macksville or Rural Lands Protection Board at Kempsey.

To determine how much water you have available on your property and how to increase these water reserves, consult the water section in this kit.

Floods

The State Emergency Service (SES) is the primary agency that deals with floods and coordinates the evacuation and welfare of communities affected by flood. If you are unsure whom to contact regarding a flood issue, try your local SES first.

IS FLOODING A SERIOUS PROBLEM?

Floods are a common occurrence in all valleys on the mid north coast, with the Macleay averaging a flood (of ≥ 5.5 metres at Kempsey) every 4 years during the 1900s. In the last 16 years, there have been 3 minor floods (May 1996, February 1997 and July 1999) and one major flood (March 2001). Serious flooding is irregular; several large floods may occur over a few years and then there may be a period of decades where only minor flooding occurs (e.g. 1967 to 2001). Flooding may occur in any month of the year. The largest floods in the Macleay (1949 and 1950) occurred in August and June, normally some of the driest months.

As the Macleay River has a much larger catchment (11,385km², compared to 1460km² for the Nambucca River, 3595km² for the Hastings River and 720km² for the Camden Haven River), it is more susceptible to serious floods than the Nambucca or Hastings valleys (see catchment maps in the Rural Living section of supplementary pack). However, even in small catchments such as the Camden Haven, there is an average of one serious flood every 10 years.

Thunderstorms normally only result in local flooding, but these “gully rakers” can cause extensive localised damage; washing away fences, soils and livestock. General flooding is associated with east coast low-pressure systems, rain depressions and monsoonal low-pressure systems that bring rain for days or weeks, often over entire catchments.

Rainfall can be intense, with up to 145mm/Hr having been recorded. Laurieton received 450mm over 24hrs in 1963 and Georges Creek 650mm in 96hrs in 1950.

Because of the rapid flow of floodwaters down the valleys, the time available for landholders to take action may be short (e.g. Often only 1/2 to 1 day for floodwaters to peak at Kempsey).

Flooding is usually of short duration and confined to areas close to rivers and their tributaries in the upper/steeper parts of the valleys. However, river heights may rise by nearly 20 metres in these areas and damage may be severe due to the speed of the water flow.

On the floodplains nearer the coast, floodwaters spread out and are much shallower and slower flowing, but extensive areas can remain inundated by water for weeks or months.

Flooding not only leads to the loss of life and possessions, but it also creates a host of other short and long term problems, for example: loss of income; loss of pastures; fence damage; weed and pest invasion; livestock starvation and disease (e.g. Pulp kidney and bloat); isolation from food and medical services, lack of drinkable water; and failure of sewage systems.

Insurance policies generally do not cover flood damage. If your property is in a flood-prone area, you should ensure you are protected as thoroughly as possible.

HOW DO YOU KNOW WHEN A FLOOD IS COMING?

The Bureau of Meteorology flood warnings are broadcast on all local radio stations. The SES will indicate in these warnings the likely consequences of the predicted flood height for local areas and advise on appropriate action. Warnings are also provided on the Bureau of Meteorology's web site www.bom.gov.au/hydro/flood/nsw

WHAT SHOULD YOU DO TO PREPARE FOR FLOODS?

First, determine if you are in a flood-prone area or an area likely to be isolated by flood; if so, prepare a flood action plan for your property. To find out whether your property is susceptible to flooding and what critical flood heights are, talk to your local shire council and SES.



Flooding at Lanes Bridge Bowraville. © Tim Ryan.

HOW DO YOU DEVELOP A FLOOD ACTION PLAN?

Read “Floodsafe: Rural Properties” included in the supplementary pack. Obtain a copy of your local “FloodSafe” guide (Kempsey Shire and Dunbogan only) from your local SES office or on the web at <http://www.mhl.nsw.gov.au/www/kempfloodlinks.html> for the Kempsey Shire and at <http://www.ses.nsw.gov.au/infopages/2232.html> for Dunbogan.

These guides describe local flood problems, evacuation procedures and emergency contacts for the area.

- Consult your local SES and neighbours who have experienced previous floods, to find out about local flooding idiosyncrasies. For instance, your property may not go under until a certain flood height, but by that time all of escape routes may be inundated.

- Obtain advice from the Rural Lands Protection Board and NSW Department of Primary Industries (agriculture) to develop a livestock flood action plan. For example, factors you'll need to consider for livestock are where can stock be evacuated to, how will they be evacuated (livestock transport trucks are likely to be in short supply during floods), what animal health issues may occur; how stock will be fed, how much feed is needed when pasture is not available and how long will livestock need to be away.

- As SES flood action plans cover a large local area, you will need to modify them specifically for your property. Your property flood action plan should cover the people, possessions, machinery, pets and livestock and specify what you will do, how you will do it and what flood height triggers you will use. It should also cover the period immediately after the flood, as water quality, pastures, electricity, sewerage, etc can take a long period to return to normal.

If a disease outbreak does occur during or after a flood, contact the vet in the Rural Lands Protection Board at Kempsey or other private veterinarians.

WHAT CAN YOU DO TO REDUCE THE NEGATIVE IMPACTS FROM FLOODING ON YOUR LAND?

- Replant riparian areas to reduce erosion of river banks and subsequent loss of pastures.
- Fence off stock from the creek and its banks to allow native plant regeneration and reduce erosion.
- Put in off-stream water troughs to eliminate the need for stock to enter creek areas.
- Contact your local Landcare office for funding.

WHERE CAN YOU GET MORE INFORMATION?

A useful reference for understanding cattle diseases is “Beef Cattle Health for the North Coast” by P. Freeman (2002), which is available from the Rural Lands Protection Board at Kempsey.

Undertaking the “Prograze” course run by NSW Department of Primary Industries (agriculture) will also help producers understand the feed requirements of livestock and how to maintain their health through supplementary feeding.

Department of Primary Industries (agriculture) has information on property management during and after floods at www.agric.nsw.gov.au/reader/flood-frost.

The Kempsey branch of the SES has information on preparing for floods and other disasters, flood photos and volunteering at www.midcoast.com.au/~kempsey/

For more information on flooding in the Macleay Valley visit the flood web page at www.mhl.nsw.gov.au/www/kempindex.htmlx.

Soils

WHY CARE ABOUT SOILS?

Soils are the basis of all life; providing the matrix that supports homes, dams, plants and soil life, while providing the nutrients and water that supports plant growth. Soils also regulate water flow across the landscape and filter water; thereby, controlling stream flows and water quality.

Without healthy soils we would not have productive pastures, crops and livestock, water quality would deteriorate, fish stocks would be reduced and our lifestyles degraded. Management of soils at a local level has catchment-wide effects.

Maintaining or improving the quality of soils should be a key goal of all landholders. Hence it is vital for all landholders to understand the potentials and limitations of their soils and how different management activities affect them.

WHAT ARE THE SOIL CHARACTERISTICS OF THE NAMBUCCA, MACLEAY AND HASTINGS?

Soils of the region are predominately derived from sedimentary or metasedimentary (sediments altered by heat) rocks, such as sandstone, limestone, mudstone, shale, etc.

Soils of the Nambucca catchment are mostly formed on easily erodible slate and shales. These form shallow rocky soils on steep slopes in the upper catchment, while the alluvial soils are fine textured silts that are prone to stream erosion. The hill slope soils of the z are generally more fertile than the hillslopes of the Macleay, as can be seen by the widespread ability to grow kikuyu on the hillslopes of the Nambucca catchment.

Dairying and beef cattle grazing, with some vegetable growing, is practiced on the alluvial soils, while the hillslopes are predominantly used for beef cattle grazing. However, there has been an expansion in horticultural tree crops (e.g. macadamias) and private forestry on the hillslopes over the last decade.

Soils of the lower Macleay catchment are mostly derived from shales and mudstones. The soils usually have a sharp texture contrast between the topsoil and subsoil, with the subsoils being heavy acid clays. These soils are generally only suitable for grazing and timber. By contrast the soils of the floodplain are often deep rich loams that are suitable for cropping, irrigation and dairying. However, there are extensive areas of acid sulfate soils, heavy grey clays and peats at lower elevations on the floodplain that limit their suitability to grazing or conservation. Along the streams in the catchment, alluvial soils generally grade from coarse sands and sandy loams in the upper reaches to finer silts and clay loams in the lower reaches. Alluvial flats can be subject to rapid mass erosion from the rapid flow of water that occurs during floods.

Dairying is chiefly practiced on the fertile alluvial soils of the floodplain and Macleay River. Beef cattle grazing dominates the hillslopes, but is also increasingly common on the floodplain as farmers have withdrawn from dairying in recent times due to poor returns.



Soil Profile Willi Willi, Macleay valley. © NSW DPI

Vegetable growing occurs on the higher (levee) floodplain soils and on the sand flats of Stuarts Points, while horticultural tree crops are common around Mt Yarrahapinni and Stuarts Point.

Soils of the upper Hastings catchment are mostly derived from sandstones and siltstones. These form shallow stony soils to stony deeper gradational soils. In the middle part of the catchment, above Wauchope and Telegraph Point, the alluvial soils are dark sandy loams that are suitable for irrigation and cropping, while the hillslopes have red and brown texture contrast soils. Nearer the floodplain, the soils are hard setting, strong texture contrast soils, with the heavy clay acid subsoils. The floodplain itself mostly consists of heavy grey clays and peats with areas of acid sulfate soils, where as the Comboyne Plateau and Port Macquarie areas have deep well-structure, fertile volcanic soils.

Much of the Hastings catchment is steep and forested. Where clearing has occurred, the less fertile hillslopes are mostly used for beef cattle grazing, while dairying is more common on the alluvial soils and Comboyne Plateau. Increasing amounts of the Comboyne Plateau have also been dedicated to horticultural tree crops such as avocados, while some grape growing occurs in the Port Macquarie region.

How agricultural production and soil structural stability are affected by the geology of each catchment can be complicated and is best discussed with advisors in your local Department of Primary Industries (agriculture) offices. Geological maps of the region are listed in the NSW DPI publications catalogue in this kit, while soil landscape maps and descriptions are listed in further reading and are available from your local Department of Natural Resources' office. However, as these are both technical documents, they are best viewed in conjunction with your NSW DPI (agriculture) advisor.

WHY IS SOIL ACIDITY IMPORTANT?

Soil pH is a measure of the acidity or alkalinity of a soil. The pH scale ranges from 0 (most acidic) to 14 (most alkaline). Soil pH is commonly measured in three ways, using a: field test kit; 1:5 water solution (pHW) or; weak 1:5 calcium chloride solution (pHCa). A field kit is useful as a rough guide to as to whether there are likely to be acidity problems in a paddock; these can be purchased from most produce stores. However, laboratory pHCa tests should be used for management decisions, as they are more accurate than test kits and are less affected by fluctuations in soil salt concentrations due to rainfall or fertiliser application than pHW tests.

Most agricultural soils in Australia have a pHCa of 4.5 to 9. However, most hillslope soils in the region are moderately to strongly acidic (pHCa 4.0 to 5.0), with a tendency for the acidity to increase with depth. This is lower than the ideal for plant growth of pHCa 5 to 7. Alluvial soils of streambanks and floodplains, and soils derived from limestone or calcareous shale tend to have pHCa of 5 or more, but this is no guarantee and should always be checked.

Soil acidity affects the availability of essential and non-essential elements to plants and hence, their growth and survival. In the acid conditions of the coast:

- Large quantities of aluminium and manganese often become available. These can be toxic to plants if they occur in excessive amounts
- Bacterial activity is reduced. These microbes fix nitrogen in legumes and break down organic matter to available forms for plants, so less nitrogen and sulfur is available for growth
- Phosphorus becomes bound chemically to aluminium and so is unavailable to plants
- Less calcium, potassium and magnesium is present;
- Manganese can become available at toxic levels if the pHCa drops below 4.5
- Molybdenum becomes less available if the pHCa drops below 4.5

Many pastures and horticultural crops grown on the coast are tolerant of the acidity levels that occur on the coast. However, failure to address increasing acidity levels reduces the options of what can be grown and in the longer term can degrade soils so much that there is a permanent reduction in soil fertility.

The most common methods for addressing acidity problems are:

- Applying lime to neutralise surface acidity and prevent future subsurface acidity
- Choosing nitrogen fertilisers carefully and applying them in smaller split applications
- Building up organic matter to make more nutrients available and improve soil structure
- Replacing the nutrients that are removed by livestock or crops

To determine whether acidity is likely to be a problem for you and how to best manage it, seek advice from your NSW DPI (agriculture) agronomist and ask them for the publication "Fertiliser for Pastures", as it is one of the best guides to correcting soil problems on the coast.

WHY ARE ACID SULFATE SOILS IMPORTANT?

Acid sulfate soils are a special case of soil acidity peculiar to the much of the floodplains. During the last major sea rise that occurred about 10,000 years ago, new coastal landscapes formed through rapid sedimentation. Bacteria in the organic rich sediments converted sulfates in the tidal waters and iron in the sediments to iron sulfides. As sea levels dropped, river-born sediments covered these iron sulfide rich sediments. As long as the iron sulfides layers remain waterlogged they cause few problems (called potential acid sulfate soils). However, if they become exposed to air (e.g. by drainage) the iron sulfides oxidise to form large amounts of sulfuric acid (actual sulfate soils). One tonne of iron sulfides can produce about 1.5 tonnes of sulfuric acid.

The release of sulfuric acid produces widespread environmental problems. As the acid moves through the soil it strips iron, aluminium, manganese, cadmium, etc from the soil. This can create soils that are so acid and toxic that few plants can survive. It can make water unsuitable for domestic, stock or irrigation use and corrode concrete, iron and steel structures. If sulfuric acid and aluminium reaches waterways in sufficient quantity, it can affect the entire aquatic food chain: altering plant composition, increasing fish diseases and occasionally causing massive fish kills.

Because of the environmental risk from acid sulfate soils, councils have placed controls on any activities that are likely to disturb, expose or drain acid sulfate soils (e.g. dam building and drain cleaning). Developments requiring council approval are listed in Local Environmental Plans available through your local council.

The best way to manage acid sulfate soils is to know where they occur on your property and how far they are below the surface. This information can be obtained from environment officers in the shire councils, who can help determine your properties risk to acid sulfate soils (they have acid sulfate risk maps developed by the Department of Natural Resources), how they are best managed and what developments require approval.

WHY IS SOIL FERTILITY IMPORTANT?

With some exceptions (e.g. alluvial soils on the floodplains and along rivers), coastal soils are mostly old, leached and of low to moderate fertility. Generally, there are a multiple nutrients that are less than optimal for plant growth. These deficiencies: reduce the productivity of the land; limit the type of agricultural enterprise that can be run; make it harder to maintain high levels of ground cover; and increases the risk of erosion

Soil tests are the most reliable way to determine what nutrient deficiencies are present. Soil analyses can be processed through local produce stores or directly with the testing companies. It is best to talk to your produce store and NSW DPI (agriculture) agronomist to determine the pros and cons of different tests.

While soil tests are the best way to determine the fertility status of soils, the colour of the soil (darker soils are usually better than lighter soils) and what plants are present can act as a guide in many situations. For example, carpet grass and spotted gum are most abundant on acid, lower fertility soils, while kikuyu and flooded gum are more abundant on soils with good water availability and higher fertility. However, plants composition can also be also influenced by other past and present factors, so it is best to consult your NSW DPI (agriculture) agronomist for further advice.

Nitrogen and phosphorus are the most widespread and limiting nutrients to plant growth in the region. Nitrogen can be obtained from legumes, which fix nitrogen from the air; or from fertilisers. However, in pasture situations it is rarely economical to apply nitrogen fertilisers. Hence, the most commonly used method to increase pasture production has been to add phosphorus in fertiliser to boost legume production, which then make the nitrogen available to grasses as they decompose. For other common nutrient problems, read “Fertiliser for Pastures”, available from NSW DPI (agriculture) offices.

To maintain the fertility of your soil:

- Test the soil regularly. How often the tests need to be taken depends on how much product is being removed from the property (e.g. dairies and croppers need to test every year; high stocking-rate beef cattle every 2-3 years and low stocking-rate beef cattle every 4-5 years)
- Replace the nutrients that have been removed
- Correct soil acidity to make nutrients available
- Recycle the soils nutrients.
 - Try to ensure that livestock manure is returned to the paddock where the original feed was grazed – rotational grazing helps here
 - Encourage soil organisms, such as earthworms and dung beetles
- Increase soil organic matter by such practices as retaining stubble, growing cover crops, mulching, including a pasture phase in a cropping system, and keeping soil disturbance to a minimum
- Include legumes in the pastures. This boosts nitrogen availability.



Soil Profile Bellbrook. © NSW DPI

All fertilisers, whether natural or man-made, have the potential to cause environmental problems such as ground water pollution, eutrophication of waterways or soil acidification. Problems usually occur when fertilisers are applied too close to dams or streams, just before heavy rains (especially when the ground cover is low) or too high a rate is applied. Always seek advice on suitable rates and types of fertilisers to use from your NSW DPI (agriculture) agronomist or produce store agronomist.

WHY IS ORGANIC MATTER IMPORTANT?

Organic matter is any living or dead animal or plant material and on farms it is primarily composed of plant litter and animal manures. It acts as a major source of nutrients for plants and as glue that improves soil structure (see below). This in turn, reduces the chance of soil erosion, improves drainage and increases water storage. Organic matter is concentrated towards the soil surface. Any reduction in organic matter (from regular cropping, soil inversion by ploughing, over-grazing, etc) can lead to poorer plant growth and increased soil erosion.

Soil organic matter levels can be maintained or increased by: including a pasture phase in a cropping system; incorporating green manure crops; growing productive perennial pastures; not overgrazing pastures; adding manure and bulky organic manures (e.g. chicken litter); encouraging dung beetles; and keeping soil disturbance to a minimum.

WHY ARE SOIL DEPTH AND SOIL STRUCTURE IMPORTANT?

When some house bricks are ground up and their nutrient content analysed, they appear to have the right balance of nutrients for plant growth. Obviously, however, house bricks are poorly structured for growing plants. The same is true of soils; they may have a good nutrient balance, but be poorly structured for plant growth.

Soil structure refers to the arrangement of soil particles into aggregates (the small clumps or clods that soils break up into when they are dug up) and the spaces between the aggregates. Soil structure determines how easily air and water can penetrate the soil and drain away, and whether the aggregates hold enough water for plant growth.

Soil structure combined with soil depth determines a soil's suitability as a growing medium for plants (also known as a soil's physical fertility).

Soil structure can be maintained or improved by:

- Increasing soil organic matter levels
- Removing stock from wetter paddocks
- Keeping vehicles and farm machinery off wet paddocks
- Maintaining a dense cover of perennial pasture
- Placing fences strategically, so that stock can be kept off wetter areas when needed
- Slashing or mulching paddocks rather than burning them
- Minimising soil disturbance
- Cultivating only when the soil moisture is right
- Deep ripping only if a compaction layer is present

For further information on managing soil structure, talk to your local NSW DPI (agriculture) advisors.

HOW SHOULD SOILS BE MANAGED TO KEEP THEM HEALTHY?

Because of the variability in soils across the region, the potential of your property and the limitations of its soils should always be assessed before undertaking any land management activities. Your local NSW DPI (agriculture) agronomist and Northern Rivers Catchment Management Authority can provide advice on these matters.

Two useful workshops that are available from NSW DPI (agriculture) are:

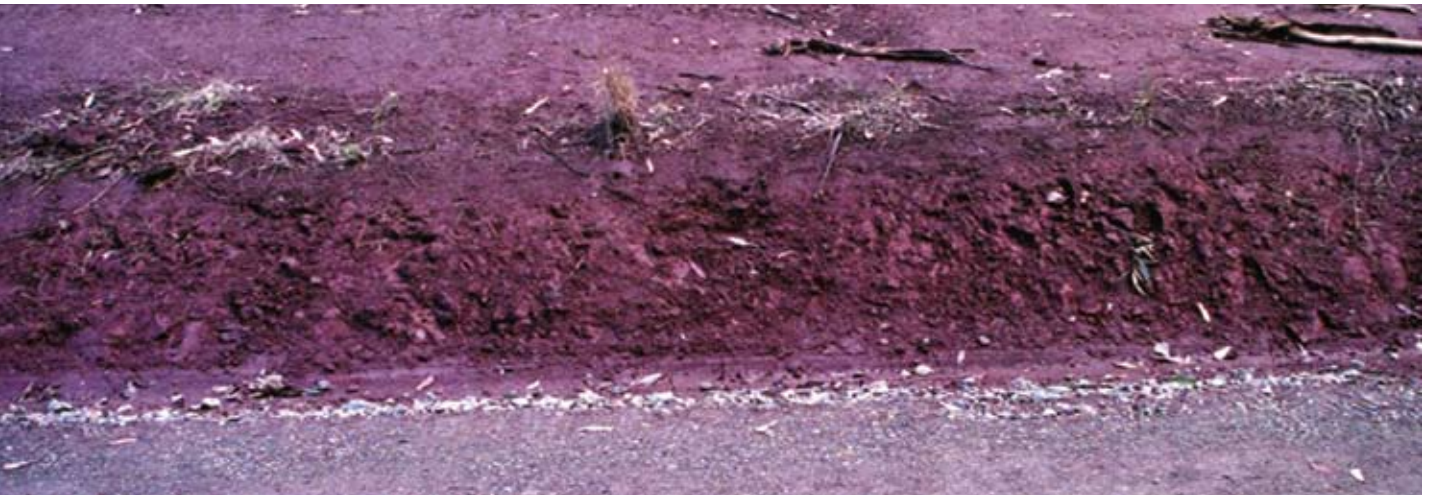
- “Landscan”. This is a workshop series that shows landholders how to assess the natural potential and limitations of their properties using soil, slope and aspect
- “Soil Health” field days, which gives landholders some simple tools to assess the chemical and structural fertility of their soils.

One of the most useful overviews of soil management on the north coast is provided by the book “Soil Sense: Soil Management for NSW North Coast Farmers”, which is available from NSW DPI. It describes the main soils on the north coast; the soil management techniques needed for each of the region's main agricultural enterprises and provides a farmer's A-Z of soil terms.

NSW DPI (agriculture) also has numerous free soil related publications on its website (www.agric.nsw.gov.au). Many of these publications are also listed in the NSW DPI publication catalogue in this kit. High levels of plant ground cover are essential for most soils on the coast to reduce erosion and sustain the production potential. Ground cover percentages that are required will depend on the erodibility of the soil and steepness of the land. However, most coastal soils require a minimum year-round cover of 90-95%. Drainage lines and steep areas are more prone to soil erosion due to greater volumes of water flow and higher flow rates, respectively. These areas should have 100% ground cover year-round.

In essence, maintaining healthy soils is about: maintaining healthy vegetation, high levels of ground cover and appropriate levels of fertility; addressing acidity; minimising soil disturbance and avoiding compaction. For other tips on maintaining healthy soils, read “Managing soils to keep them healthy and productive” in the supplementary pack.

Calcareous shale on Willi Willi Rd. © NSW DPI



Pastures

WHAT TERMS DO YOU NEED TO KNOW?

When discussing pastures it is useful to understand the following terms, as they are often confused:

- Native species are those that were present before European settlement (e.g. kangaroo grass and pitted bluegrass). Native pastures are pastures where native species predominate.
- Introduced species are plants that have been introduced from outside Australia (e.g. setaria and Rhodes grass).
- Improved pastures are where some management practice has substantially lifted production or quality (e.g. where clover and superphosphate have been oversown into native pastures or introduced species have been sown into a ploughed paddock)
- Naturalised species are plants that were originally introduced, but now do not require the intervention of people to persist (carpet grass and paspalum). Naturalised pastures are where production is dominated by naturalised species, but native species may still be abundant.

WHY DO I NEED TO KNOW ABOUT PASTURES?

For most landholders it is essential to be able to identify pasture species and know how to manage them as pastures form the basis of much of the agricultural production of the region. Mismanagement can lead to weed invasion, soil erosion and loss of profits.

Pasture species composition is a major determinant of pasture productivity, and hence, the type of stock enterprise that can be run and likely performance of the stock. Pasture species also provide information about the soils and/or previous management on a property (e.g. elastic grass grows on compacted soils, blady grass is abundant where pastures are regularly burnt and kikuyu prefers high fertility conditions).

A number of pasture species are noxious weeds (e.g. giant par-rattata grass) and are required to be controlled under the Noxious Weeds Act 1993 (see “Weeds” in this kit). Controlling noxious and other problem weeds also makes for good neighbour relations. Other pasture species can cause stock problems at certain times of the year (e.g. white clover and bloat in cattle, setaria and bighead in horses).

Knowing these potential problems helps in managing the pastures. Native pasture management is regulated by the Native Vegetation Act 2003 (see “Native Vegetation” in this kit”) and certain management activities (e.g. ploughing) need a permit. See your local Northern Rivers CMA for more information.

WHAT ARE THE CHARACTERISTICS OF THE PASTURES OF THE NAMBUCCA, MACLEAY AND HASTINGS VALLEYS?

Due to the high, summer-dominated rainfall and relatively warm winters, pasture production in the area is best suited to, and is dominated by, tropical and subtropical warm-season growing perennial grasses. Most of the more fertile land and lower slopes are dominated by sown and naturalised species. The most common species (all naturalised) are kikuyu, carpet grass and paspalum. Kikuyu dominates more fertile and deeper soils, where drainage is reasonable (e.g. floodplains). Carpet grass and paspalum are most abundant on lower-fertility, shallow soils or those that suffer impeded drainage and that have previously been disturbed (e.g. hill country that was under cultivation in previous decades).

In the earlier days of agriculture in the region, virtually all land that was accessible by machinery was sown to introduced species. Hence, native pastures are only common where the soils are poor (shallow, steep or rocky) and/or machinery can’t gain access. Native pastures form about 1/3 of the dryland pastures of the Macleay, but probably less in the Nambucca and Hastings (generally better soils). Swamps are also dominated by native species: wetlands being a valuable grazing resource, as well as providing major bird habitat and fish breeding grounds. Even though native species are less dominant than naturalised and sown pastures, there are far more species and form an important store of native biodiversity. The most common species are kangaroo grass, blady grass, pitted bluegrass and barbed-wire grass.

The dual challenges of pastures of the area are related to quantity and quality. Pastures have a relatively short growing season (mostly late spring to early autumn) and produce little or no growth over winter.

During the growing season, pastures can quickly get away from stock and rapidly lose quality as they mature. Slashing is the main tool used throughout the valleys to maintain a better level of pasture quality (and control weeds). It is also relatively difficult to maintain legumes at desirable levels, due to adverse climate (rain at wrong time of year) and soils (too acid and low in phosphorus). Legumes are desirable as they provide nitrogen for grass growth and are high quality pasture components.

The two main ways of meeting these challenges is 1) by matching stock enterprises to the pasture production cycle (e.g. weaner production) and 2) modifying pasture production to match the stock enterprise needs (e.g. using lime and phosphorus fertilisers to lift legume production, and silage making).

While winter growing grass species could fill the winter feed-gap, the region’s low winter rainfall and hot wet summers are generally unsuited to perennial winter-growing species. While species such as phalaris, fescue and cocksfoot were sown in the past, they rarely survived more than 1 or 2 seasons. Winter-growing annual species have been more successful, with annual ryegrass commonly sown into kikuyu pastures.



HOW DO I KNOW WHAT PASTURES I HAVE?

Your NSW DPI agronomist can identify pasture plants for free. See your local NSW DPI (agriculture) for more information and the attached “How to Collect Plants for Identification”. While samples can also be identified by the National herbarium, they charge landholders. Samples sent through NSW DPI (agriculture) incur no charge.

- The botanic gardens at Coffs Harbour also identifies plants for a small donation
- NSW DPI (agriculture) runs one-day “Native and Naturalised Grasses” and “Paddock Plants” workshops. See NSW DPI (agriculture) in Kempsey for more information.
- NSW DPI (agriculture) in Kempsey sells a booklet “Grasses of the Mid North Coast” that describes the most common paddock grasses of the area. They also sell a computer CD “Common Pasture Plants of the Macleay Valley” describing some 120 common pasture grasses and herbs. See NSW DPI (agriculture) in Kempsey for more information.
- NSW DPI (agriculture) can provide a wide range of other publications that can help you identify your pastures. These are listed in their publications catalogue in the supplementary pack or visit www.agric.nsw.gov.au/reader/pastures

HOW DO I MANAGE MY PASTURES IF I DON'T HAVE STOCK?

If you are living in a bushfire prone area, a build-up in pasture mass can be a serious fire hazard for you and your neighbours. You need to maintain firebreaks and asset protection zones (see fire management later).

To control pasture build-up, consider:

- Agisting stock, if your external fences are in good condition (see your stock and station agent for more information). Having a written agreement stating all conditions of the agistment avoids misunderstandings. Note that if your boundary fences aren’t in good condition, you may be liable for any damages caused by stock wandering from your property
- Slashing. If you only have a small area or you are not mechanically minded, contract slashing may be the best option: your neighbours will probably know a local contractor. If you intend to buy your own tractor and slasher, consult experienced neighbouring farmers as to the most appropriate machinery for the job (e.g. in steep or boggy country a 4-wheel drive tractor may be needed)
- Fire can be used as a hazard reduction tool in particular situations (see fire management later), but is not recommended as a general pasture management tool across a property. Burning can lead to adverse changes in pasture composition (e.g. increased percentage of the fire tolerant blady grass), increased erosion (as ground cover is reduced or lost) and weed invasion (reduced pasture composition unless great care is taken)
- Always control noxious and other problem weeds (see “what weeds have I got?”). Your control options will depend on the weed species and level of infestation. See your NSW DPI (agriculture) agronomist for more information
- Consider whether you need pastures at all. Is the area better suited to forest?

HOW DO I MANAGE PASTURES IF I HAVE STOCK?

While it is possible to run stock on pastures with only limited pasture knowledge, it is more likely that: adverse changes will occur without your realising the causes (e.g. regular burning causing the spread of blady grass, loss of biodiversity and soil erosion); it will be more difficult to get through the hard times; and profitability will be reduced. What pastures should be grown, where they should be grown and how they should be managed is a complex topic that depends on what mix of enterprise, landscape and soils are present.

General principles for good pasture management include:

- Thoroughly plan before undertaking pasture improvement
- Always spend money first on areas which will give the greatest return – these are generally the flats, but only soil testing will tell.
- Always maintain appropriate levels of groundcover (in most situations 90%)
- Fence for better stock management and better pasture utilisation
- Supply adequate watering points so that livestock utilise as much of the pasture as possible. The further pasture is from a watering point, the less likely it is to be utilised
- Assess soil chemical and structural fertility to know what are the most limiting factors to plant growth (see “Soils” in this kit)
- Apply sufficient fertiliser (man-made or organic) to meet the needs of the pasture species that are present.
- Know what pasture quantity and quality livestock require (and when), to help determine what type of pasture management would best match their needs.
- Sown and naturalised pastures need a well adapted and persistent legume component. Without it, desirable grasses will often be replaced by less desirable ones and stock performance reduced.

Pastures along Nulla Nulla Creek, © NSW DPI



There are a number of sources available to build the knowledge that is needed for good pasture management:

- Your local NSW DPI (agriculture) agronomist or produce store agronomists can provide property specific advice as well as generalised advice.
- Prograze, a workshop series run by NSW DPI (agriculture), is designed to develop skills in pasture and livestock assessment and management.
- Landscan, a workshop series run by NSW DPI (agriculture), is designed help landholders develop skills and knowledge to assess their natural resources (pastures, vegetation, soils and topography) and better manage land use.
- NSW DPI (agriculture) also offers short courses on sowing pastures and silage making. Check with your local office to find when and where these will be held
- Check your local paper for field days being run by various organisations.
- NSW DPI (agriculture) publishes a wide range of information on pasture management. These are available from your local NSW DPI (agriculture) office and on the web at www.agric.nsw.gov.au/reader/pastures
- Primernotes CD is a collection of about 5800 information sheets dealing with agriculture and natural resource management. It's available through NSW DPI (agriculture).

Native Vegetation

WHAT IS NATIVE VEGETATION?

Native vegetation is any plant species that existed in NSW before European settlement. This includes trees, saplings, shrubs, scrub, understorey plants, groundcover (any type of herbaceous vegetation) and wetland plants.

WHAT IS THE VALUE OF NATIVE VEGETATION?

Just part of the value of native vegetation is that it;

- provides pasturage for stock in difficult areas, where introduced pastures are unsuitable
- shelters stock from rain, wind and heat, improving their comfort and performance
- protects horticultural crops, increasing their yields
- shades and cools streams and dams, providing better quality drinking water and fish habitat
- filters water runoff, reducing nutrients leaving the land and causing algal blooms in streams and dams
- harbours wildlife; many of which help control agricultural insect pests
- stabilises soils and reduces erosion
- improves the value of properties
- provides aesthetic value
- supports biodiversity and ecosystem function

HOW ARE NATIVE AND INTRODUCED VEGETATION DIFFERENT?

While introduced vegetation provides many of the same functions (see above) as native vegetation, it usually lacks certain valuable aspects such as;

- native pastures are adapted to low nutrients, acidity and drought and so can provide ground cover and stock feed on steep, unfertilised and shallow soils, where introduced pasture is unsuitable or too expensive to sow
- native grasses often form tall erect tussocks with spaces between plants; this provides valuable habitat for ground living birds, lizards, etc. Many introduced grasses are too dense or low growing to form a useful habitat (e.g. low dense mat of carpet grass)
- native forests typically have a high plant biodiversity. Few species tend to be sown in introduced plantations and their more uniform age and structure provides a less diverse habitat for other species to exploit (e.g. epiphytic orchids and ferns).
- native vegetation maintains a higher diversity of animals than its introduced equivalent. Many native animals are adapted to a diet of particular native plant species (e.g. koalas). The greater number of plant species and ages in native vegetation also provides a more diverse food source that is spread throughout the year.



Dry sclerophyll forest. © Joy van Son.

WHAT TYPES OF NATIVE VEGETATION ARE THERE ON THE MID NORTH COAST?

The mid north coast has a very diverse range of native vegetation communities including rainforest, wet sclerophyll forest, dry sclerophyll forest, grassy woodlands, heathland, swamp sclerophyll forest, freshwater wetlands, estuarine and saline wetlands and grasslands.

The type of community can be a useful indicator of soil type and water availability. Rainforests occur on soils with the highest phosphorus and water availability. As soil fertility soil drops, eucalypts become more common. Wet sclerophyll forests (understorey with softer leaves such as rainforest plants and ferns) occur on the more fertile soils with good water availability (e.g. soils of the Nambucca beds).

On drier low-phosphorus soils (e.g. low-fertility shallow soils of the Kempsey Hills), dry sclerophyll forest (understorey with tough leaves such as acacias and heath) becomes more common. An abundance of kangaroo grass, blady grass and bracken in the understorey of sclerophyll forests is usually a sign of too frequent burning.

Heathlands occur on very low fertility soils, usually sands along the coast. However, it is not unusual to see scattered heath growing in hillslope pastures where soils are shallow and periodically waterlogged. Swamp sclerophyll and wetlands occur on the floodplains where soils are periodically or permanently waterlogged.

Native grasslands are usually a good indication of soils that are unsuitable for intensive agriculture (e.g. crops or sown pastures). They mostly occur on soils that are not suitable for cultivation (e.g. steep, rocky) or are agriculturally poor (e.g. sandy, very acid, shallow or waterlogged soils). At the start of European settlement grasslands were not common (mostly along rivers), although grassland species also occurred in the understorey of forests. Extensive forest clearing for agriculture up until the 1940s, expanded the distribution of grasslands.

However, cropping and intensive pastures removed most native species, except where these practices were not suitable. Today grasslands dominated by native species usually only occur where machinery couldn't be taken or where it was uneconomical to plough.

WHAT ARE THE HAZARDS TO NATIVE VEGETATION?

In the early days of settlement, the greatest hazard to native vegetation communities was widespread clearing. Early settlers cleared large tracts of forest, mostly for beef cattle and sheep grazing. Towards the end of the 1800s dairying was taken up and rapidly expanded, until by the 1930s there were more than 1200 dairies in the Macleay alone. This increase in farming intensity led to further clearing; pasture improvement; and cropping in areas where today it wouldn't be considered viable. Frequent burning was also widely used to promote early spring pasture growth and for bushfire hazard reduction. This further reduced the extent of some communities (e.g. rainforests) and changed the structure of most others. For example, forest understoreys became grassier; there was less diverse habitat (e.g. fallen logs and tree hollows) and fewer species, while native grasslands were increasingly dominated by blady grass, a fire tolerant species.

The coastal floodplains also underwent significant changes. Originally, the floodplains were naturally inundated by water for long periods and wetlands covered much of the area. This limited the use of the fertile soils for dryland agriculture. Hence, in the 1900s, large-scale drainage works (mostly in the Macleay) were undertaken to remove floodwaters more rapidly and allow for the expansion of dryland agriculture, especially dairying. This led to the loss of considerable tracts of wetlands.

Since the mid 1900s, the profitability of agriculture has declined and less profitable areas have been taken out of production. In these areas widespread forest regrowth has occurred. Today, the greatest hazards to native vegetation communities on the mid north coast is no longer widespread clearing, but the degradation of what is left. Many communities are fragmented and substantially modified by disturbances such as grazing, overly frequent fire, logging and weeds.

Modified forests are not as valuable to biodiversity as the original old growth forests. Old growth forests are mature or over-mature forests that contain large old trees with many hollows and dead branches. They tend to have a more diverse understorey structure and species composition than other forests. These forests have been reduced to about 10% of their original extent and need to be conserved wherever present, as their loss has serious consequences for biodiversity in the area.

Where native vegetation has become fragmented the patches created become isolated, especially where the land between is substantially altered for farming activities. This leads to a breakdown in species migration, dispersal, pollination and other functions required for functioning of the habitats. Ultimately, as the patches shrink, biodiversity declines, sensitive species become locally extinct and weeds invade. To maintain the functioning and value of native vegetation these patches need to be linked by corridors within properties, between properties and at the regional level.



Bowraville Nature Reserve. © Joy van Son.

HOW CAN NATIVE VEGETATION BE IDENTIFIED?

There are no guides that cover all the native plants of the mid north coast. Unless you are experienced with plant identification, it is often most efficient for landholders to have an advisor identify their plants. However, no agency deals with all plant communities and the species they contain, so you may need to visit several sources including

- Coffs Harbour botanic gardens herbarium
- Botanical information service, Royal Botanic Gardens, Department of Environment and Climate Change, Sydney
- Agronomists in NSW Department of Primary Industries (agriculture) at Kempsey and Taree (pastures, some bushes and trees)
- Environmental officers in the Kempsey or Port Macquarie-Hastings councils (wetland plants)
- National Park rangers in the National Parks division of the Department of Environment and Climate Change (most natives)

It is best to ring ahead to ensure that someone can identify your plants. Also, read "Plant Collecting and Identification on the Farm" in the supplementary pack to ensure the plant sample is suitable for identification. Alternatively, if you develop a Property Vegetation Plan (see management) through the Northern Rivers Catchment Management Authority, you will receive a property map and an assessment of the native vegetation present.

There are a number of useful books/CDs to help landholders identify native plants. Many of these are available from local libraries:

"Eucalypts and Angophoras of the North Coast of NSW" by CL Bale (1996). Available from the United Campus Bookshop, University of New England, Armidale;

"Wildflowers of the North Coast of New South Wales" by B Kemp (2005);

"Common Pasture Plants of the Macleay Valley" by H. & C. Rose (2006). Available from NSW DPI (agriculture) at Kempsey;

"Common Indigenous Trees of the Wallamba Valley and Surrounds" by Dyers Crossing Landcare Group Inc. (2005). Available from Dyers Crossing Landcare Group Inc, c/o Karuah Great Lakes Landcare Management Committee Inc., PO Box 3, Nabiac, NSW, 2312;

"Trees and Shrubs in Rainforest of New South Wales and Southern Queensland" by JB Williams et al (1984). Available from the United Campus Bookshop, University of New England, Armidale;

"Rainforest Climbing Plants. A Field Guide to their Identification" by GJ Harden, JB Williams, W McDonald (2007). Gwen Harden Publishers. Available from gwenharden@yahoo.com.au

"Field Guide to Eucalypts" Volume 2 by MIH Brooker and DA Kleinig (1990);

"Waterplants of New South Wales" by GR Sainty and SWL Jacobs (1981). Available in libraries;

"Wetland Plants of Queensland. A Field Guide" by KM Stephens and RM Dowling (2002).

NSW DPI (agriculture) runs "Native and Naturalised Grasses" workshops, which covers how to identify and manage native species. Contact the agronomist in NSW DPI (agriculture) at Kempsey. Other workshops and field days on native vegetation are run by many different organizations in the region, so it is worthwhile joining your local catchment network to stay informed (see your Landcare community support officer).

HOW CAN THE QUALITY OF NATIVE VEGETATION BE ASSESSED?

Assessing the health of your remnant vegetation is the first step in restoring the health of the native vegetation on your property. Unlike other areas of the farm, untidiness is a positive feature of native vegetation: over-mature trees, dead trees, fallen logs, bush rocks, tree hollows and a diverse understorey of saplings, bushes and groundcovers are all vital to conserving biodiversity. Useful tips for how to assess your native vegetation are included in the tips and tools information sheet from Meat and Livestock Australia "Native Vegetation 1: Assessing the condition of remnant vegetation" in the supplementary pack. For a more comprehensive guide, read "Vegetation Survey and Assessment – a Practical Guide for the Management of Native Vegetation" (2004), which is available from Tocal College, NSW DPI (agriculture).

HOW CAN NATIVE VEGETATION BE BEST MANAGED?

A good overview to the management of native vegetation is included in the tips and tools information sheets from Meat and Livestock Australia: "Encouraging Biodiversity Benefits"; "Native Vegetation 2: Improving the Value of Remnant Vegetation"; and "Native Vegetation 3: Revegetating the Farm" found in the supplementary pack

Expert advice in all aspects of the management of native vegetation is somewhat fragmented, partly because there are different goals (production, conservation) and many types of habitats. The best initial contacts are the Northern Rivers Catchment Management Authority and Landcare, as they have networks of contacts in native vegetation management and can advise as to what funding and training is available.

Other useful sources of information and advice can also be obtained from:

- National Parks division of the Department of Environment and Climate Change for conservation of most habitats. They also offer a range of conservation schemes (view at www.nationalparks.nsw.gov.au/npws.nsf/Content/conservation_partners)
- agronomists in NSW DPI (agriculture) at Kempsey and Taree for production and conservation of native pastures
- Wetlands Australia for all aspects of wetlands
- environmental officers in the Kempsey or Port Macquarie-Hastings councils (wetland plants)
- private consultants (see "Environmental and/or Pollution Consultants" and "Natural Resource Consultants" in the yellow pages) for all habitats and management goals

While there are many books that are relevant to vegetation management, much of the information is available on the web. Hence, only five books of a practical nature are included here:

"Plan for Trees – a Guide to Farm Revegetation". Available from Tocal College, NSW DPI (agriculture)

“Bushland Resources Kit”. Although designed for the Hunter Valley, all the principles and many of the habitats are the same as the mid north coast. Covers assessment and revegetation. Available from the Hunter Catchment Management Trust. Also available as a pdf file at www.hcmt.org.au/Bushland_resource_kit.php3.

“Revegetating Streams in the Nambucca Catchment. A Guide to Species and Planting Methods” Available from Nambucca Landcare

“Revegetating Streams in the Macleay Catchment. A Guide to Species and Planting Methods” Available from Macleay Landcare

“Revegetating Streams in the Hastings Catchment. A Guide to Species and Planting Methods” Available from Landcare in Hastings Landcare

Nearly all organizations provide their information on the web, which is now becoming the best place to access information. There are enormous numbers of articles available on every aspect of native vegetation management.

The following will help you quickly link to them:

- www.naturalresources.nsw.gov.au for rules on vegetation clearing and many other issues
- www.npws.nsw.gov.au for biodiversity information and conservation management
- www.environment.gov.au for links to local, state and federal information
- www.wetlandcare.com.au and www.naturalresources.nsw.gov.au/care/wetlands/ for wetland management
- www.rivers.gov.au for riverine vegetation management

WHAT RULES CONTROL THE MANAGEMENT OF NATIVE VEGETATION?

While there are many pieces of legislation that may impact the management of native vegetation in rural NSW, the two major pieces of legislation are the; 1) Environmental Planning and Assessment Act 1979 and 2) Native Vegetation Act 2003.

The Environmental Planning and Assessment Act 1979 controls the extent and conditions of development on public and private land. Councils administer the Act at the local level through the development of local environment plans. The planning laws are quite complex and undergoing change, so it is best to refer to council before undertaking any development.

The Native Vegetation Act 2003 is the principle legislation controlling the management of native vegetation in rural NSW and is administered by regional Catchment Management Authorities. The key objective of the Act is to prevent clearing unless it improves or maintains environmental outcomes. Details of the legislation can be obtained from the Northern Rivers Catchment Management Authority, who has published a series of information sheets on the Act. The following is a brief outline of the Act and some of its implications for landholders.

The Act defines three types of native vegetation: remnant, protected regrowth and unprotected regrowth.

For the mid north coast, remnant vegetation is defined as any vegetation that has regrown before the 1st January 1990. However, remnant vegetation also remains remnant if it has regrown following illegal clearing or following clearing by natural causes (flood, drought, etc). Regrowth is any vegetation that has regrown since 1st January 1990. Protected regrowth is native vegetation that has been grown or protected for biodiversity conservation purposes with the assistance of public funds or is recognised as protected growth in a property vegetation plan, environment plan, natural resource management plan or interim protection order. If none of these circumstances apply, then it is classed as unprotected regrowth.

The Act makes it an offence to clear native vegetation unless:

- there is an approved property vegetation plan
- development consent has been obtained
- the vegetation is unprotected regrowth
- for certain types of groundcover
- for approved routine agricultural management activities (RAMAs)
- for continuation of existing cultivation, grazing or rotational farming practices; or for sustainable grazing

The Act does not apply to certain types of clearing authorised under other legislation, such as the Rural Fires Act 1997, State Emergency and Rescue Management Act 1989, etc.

A property vegetation plan is a voluntary, but legally binding, agreement developed in conjunction with your catchment management authority. It may address matters such as thinning, clearing, identification of regrowth and the continuation of farming practices. A property vegetation plan is the primary means by which landowners can take advantage of funding being offered by the government for conservation on private land (e.g. fencing, off-stream water supplies and weed control).

RAMAs are farming, safety and other activities where necessary clearing of native vegetation does not require approval under the Native Vegetation Act 2003. These activities and the extent of clearing permitted on the north coast is defined in the information sheet “What are the exemptions for routine agricultural management activities in coastal CMAs?” in the supplementary pack.

Where illegal clearing is occurring, CMA officers have the power to stop the work, order remedial work and undertake criminal prosecutions.

Weeds

WHAT IS A WEED?

Weeds are simply plants growing where they are not wanted. They may be any species of plant, including algae, ferns, grasses, forbs, vines, shrubs and trees.

WHY CARE ABOUT WEEDS?

Rural landholders need to be aware of the different weeds on their properties as different species can

- Poison stock (e.g. red lantana)
- Reduce pasture production and quality (e.g. giant Parramatta grass)
- Harbour pest animals (e.g. lantana and rabbits)
- Cause injury (e.g. spear thistle)
- Degrade natural habitats (e.g. cat's claw creeper smothers riverine vegetation)
- Increase soil erosion (e.g. willows along streams and annual weeds in pastures)
- Taint milk and meat products (e.g. Hexham Scent)
- Host diseases of useful plants

For rural landholders on the mid north coast, weed control often represents a considerable cost in both time and money. This is because the climate is ideal for weed growth and weeds often grow in areas that are difficult to access with machinery. Control costs tend to rapidly increase, and available control options decrease, with weed density and extent.

WHAT TYPES OF WEEDS ARE THERE?

There are several terms for weeds that are often confused by landholders and which can have important implications for actions landholders need to take. Noxious weeds are plants that are declared to be noxious under the Noxious Weeds Act 1993. To be declared noxious, a weed must have a detrimental effect or cause serious economic loss to agriculture, to the environment or human health. However, a weed meeting these criteria will only be declared noxious if there is a reasonable and enforceable means of controlling the weed (e.g. although fireweed is a serious weed of pastures, it is not declared noxious in the Macleay or Hastings as it is no longer regarded as feasible to control it). The declarations may be on a state or local basis, each district on the mid-north coast having its own declarations.

The Noxious Weeds Act 1993 requires that landholders and/or the occupiers of land must control noxious weeds on land under their control. Occupiers may also be responsible for noxious weeds along riversides or other watercourses and on adjoining unfenced roads even though the land is not their property. Each noxious weed is given a category that specifies the degree of control that is required (see “Noxious Weed Guide for the North and Mid North Coast” in this kit for explanation).

On the mid-north coast, local councils are responsible for enforcing control of noxious weeds on council land, private land and vacant crown



Fire weed in paddock, South Arm Rd. © Joy van Son

land. Each council employs a weeds officer whose duties include the inspection of private land for the presence of noxious weeds on private property. Where noxious weeds are found, the officer will notify the landholder and provide control advice. If they are not satisfied reasonable and effective measures have been undertaken they can resort to legal action, issuing fines or undertaking control measures at the owner's expense.

Noxious weeds that are currently the most costly for rural landholders on the mid north coast are giant parramatta grass, red-flowered lantana and fireweed. However, for a full list of noxious weeds in each district, see the “Noxious Weed Declarations” in the supplementary pack.

Poisonous weeds are weeds that are toxic to stock and/or humans. There is no legal obligation for poisonous weeds to be controlled unless they are also declared noxious, but it is in the best interests of landholders who are carrying stock to do so. Many stock die each year in the region from eating poisonous plants, so an animal's natural instinct to know which plants are good for them cannot be relied on. Poisoning can occur whether an animal has been on the property its entire life or has just been moved from another area. The seriousness of a poisonous weed depends on the weather and the plant's toxicity and palatability (e.g. mother of mil-

lions is highly toxic, but rarely eaten: however, during drought it may be eaten as nothing else is available). Some of the most prevalent poisonous weeds for rural landholders on the mid north coast are red-flowered lantana, bracken, green cestrum and crofton weed (for horses).

Environmental weeds are plants that invade natural areas. Some of the effects of environmental weeds are that they: impede or suppress natural vegetation; prevent regeneration of indigenous plants; disrupt or displace native animals; and create habitat for pest animals. Environmental weeds are the major threat to conserving, restoring and rehabilitating native vegetation on the mid north coast. Generally, plant communities will naturally regenerate if weeds are suppressed: hence, weed management is the primary tool for conserving native vegetation.

Some of the most costly and aggressive environmental weeds for rural landholders on the mid north coast are red-flowered lantana, cat's claw creeper, madiera vine and water hyacinth.

Agricultural weeds are plants that have a detrimental affect on agricultural production. They may affect grazing enterprises by replacing desirable species e.g. Giant Parramatta grass, inhibiting stock from grazing e.g. dense stands of spear thistle or poisoning e.g. fireweed. Some of the agricultural weeds that are widespread and resulting in significant costs are red-flowered lantana, giant parramatta grass, fireweed, bracken and spear thistle.

Whether a weed is a noxious, environmental or agricultural weed will depend on the location e.g. fireweed is only declared noxious in the Nambucca shire. Also, while bahia grass is a valuable grass on shallow soils in the upper parts of the valleys, it's regarded as a serious agricultural weed on floodplains due to its ability to outcompete the more valuable grass, kikuyu.



Fire Weed. © Joy van Son.

HOW CAN WEEDS BE IDENTIFIED?

Where weeds are found it is essential to get them positively identified as the species determines;

- the seriousness of the weed (giant parramatta grass is far more serious than african parramatta grass);
- how it is spread (fireweed has wind blown seed, while parramatta grasses have sticky seeds that are spread by stock and vehicles);
- what management practices may need to change to prevent re-infestation (spear thistle flourishes where there is high nitrogen availability)
- the timing and methods of weed control (much money is often spent using the wrong chemical on the wrong weed).

There are no guides that cover all the weeds of the mid north coast. Hence, it is often most efficient for landholders to have one of the following advisors identify their weeds and provide management advice:



Spear Thistle. © NSW DPI



Giant Parramatta Grass. © Joy van Son.

- Agronomists in NSW Department of Primary Industries (agriculture) (NSW DPI (agriculture)) at Kempsey and Taree for pasture and cropping weeds;
- Horticultural Officer in NSW DPI at Coffs Harbour for horticultural weeds;
- Noxious Weeds officers at Nambucca, Kempsey or Port Macquarie councils for noxious weeds;
- Agronomists at local agricultural produce stores for agricultural weeds;
- Private consultants (see “Environmental and/or Pollution Consultants” and “Natural Resource Consultants” in the yellow pages) for all weeds
- Landcare officers in each valley

Where the above advisors cannot identify the weeds, samples can be forwarded to the Coffs Harbour Botanic Gardens herbarium and Botanical information service (Royal Botanic Gardens, Department of Environment and Climate Change) in Sydney for identification. However, these organisations do not provide management information. Read “Plant Collecting and Identification on the Farm” in this kit to ensure weed samples are suitable for identification.

There are a number of useful books to help landholders identify weeds. Many of these are available from local libraries or can be viewed at NSW DPI (agriculture) in Kempsey, Taree and Coffs Harbour

“Common Weeds of the Mid North Coast”
by C. & H. Rose (2006). See NSW DPI (agriculture) in Kempsey

“Weeds: An Illustrated Botanical Guide to the Weeds of Australia”
by B.A. Auld and R.W. Medd. (1987)

“Noxious Weeds of Australia”
by W.T. Parsons and E.G. Cuthbertson. (1992)

“Poisonous Plants: Handbook for Farmers and Graziers”
by E.J. McBarron (1983)

“Bush Invaders of South-East Australia: a Guide to the Identification and Control of Environmental Weeds Found in South-East Australia” by A. Muyt (2001)

“Noxious and Environmental Weed Control Handbook”
by R Ensby (2005). Available from NSW Dept of Primary Industries district offices

“Weed Control in Lucerne and Pastures” by J Dellow et al (2004). Available from NSW Dept of Primary Industries district offices

A range of weed information sheets and booklets are listed in the “NSW DPI publications catalogue” in this kit

NSW DPI (agriculture) runs “Weed Identification and Management” field days. Contact NSW DPI (agriculture) in Kempsey.

Tocal College in NSW DPI (agriculture) at Paterson runs various weed management workshops (see www.agric.nsw.gov.au/reader/tocal-college)

Some of the most useful weed identification and management web sites (containing photos) are

North Coast Weeds Advisory Committee at www.northcoastweeds.org.au

NSW Department of Primary Industries at www.agric.nsw.gov.au/reader/pests

Weeds Australia at www.weeds.org.au

HOW CAN WEEDS BE MANAGED?

Weed management does not equal weed elimination. It is rarely physically or economically possible to fully remove all weeds and their seeds and exclude further entry. Weed seeds are constantly being imported by means over which landholders only have limited control (e.g. wind, water; vehicles and animals). Like all plants, weeds need light, water and nutrients to grow. Situations that free these resources up increase the opportunity for weed establishment. Hence, the principles of good weed management are to limit the availability of weeds to be able to utilise these resources and limit the availability of these resources to weeds that are present.

Common situations that make these resources available to weeds on the mid north coast are;

- Poor ground cover – most weeds need an open area to establish, as this provides them with light, water and nutrients to grow. Often the openings do not need to be for long periods or large in size. Hence, maintaining high ground cover year-round is necessary to limit weed establishment. This can be achieved by: using stocking rates, fertilisers rates and species that are best suited to the conditions; controlling bushfires; limiting the use of fire as a management tool; fencing conservation areas and streams; and mulching. Sometimes decreases in ground cover can't be helped, as during (and after) droughts, floods and fires. However, good management (early destocking in drought, provision of sacrifice areas, provision of firebreaks, extra vigilance, etc) can greatly minimise these effects.
- Soil disturbance – most areas have a large buried weed seed bank, even in what appears to be pristine native vegetation. However, most weed seeds won't germinate unless they are brought to the surface by soil disturbance, as many seeds require light to germinate. Disturbance also frees up nutrients and water for weed growth. Always consider the consequences of any action that are likely to cause soil disturbance and whether a better alternative is available.

- Fertiliser usage – most native vegetation is adapted to low nutrient soils and can't fully utilise high levels of nutrients. Hence, adding moderate to high rates of fertiliser to native pastures often just frees up nutrients for use by weeds. Conversely, many desirable introduced plants (e.g. kikuyu) require high nutrient levels to be vigorous and competitive. If nutrients levels become sub-optimal, the vigour of the desired plants can drop, releasing resources for the use by weeds. Basing fertiliser applications on soil tests and plant needs will minimise weed invasion.

Weed management strategies should limit the:

- 1) entry of weeds onto the property
- 2) establishment of new weeds
- 3) spread of established weeds between areas within the property
- 4) abundance of established weeds (if they are causing problems).

Unfortunately, many landholders only address established weeds, yet this is the most costly and time-consuming strategy. Good farm hygiene can go a long way towards limiting weed entry, spread and establishment on a property

- Keep new stock in a holding paddock for up to a week to allow weed seed to pass through their system
- Don't let machinery drive across a property unless it has been thoroughly cleaned. Machinery and stock are the main means by which giant parramatta grass is spread around the coast
- Keep machinery to set tracks if it must driven on the property
- Regularly slashing along the main entrance to the property
- Use equipment in the cleanest paddocks first. Paddocks with noxious weeds should always be last.
- Have a washdown area and thoroughly cleaning equipment after use on weedy paddocks
- Only feed out introduced feeds (hay, silage) within set areas. These areas should preferably be arable, in case it needs to be resown.
- Regularly inspect for new occurrences of weeds, especially around holding yards, washdown areas, sheds, tracks, creeks and feedout areas.

Often several weed control methods will be needed, varying with the location, density and area of weed infestation, as well as the vegetation community in which the infestation occurs. Always obtain advice on the best strategy (see advisors under "How can weeds be identified?").

The main control methods available are;

Hand – cheap and useful for small infestations, but time consuming e.g. hoeing, hand pulling

Mechanical – moderate to high cost, but useful for large continuous infestations e.g. slashing, mowing or ploughing

Cultural – cheap to expensive. Often has beneficial side effects, such as more productive and profitable pastures e.g. grazing, competitive pastures or cropping in extremely weedy situations

Biological – introduced pests and diseases of weeds

Chemical – cheap to expensive, but has environmental and human hazards (the Pesticides Act 1999 places conditions on the use of herbicides – see Pesticide Usage). Generally used where the above methods are ineffective.

Other points to consider in weed management are;

- If weeds are to be removed, what will fill the gap in the short-term (e.g. placing mulch over a bared area) and long-term (re-invigorated pastures), otherwise weeds will keep returning.
- Established agricultural weeds (e.g. fireweed) in production situations are not always economical to control until they reach a certain threshold density (see NSW DPI (agriculture)).

WHAT APPROVALS MAY NEEDED TO BE UNDERTAKE WEED CONTROL?

Whether an approval is needed will depend on the location, type of weed and form of weed control being undertaken.

Listed below are the approvals that are, or may be, required from different bodies.

- Rural Fire Service approval is required to burn off in the bushfire danger period
- Council approval is required from
 - All councils to work on roadsides
 - Nambucca Shire Council on land zoned as Environmental Protection and areas identified as significant vegetation and wildlife corridors
 - Kempsey Shire Council on land zoned as Environmental Protection, for some tree species covered by a Tree Preservation Order and for earthworks on the Lower Macleay floodplain
 - Port Macquarie-Hastings Shire Council for tree species covered by a Tree Preservation Order and in land zoned as Environmental Protection
- Northern Rivers Catchment Management Authority approval may be required
 - for the control of native weed species e.g. native peach and blady grass
 - for the control of non-native weed species where the works will also clear native vegetation
 - to carry out certain earthworks within 40m of a watercourse
- Department of Lands approval is required for all activities affecting crown land unless specified in the lease.
- National Parks (Department of Environment and Climate Change) approval is required if your work will affect threatened species, populations or ecological communities or aboriginal relics or sites. Consult with National Parks if you will affect flora/fauna and require consent from councils or other departments.



Giant Parramatta Grass.

- Department of Urban Affairs and Planning approval is required if undertaking development affecting wetlands, littoral rainforests or koala habitat
- Environmental Protection Authority (Department of Environment and Climate Change)
 - a licence is required if you will pollute waterways (including herbicides)
 - a permit is required to use an unregistered pesticide, or a pesticide contrary to the label

PESTICIDE USAGE

The Pesticides Act 1999 regulates the transport, storage and use of pesticides. Pesticides include bactericides, baits, fungicides, herbicides, insecticides, lures, rodenticides and repellents. Under this act, training is compulsory for commercial users of pesticides (see "New Law for Training People Who Use Pesticides in Their Work" in the supplementary pack). If a landholder employs a contractor to apply chemicals on a property, it is their responsibility to ensure the contractor is suitably qualified. Be aware that the landholder can be held liable if they fail to provide essential information, provide wrong or misleading information, or coerce or pressure a contractor so that pesticide misuse occurs (see "Pesticides Act 1999: Your Responsibilities" in this kit).

Pesticides are often toxic to non-target organisms. Always follow the instructions on the label and never apply herbicides close to waterways unless the product is specifically designed for that purpose. Chemical users face the problem of what to do with their empty chemical containers. Since 1999 chemical users have paid a 4c a litre levy on pesticide products to fund drumMUSTER; a program to help chemical users dispose of containers. Normally drumMUSTER collections are organised by local councils. Enquire with the local council or reseller to determine when the next collection will be run. All that is required of the user is that the containers are cleaned immediately after use and stored in a safe location until collection.

For more information on pesticide usage, talk to local advisors listed under "How can weeds be Identified" or visit NSW DPI's website at www.agric.nsw.gov.au/reader/pests

NSW DPI (agriculture) also regularly publishes the free "Noxious and Environmental Weed Control Handbook" and "Weed Control in Lucerne and Pastures", which are available from their offices.

Information on the Pesticide Act 1999 are available from the Environmental Protection Agency (part of the Department of Environment and Conservation) at www.epa.nsw.gov.au

Pesticide training courses are organised by NSW DPI (agriculture) and TAFE (www.lg.tafensw.edu.au/smarttrain), ChemCert (NSW) Ltd. (02 93874714 or www.chemcert.com.au) and NSW Famers Association (0268848822 or www.nswfarmers.org.au). Other training organizations are listed in the yellow pages under training organizations.

Information about DrumMuster is available at DrumMUSTER (www.drummuster.com.au)

Water

WHY WORRY ABOUT WATER?

While the coast has a high annual rainfall, it does experience extended dry periods, especially from late autumn to late spring. During this time, rain is often light, with little runoff to replenish streams and dams, and domestic water usage typically exceeds water-tank replenishment. Even during the high summer rainfall period, water usage can exceed storage, as water usage rises dramatically. The coast also suffers from drought; the mid north coast having experienced two extended (3-year) droughts in the last 15 years.

While it isn't possible to totally drought proof your property, rural landholders that plan their water supply are much less susceptible to the affects of dry periods than their unprepared neighbours. The alternatives to good planning can be expensive (e.g. reliance on water carriers, selling off stock during unfavourable prices, death of horticultural crops, etc).

How landholders manage their water supplies also affects: the quality and quantity of domestic, stock and irrigation water for downstream users; fish stocks; wildlife (e.g. waterbirds); and the recreational and aesthetic values of waterways throughout the catchment

WHAT REGULATIONS CONTROL RURAL WATER USAGE?

The Water Management Act 2000 and Water Act 1912 control the extraction and use of water, construction of dams and activities in or near water courses in NSW. However, local environment plans also place controls on what activities can be undertaken. Hence, it is always best to contact the resource access officer in the Department of Water and Energy (DWE) at Grafton and local shire council to obtain the latest information and determine what approvals are needed for activities that extract or use water or occur near water sources (including floodplains).

As part of the national water reform process, the Water Management Act 2000 is gradually replacing the Water Act 1912. Because these changes were underway at the time of writing, only a brief summary of the Acts implications for landholders is provided here.

The Water Management Act provides for NSW to be divided into areas, each of which will have a water management plan. Currently, there are several water sharing plans in place on the mid north coast, information on these can be accessed on the DWE website www.naturalresources.nsw.gov.au/water/sharing/index.shtml. Water management plans are expected to be in place throughout NSW by July 2006 and will address water sharing, drainage and floodplain management and water source protection.

All rural landholders in NSW currently have rights to access water for their basic needs. These are domestic and stock rights, harvestable rights in farm dams and native title rights.

Landholders, who own or occupy land that includes a riverbank or lake edge or that overlies an aquifer, can take water without a licence for stock (not intensive industries) and domestic use. However, the water cannot be used for irrigation, crops that will be sold or bartered or for washing down machinery sheds; these still require a water



Nambucca River. © Joy van Son.

use licence. Landholders are also allowed to capture up to 10% of the average regional rainfall runoff on their property; capture in excess of this requires a licence (see dams). The captured water must be stored in dams, but can be used for any purpose, including crop irrigation. However, the amount stored is unlikely to be sufficient for a significant area of irrigation. Anyone who holds native title rights to water under the Native Title Act 1993 can take water for personal, domestic and non-commercial needs.

During dry times, restrictions may be placed on the amount of water that can be extracted. Prior to water management plans, commercial use (e.g. irrigation, dairies, aquaculture and intensive animal production) of water requires a licence. When water management plans are put in place, licences will be converted to water access licences. The licences will be allocated to individuals rather than properties, allowing users to purchase water from licensed users who are not extracting their full quota. All water plans will define rules for extraction during low river flows, such as when pumping is not permitted and how much water can be taken at different flow levels.

In addition to water access licences, approvals are required under the Water Management Act to undertake water supply (e.g. bores) drainage and flood works, and to remove material from land, dump material on land or undertake any other activity within 40 metres of a river that affects the quantity or flow of water.

More information on water management plans can be found in the information sheets "Overview of Macro Water Plans" and "Benefits of Macro Water Plans", which are available from DWE offices or at www.naturalresources.nsw.gov.au/water/macro/.

HOW MUCH WATER DO YOU NEED?

How much water is needed on a property depends on many factors, such as: the source of the water; the number of people and stock; whether it is to be used for fire fighting; and the properties' location (hotter, drier areas further from the coast lose more dam-water to evaporation). See the supplementary pack for the DWE information sheet "How much water do I need for my rural property" that will help you estimate water your requirements.

HOW MUCH WATER HAVE YOU GOT?

The maximum amount of water that can be stored on a property at any time can be estimated from the dam capacity (see the information sheet "Farm dams – what size are your existing dams?" at www.naturalresources.nsw.gov.au/water/farm_dams/factsheets.html), bore and river-pump flow rates and water-tank volumes. These figures can be used to seek advice about the sufficiency of your water supply from the resource access officer in DWE at Grafton, local suppliers (e.g. water-tank suppliers and local dam contractors) and neighbours.

Although the volume of water potentially available to your property may appear large, its reliability for different uses during dry periods can vary because: river water quality often deteriorates during low flows; smaller streams may completely dry up; bores and wells may become increasingly saline when water levels are drawn down too far; and rainwater capture by roofs may be insufficient to refill water-tanks except in wet periods.

How you meet the difference between what you need and what you have depends on the reliability and cost of different water sources. One of the simplest ways to conserve water for domestic use is to use water tanks to capture rainfall runoff from home and shed roofs. To get the most from your water supplies read "Farm Water", listed in the NSW Department of Primary Industries (NSW DPI) publication catalogue in this kit.

BORES AND WELLS

Accessing water from an aquifer under a property doesn't require a licence for domestic and livestock rights. However, the bore or well must be licensed (for free) through the licensing division of the DWE. Water use for other purposes also requires consent from the licensing division. If you are considering constructing a well or bore on the floodplains, seek advice from your local shire council first, as planning permission is needed for works which may disturb acid sulfate soils.

The flow rate and quality of the water needs to be determined to assess its adequacy for different uses; many aquifers are too saline for certain uses or become increasingly saline as the water level is drawn down. There are also a range of metals, such as iron and aluminium, which affect water quality.

Information about the location and depth of aquifers in your region can be obtained from the resource access officer at the DWE in Grafton. The DPI (ag) can undertake water testing for stock and irrigation purposes, but not for domestic use. Contact your resource access officer in DWE at Grafton or local council for drinking water testing laboratories. Advice about the flow rates of bore and river pumps can be obtained from the irrigation officer in the DPI (ag) at Grafton or from local suppliers of equipment (see yellow pages).

DAMS

If you are intending to build a dam, seek advice from the resource access officer in the DWE at Grafton and your local council, as consents are required in a number of circumstances, including:

- if the total volume of all dams on a property will exceed the harvestable rights limit. However, if you find the dams currently on the property exceed the harvestable limit, you also need to obtain a licence from the licensing division of the DWE
- if the dam is to be constructed on a floodplain. As it may divert flood flows, consent is also required from the licensing division
- for dams with an area of more than 0.5ha and located: in or within 40 metres of a natural waterbody, wetland or environmentally sensitive area: or in an area with high watertables, acid sulfate soils or saline soils. In this case local council approval is needed
- if any new dam, or alterations to existing dams, affects fish passage, then consent may be needed from the DPI (fisheries).

Farm dams that are part of your harvestable rights can be located on hillsides, gullies and minor watercourses. The definition of a minor watercourse and how to work out the stream order is explained in the information sheet "Farm dams – where can they be built without a licence?" on the DWE website www.naturalresources.nsw.gov.au/water/farm_dams/factsheets.shtml or by contacting their resource access officer. If you wish to build the dam on a permanent river or creek you will need to obtain permission from the DWE first.

You will need to calculate whether your maximum harvestable rights dam capacity (MHRDC) is, or will be, exceeded if you want to: irrigate from dams; build a new dam; or sell part of your property

(subdivision of a property can mean one part may then exceed its MHRDC as this is based on the area of each new property). In all cases, if the MHRDC is exceeded, a licence will be required. How to calculate your MHRDC is described in the information sheet “Farm dams – what size can you build without a licence?” on the DWE website www.naturalresources.nsw.gov.au/waterfarm_dams/factsheets.shtml or by contacting the resource access officer in DWE at Grafton.

Depending on how they are constructed, dams can either be rather sterile places or a haven for wildlife. Dams provide for wildlife if they have: a range of water depths near the edge; reeds, rushes and other water plants; surrounding and overhanging woody native vegetation; and refuge areas (e.g. fallen logs, dense shrubs or central mound). It is also beneficial to restrict the access of stock, so the entire dam bank isn't trampled.

One of the benefits of building a dam that considers biodiversity conservation is that it also provides better quality drinking water as: vegetation above a dam filters sediments out of the water; reducing eutrophication and algae growth; overhanging vegetation cools the water; and exclusion of stock from much of a dam's edge reduces faeces and urine entering the water. Water quality can also be protected by maintaining a (approximately) 20m spray and fertiliser buffer around a dam, combined with high ground cover.

For a fuller discussion of how to create a dam for stock and/or wildlife, read;

“Farm Dams. Planning, Construction and Maintenance” by B Lewis (2002), which is available from the DPI bookshop

“Planting Wetlands and Dams by N Romanowski (1998), UNSW Press, which is available from most bookshops

Further information on dam construction can also be obtained from the DPI website at www.agric.nsw.gov.au/reader/dams-storage. Before starting the construction of a dam or earthworks, it is advisable to consult with Soilworks in the Department of Lands and your local catchment management authority as they have responsibility for soil conservation in NSW. Always check with neighbours for a reliable dam builder; as a good knowledge of local soils and landscapes is needed to build a successful dam.

RIVERS

You do not need a licence to pump water if your property fronts a river or lake and you want to use the water for stock or domestic purpose: however, you will need one for commercial activities. Applications for licences can be made to the licensing division of the DWE in Grafton, but may not be approved – check before applying. The water can be pumped directly to your home or stock trough or into a dam for storage. Local councils regularly monitor the quality of some streams and it is worthwhile checking with them as to what problems may exist and how best to treat the water.

While stock can obtain water directly from streams, their urine and faeces reduces the quality of water for downstream users. At the same time, they can erode streambanks and degrade riparian vegetation through trampling and grazing.

Healthy riparian vegetation is vital for:

- reducing streambank erosion (by stabilising the soil and reducing the velocity of stream flows)
- Providing wildlife corridors
- decreasing pest insects (by providing habitat for insect-eating native animals)
- preventing nutrient loss (by acting as a filter)
- increasing fish stocks (by shading and cooling stream water and providing log habitats and food)
- decreasing algal growth (see “Managing riparian land” in the supplementary pack)

To provide these benefits, wherever practical, a vegetation buffer of at least 10m wide should be maintained along streams. This should be fenced (plain wires, as barbed-wire is more likely to catch vegetation during floods and wash away the fence) and off-stream water supplies provided. This does not mean that stock can't graze the fenced-off area, but only that their access is controlled. Stock are useful to reduce grass and weed growth. The Northern Rivers Catchment Management Authority (NRCMA) provides funding opportunities to landholders for riparian management (fencing, off-stream water supplies, replanting, etc) and should be the first port of call to find out what is available. Your local Landcare officer can also put you in touch with others who have practical knowledge with riparian management, as well as inform you of current training and funding opportunities.

Riparian land doesn't just cover the immediate streamside, it also includes gullies that sometimes run with water; areas surrounding lakes and wetland and river floodplains that feed into rivers during floods.

To find out more about the benefits of riparian land and how to manage waterways read:

Land and Water's riparian management information sheets at www.rivers.nsw.gov.au

“Managing Waterways on Farms” by D Brower (1997). See irrigation and water section in the NSW DPI publications catalogue in this kit.



Drainage Lines, Bellmore River. © NSW DPI

IRRIGATION

Irrigation, whether from a river; bore, well or dam requires a licence from the DWE. However, new irrigation licences are not being made available, so if your property doesn't have a licence, you will need to purchase one from a current licence holder if you wish to irrigate.

The licences are currently based on a set area (e.g. 10 hectare irrigation licence), so you will also need to find a landholder with an appropriately sized licence. However, meters are progressively being added to pumps and all licences will be based on volume (e.g. 10 megalitres per year) under the new water management plans that should be operational in July 2006.

The supply of water for irrigation is not completely secure. During low stream flows, pumping can be halted by the DWE (advertised in local papers) on the recommendation of local water user associations (landholder groups). To find out more, talk to the resource access officer in the DWE at Grafton.

The irrigation officer in NSW DPI (agriculture) at Grafton provides advice on irrigation design and management and also runs an “Introduction to Irrigation Management” course (see www.agric.nsw.gov.au/irrigation-waterwise). NSW DPI (agriculture) also provides information on many aspects of irrigation at www.agric.nsw.gov.au/reader/water-irrig. For advice, design and installation of irrigation systems contact private irrigation specialists (see irrigation &/or reticulation systems in the yellow pages).

WATER QUALITY – IS IT USABLE?

The coast's high rainfall and tidal rivers may give the appearance that copious amounts of water are available for all users. However, farm water comes from different sources and so its quality varies. Water may be unsuitable for domestic, stock, irrigation or other farm activity uses. Problems may be chemical (e.g. salinity) or physical (e.g. algae) and on the coast can involve acidity, iron and other metals, salts, hardness, algae and bacteria.

For example:

- within the tidal range of streams (e.g. to Kempsey on the Macleay River), salts levels are normally too high for human, stock or irrigation purposes
- above the tidal range of streams, algal levels (e.g. blue-green algae) can increase to toxic levels during periods of low flows. Dams can also have toxic algal blooms due to nutrient runoff from paddocks
- on the floodplains, aluminium, iron, manganese and sulfur can be high due to the presence of acid sulfate soils or salt layers within the soil.

For more information on drinking water quality issues, visit the Department of Health's website at www.health.nsw.gov.au/public-health/ehb/water/drinkwater.html.

For more information about farm water quality, visit the DPI's website www.agric.nsw.gov.au/reader/water-irrig or specifically for blue-green algae visit www.murraybluegreenalgae.com/Graziers.htm.

If you have doubts about the quality of your stock and irrigation water supply, water testing can be conducted by;

- DPI (agriculture), with water sampling kits available from local offices
- Soil Conservation Services in the Department of Lands

Strategies rural landholders can use to maintain water quality on their property and across the catchment include;

- maintaining high levels of ground cover throughout the year
- maintaining a broad healthy riparian vegetation strip
- retaining native vegetation on steep slopes
- controlling stock access to dams and streams
- using off-stream watering (e.g. troughs and tanks)
- not applying fertilisers or sprays just prior to heavy rainfall events, especially if the soil is already saturated.
- using split applications of fertilisers rather than a single heavy application
- only applying fertilisers when pastures are actively growing
- maintaining fertiliser and spray buffers around dams and streams.

Fire

WHAT IMPACT DOES FIRE HAVE ON THE ENVIRONMENT?

Fire is a natural part of the Australian landscape, but its incorrect management (both bushfires and deliberate burning) can have many undesirable consequences such as:

- Death and injury to people
- Loss of homes and other assets
- Loss of vegetation communities (e.g. rainforests and wetlands)
- Changes in the structure and composition of communities (e.g. loss of shrubby understoreys that act as habitat and food sources for a wide range of lizards, birds and mammals)
- Loss of wildlife because animals couldn't escape the flames, or later, due to the destruction of habitat and food sources. Where wildlife is injured or orphaned by fire, contact FAWNA/WIRES (groups that specialises in wildlife recovery)
- Changes in the composition of animal species (e.g. animals that prefer dense shrubby understoreys are displaced by other species that are adapted to more open understoreys as fire frequency increases)
- Degradation of soils from the loss of ground cover, organic matter and nutrients
- Contamination of water sources from increased soil erosion brought on by the loss of ground cover.

The degree of impact that fire has on the environment depends on its frequency (how often fires occur), intensity (how hot the fire is), extent (the area burnt by the fire) and season (what time of year the fire occurs).

Most Australian plants and animals are resilient enough to tolerate a single fire, as long as it is not too great in extent or too intense. However, plants that rely solely on seeds to regenerate require sufficient time between fires to grow to maturity and set seed, otherwise they will fail to recolonise after fires. Equally, if fire is suppressed for too long, larger longer-lived species may out compete smaller species for space and light.

Generally, when fire is excluded, long-lived species such as trees and bushes come to dominate and as fire frequencies increase the vegetation becomes more open and grassy. The desirable fire frequency is very dependant on type of vegetation communities and its species composition. For example, research has shown that:

- Coastal heathland requires a fire frequency of every 7-20 years (with most fires around 8-12 years) to maintain its biodiversity. In rocky inland areas, where growth is slower, fire frequencies need to be reduced to every 15 to 50 years
- Dry sclerophyll forest needs a variable fire regime of 7 to 25 years where there is no grassy groundcover, but where there is, then a fire every 3 to 25 years is recommended. The grassy layer is best maintained with a fire interval of 3-6 years, while the shrub layer will increase if this is extended to every 7-25 years

- Freshwater wetlands can be burnt every 6 to 26 years, but only when the ground is wet. Otherwise, peat fires can occur and the wetland destroyed
- Rainforest is very sensitive to burning, so fire should be excluded.

Variability in the frequencies of fires is important, as even within one community type there will be species that benefit from more frequent fires and others that benefit from longer intervals between fires. Hence, varying the fire interval tends to produce greater species richness.

As the intensity of a fire increases, so does its destructive ability. Intense fires may kill the dominant overstorey (e.g. trees), damage plant regeneration sites (e.g. buds) and destroy soil seed banks; thereby, reducing the ability of plants and community types to regenerate. Intense fires can also degrade the soil by reducing the organic matter content (soil glue and nutrient store) and biological life, resulting in poorer water infiltration and greater erosion. This in turn increases water pollution, as soils and nutrients are washed into dams, rivers and wetlands.

Fire should be excluded from riverine vegetation and other vegetation surrounding water bodies (e.g. dams). These communities act as biological filters that reduce the movement of soils and nutrients and hence minimise the contamination of water sources.

Extensive fires that burn out large areas reduce the ability of plants and animals to recover. Patch burning provides animals with refuge and forage and creates a seed source for plants to more quickly recolonise burnt areas. Patch burning also reduces fuel loads, potentially slowing the spread of wild fires.

While the protection of life and property come first, if landholders use a zoning approach to fire management then the risk to farm assets can be minimised while other areas can be managed for biodiversity. To find out more about preparing your property for fire using protection zoning, go to the NSW Rural Fire Service's web site at www.rfs.nsw.gov.au. To find out more about managing fires for different plant species and communities, read "Managing Fire on Your Property: A Landholders Booklet". Photocopies of this booklet are available from Landcare offices.



WHAT IMPACT HAS FIRE HAD ON THE MID NORTH COAST?

There have been many vegetation changes associated with the inappropriate use of fire, including: a reduction in the extent of rainforest; degradation of wetlands (at times forming scalds that cover many hectares and which takes decades to reclaim); loss of shrubby understoreys in forests; invasion of pastures by less desirable species; loss of wildlife habitat; weed incursion; and soil erosion.

Just two examples of inappropriate fire use are included here;

- Until recently, regular burning of pastures in late winter and early spring was a widespread practice on the mid north coast. While regular burning is still practiced today, it is far less common. One of the most common reasons for burning was to stimulate early spring pasture growth (especially of the native species blady grass), at a time when most pastures were dormant and of poor quality. However, the high frequency of burning gave blady grass a competitive advantage over other pasture species, so that blady grass now dominates large areas and often occurs as a monoculture. Unfortunately, blady grass only provides good quality feed for about 4-6 weeks after burning and then becomes rank and unpalatable to stock. One of the most common practices to remove the rank growth and stimulate new growth in the following year was to re-burn the pastures, further exacerbating the spread of blady grass, loss of species and shortening of the pasture growth period.

Regular pasture burning has also led to the loss of soil organic matter and soil nutrients. As a consequence, the soils tend to: form crusts that limit water infiltration; be more prone to erosion, thereby reducing the depth of topsoil; and provide a less nutritious medium for crop and pasture growth.

- Hazard reduction burns in forests have also had negative impacts. Frequent burning tends to open up many forest types, removing shrubs and increasing the grassiness of the vegetation. The most common species to benefit are fire-loving grasses, such as blady grass and kangaroo grass, that grow rapidly and produce a large bulk of highly combustible material. The increased rate, at which combustible material is produced, increases the need for more regular burns. These fires also burn hotter, increasing its affect on the forest structure. Hence there is a downward spiral, where fire opens the forest structure, this increases the abundance of grasses, more bulk is then produced more quickly and then even more frequent fires are needed to reduce the bushfire hazard.

FIRE. WHAT ARE YOUR RIGHTS AND RESPONSIBILITIES?

The Rural Fires Act 1997 (and Regulations) and Worker Compensation Act 1987 are the current legislation affecting bushfires. The Rural Fires Act established the Rural Fires Service, which is responsible for the management of fires in rural areas of NSW.

Under the Rural Fires Act, a bushfire danger period has been established, from the 1st October to the 31st March each year. The dates can be varied for different local government areas depending on local conditions. The approach of the bushfire danger period and any variations to the dates is extensively advertised in local papers and over local radio stations. However, landholders can also obtain the information from the NSW Rural Fire Service's web site at www.rfs.nsw.gov.au. During the bushfire danger period, you can only light fires under permit from the Rural Fire Service. These can be obtained by contacting your local Rural Fire Service control centre.

The Rural Fire Service can also declare a total fire ban at any time. During this period, you are not permitted to light any fires, even if you have a permit from the Rural Fire Service that is still current. If you do become aware of an unauthorised fire on any land during the bushfire danger period (or total fire ban period), you must take all possible steps to extinguish it. Where you can't do this, you need to inform the Rural Fire Service (on their emergency number) as soon as possible.

If you are responsible for lighting an unauthorised fire on your property during the fire danger period or total fire ban period, you will be liable to a penalty of up to \$5500 or 12 months prison. Where the fire escapes to someone else's property (or you set light to the property), the penalty may be up to \$11000 or 5 years prison. You may complain to the Rural Fire Service, if you believe a fire hazard exists on an adjacent property. The Service will then discuss control measures with the owner. Where recommendations are ignored, the Rural Fire Service will issue a fire hazard reduction notice, which obliges a landholder to undertake the hazard reduction at their own expense. If they don't comply, the Service can employ someone else to do the work and charge the landowner for it.

If you clear away all combustible material within 6 metres of a dividing fence, then unless your neighbour does the same, they will be responsible for all fire damage to the fence.

HOW CAN YOU LEARN TO MANAGE FIRES?

The Rural Fire Service is responsible for managing fires across 90% of NSW. To do this, it largely depends on volunteers to fight the fires. Becoming a volunteer not only provides a community service, but is the best way to learn how to prepare for, manage and fight fires. All volunteers are trained in fire fighting and there is a range of courses offered for different specialities. To find out more contact your local Rural Fire Service control centre or go to www.bushfire.nsw.gov.au Joining the RFS.

A number of government organisation are available to provide advice to landholders on fire management on private properties. These include:

- Rural Fire Service - contact fire control centres for all aspects of fire management;
- NSW DPI (agriculture) – contact agronomists at Kempsey and Taree for pasture management
- Shire councils – contact their environment officers
- National Parks division of the Department of Environment and Climate Change - contact the regional office in Port Macquarie for biodiversity management



Hazard reduction burn, Cowarra State Forest. © Jeremy Bradley.

WHAT HELP IS AVAILABLE AFTER A FIRE?

The Department of Community Services is responsible for welfare and recovery services. They can coordinate food, accommodation, clothing, advice and financial and personal support. Contact the State Disaster Recovery Centre

The Department of Primary Industries (agriculture) coordinates the provision of animal relief services to primary producers, such as coordinating the supply and distribution of fodder, managing the care of pet animals. Contact should be made through your local RFS fire control centres.

Visit the Department of Primary Industries (agriculture) web site www.agric.nsw.gov.au/bushfire for information on assessing burns on stock, humane destruction and disposal, pasture recovery and caring for native animals.

The Rural Assistance Authority provides a natural disasters loan scheme that charges nominal interest for primary producers within an area declared a natural disaster.

If you have injured or orphaned wildlife, contact FAWNA/WIRES, these are local wildlife groups that specialises in the care of injured and orphaned wildlife.

WHERE CAN YOU GET FURTHER INFORMATION?

Reading

“The Complete Bushfire Safety Book” by J Webster (2000). ISBN 1 74051 0348. Published by Random House. Available from most bookshops.

“Managing Fire on Your Property: A Landholder Booklet”. Available from local Landcare offices.

Web Sites

Bushfire preparedness, restrictions, permits and management at www.bushfire.nsw.gov.au/

Fire and its management for biodiversity at www.gu.edu.au/school/asc/fire2/home.html

Resources

Abbreviations used in this document are:

- DECC = Department of Environment and Climate Change
- DWE = Department of Water and Energy
- NRCMA = Northern Rivers Catchment Management Authority
- NSW DPI = NSW Department of Primary Industries
- Qld DPIF = Queensland Department of Primary Industries and Fisheries
- RLPB = Rural Lands Protection Board

INTRODUCTION TO RURAL LIFE

No government agency has advisors who specifically deal with taking up a rural lifestyle. The most comprehensive introduction to rural living is available in the reading and web sites listed below. After you have read some of these, seek local advice on specific areas from the contacts listed under each topic heading.

Reading:

“North Coast Agriculture” (2004) in the supplementary pack. Describes the current status and future viability of all rural industries on the north coast; “Introduction to Rural Life” section in the supplementary pack; “Rural Life. Is It For You?” by C. Benjamin (2002). ISBN 0 7345 0202 8. Available from NSW DPI (agriculture) bookshop in Orange. A book and CD that helps you examine what you want and need from the land, and what will be your responsibilities and legal obligations; “Buying Your Bush Block”. ISBN 043 06706X. See general section of the NSW DPI’s publications catalogue in the supplementary pack. An A-Z of property, finance, services, and environment and community issues; “Farming in a Small Way”. ISBN 0 7347 1500 5. See general section of the NSW DPI’s publications catalogue in the supplementary pack. Provides information on finding the farm you want, choosing the right enterprise, and avoiding the perils and pitfalls of rural life; “Town and Country Farming” magazine is a quarterly publication available from newsagents; “Small Farms” is a monthly magazine available from newsagents. They also have a bookshop (02) 4861 7778 and web site; “What to Expect Living in a Rural Area”. See leaflet in the supplementary pack; “Being a Better Rural Neighbour”. See leaflet in the supplementary pack.

Web Sites

- Qld DPIF’s Rural Life newsletter is for people involved or interested in starting family-owned farms. From www.dpi.qld.gov.au go to >Services> Newsletters>Rural Life

- Small Farms magazine and bookshop at www.smallfarms.net/

- Regional Services (www.regionalaustralia.gov.au) is the Commonwealth government’s site outlining services available to regional Australia. You can order the services directory as a booklet on 1800 026 222.

NATURAL RESOURCES

SOILS

Contacts

- General information about local soils
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree
- Location of acid sulfate soils and planning controls
 - local Shire Councils
- Suitability and management for pastures and cropping
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree
- Suitability and management for horticulture
 - horticulture officer, NSW DPI (agriculture) at Coffs Harbour
- Management of acid sulfate soils
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree
 - environmental officers at Nambucca, Kempsey and Port Macquarie-Hastings Shire Councils
- Soil erosion control measures
 - Northern Rivers Catchment Management Authority at Kempsey and Coffs Harbour
 - Landcare community support officers at Bowraville, Kempsey and Wauchope
 - NSW DPI (agriculture)
 - Soil Conservation Services in the Department of Lands at Singleton for advice and works
- Soil erosion control funding
 - Northern Rivers Catchment Management Authority at Kempsey and Coffs Harbour
 - Landcare at Bowraville, Kempsey and Wauchope
 - Port Macquarie-Hastings Shire Council
- Earthworks
 - Shire Councils for planning controls
 - Soil Conservation Services in the Department of Lands at Singleton for advice and works
 - local contractors (see “excavating &/or earth moving contractors” in the yellow pages)
- Soil chemical testing
 - NSW DPI (agriculture) offices for advice and list of testing laboratories
 - Soil Conservation Services in the Department of Lands
 - Produce stores (see yellow pages)

Training Courses

“Soil Health”. Field days that gives landholders simple tools to assess the chemical and structural fertility of their soils. Contact NSW DPI (agriculture) at Kempsey

“Landscan”. Workshops that show landholders how to assess the natural potential and limitations of their properties using soil, slope and aspect. Contact NSW DPI (agriculture) at Kempsey or Taree

Reading

“Soils” section in this kit

“Soil Sense – Soil Management for NSW North Coast Farmers (2nd edition)” edited by R Lines-Kelly (2000). ISBN 0 7347 1210 3. Available from NSW DPI (agriculture) bookshop. Describes the main soils on the north coast; the soil management techniques needed for each of the region’s main agricultural enterprises and provides a farmer’s A-Z of soil terms.

“Soil Landscapes of the Kempsey – Korogoro Point 1:100000 Sheet” by G. Atkinson (1999) and “Soil Landscapes of the Macksville – Nambucca 1:100000 Sheet by M. Eddie (2000). Technical manuals and maps that describes the soil landscapes, their potential and limitations, of much of the eastern section of the region. Best referred to with an advisor; most of whom will have copies. See soils section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Management of soil structure, nutrients and biology for agriculture at www.agric.nsw.gov.au/reader/soil-health-fertility

- Many aspects of soils in NSW at www.naturalresources.nsw.gov.au/care/soil/

- Agricultural portal to a range of soil information at local, state and federal level at www.agriculture.gov.au

- Maps and data of natural resources information held by the NSW Government (www.nratlas.nsw.gov.au)

- Environmental portal to a range of soil information at local, state and federal level at www.environment.gov.au

WATER

Contacts

- Dam regulations and licensing
 - licensing division of DWE at Grafton
 - local shire councils
- Advice on dam construction and earthworks
 - Soil Conservation Services in the Department of Lands
 - NRCMA
- River health: management and funding
 - NRCMA
 - Landcare Community Support Officers
 - Some shire councils
- Dam construction
 - Soil Conservation Services in the Department of Lands
 - private dam builders (see “earth moving/ excavating contractors” in the yellow pages)
- Bore and river pumping regulations and licensing
 - licensing division of DWE at Grafton
- Aquifer locations, depths and possible yields
 - Resource Access Officer in DWE at Grafton
- Bore construction
 - Private contractors (see “boring &/or drilling contractors” in the pages)
- River quality/height monitoring
 - Local shire councils
- Pump performance and irrigation design
 - Irrigation Officer in NSW DPI (agriculture) at Grafton
 - Private irrigation consultants (see “irrigation &/or reticulation systems” in the yellow pages)
- Stock and irrigation water quality testing
 - NSW DPI (agriculture)
 - Soil Conservation Services in the Department of Lands
- Domestic tank water quality testing
 - Local shire councils

Training Courses

“Introduction to Irrigation Management (Waterwise)”. Contact the irrigation officer in NSW DPI (agriculture) at Grafton.

“Introduction to Irrigation Pumps”. Contact the irrigation officer in NSW DPI (agriculture) at Grafton.

Reading

“Water” section in this kit

“Overview of Macro Water Plans” and “Benefits of Macro Water Plans” information sheets outline the new water management plans that will affect all rural water users. Available from all DWE offices.

“Managing Waterways on Farms”. Describes how to manage creeks and streams to prevent erosion and improve water quality. See irrigation and water section of the NSW DPI’s publications catalogue in the supplementary pack

“Farm Water”. See irrigation and water section of the NSW DPI’s publications catalogue in the supplementary pack

“Farm Dams. Planning, Construction and Maintenance” See irrigation and water section of the NSW DPI’s publications catalogue in the supplementary pack

“Planting Wetlands and Dams by N Romanowski (1998). ISBN 0868406082. Available from most bookshops.

Web Sites

- Water rights, dams, legislation and licencing at www.naturalresources.nsw.gov.au/water/index.html

- Dam construction at www.agric.nsw.gov.au/reader/dams-storage

- Irrigation management at www.agric.nsw.gov.au/reader/water-irrig

- River and riparian management at www.rivers.gov.au

- Drinking water quality issues at www.health.nsw.gov.au/public-health/ehb/water/drinkwater.html

NATIVE VEGETATION

Contacts

- Vegetation identification
 - Coffs Harbour Botanic gardens herbarium – all plants
 - Botanical Information Service, Sydney Botanic Gardens, Department of Environment and Climate Change, Sydney – all plants
 - agronomist, NSW DPI (agriculture) at Kempsey – pastures, weeds and poisonous plants
 - NRCMA, if it is part of a property vegetation plan – see “Native Vegetation” in the supplementary pack
 - rangers, National Parks and Wildlife division of the Department of Environment and Climate Change
 - private consultants (see “natural resource” or “environmental &/or pollution” consultants in yellow pages)
- Vegetation assessment
 - NRCMA, if it is part of a property vegetation plan – see “Native Vegetation” in this kit
 - private consultants (see “natural resource” or “environmental &/or pollution” consultants in yellow pages)
- Native pasture management
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree
 - agronomists at local produce stores
 - private consultants (see “farm & agricultural advisory services” in the yellow pages)
- Wetland management
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree
 - NRCMA
 - Wetland Care Australia
 - environmental officers at Kempsey and Port Macquarie Shire Councils
- Forest management for conservation (also see “forestry” in the “plant industries” section)
 - NRCMA
 - National Parks and Wildlife division, DECC
 - private consultants (see “natural resource” or “environmental &/or pollution” consultants in yellow pages)
- Native vegetation clearing
 - NRCMA for advice and approvals
 - shire councils for development approvals
 - agronomists, NSW DPI (agriculture) at Kempsey and Taree for advice on the economics of clearing for agriculture
- Conservation agreements and funding opportunities
 - NRCMA
 - National Parks and Wildlife division, DECC

Training Courses

“Native and Naturalised Grasses”. Grass identification and management. Contact the agronomist in NSW DPI (agriculture) at Kempsey.

“Native Vegetation Recognition” field days. Other identification and management workshops are often run. Contact your local Landcare community support officer for more information.

“Bush Regeneration” and “Conservation and Land Management”. Contact your local TAFE college for more information.

Reading

“Native Vegetation” in this kit

Identification

- “Eucalypts and Angophoras of the North Coast of New South Wales” by CL Bale (2003). A key to, and description of, all eucalypts and angophoras found on the north coast. Available from the United Campus Book shop, University of New England, Armidale
- “Field Guide to Eucalypts.Vol. I. South-eastern Australia” by MIH Brooker and DA Kleinig (1990). ISBN . Available from most bookshops
- “Common Indigenous Trees of the Wallamba Valley and Surrounds” by Dyers Crossing Landcare Group Inc. (2005). Available from Dyers Crossing Landcare Group Inc, c/o Karuah Great Lakes Landcare Management Committee Inc., PO Box 3, Nabiac, NSW, 2312
- “Tree and Shrubs in Rainforests of New South Wales & Southern Queensland” by JB Williams et al. (1984). An easy to use pictorial key to rainforest trees and shrubs. Available from the United Campus Bookshop, University of New England, Armidale
- “Rainforest Climbing Plants” by JB Williams and GJ Harden (1984). An easy to use pictorial key to rainforest climbing Plants. Available from the United Campus Bookshop, University of New England, Armidale
- “Common Pasture Plants of the Macleay Valley” by H. & C. Rose (2006). A CD describing more than 120 native and introduced pasture plants in the Macleay Valley. Available from NSW Department of Primary Industries in Kempsey
- “Wildflowers of the North Coast of New South Wales” by B Kemp (2004). ISBN 1 877069 05 1. Available from most bookshops.
- “Waterplants of New South Wales” by GR Sainty and SWL Jacobs (1981). The definitive photographic guide to waterplants of the region. Out of print, but available in many libraries.
- “Wetland Plants of Queensland. A Field Guide” by KM Stephens and RM Dowling (2002). ISBN 0643066748

Assessment and Management

- “Vegetation Survey and Assessment – a Practical Guide for the Management of Native Vegetation” (2004). Available from Tocal Agricultural College, NSW DPI’s (ag) at Paterson
- “Bushland Resources Kit”. Although designed for the Hunter Valley, all the principles and many of the habitats are the same as the mid north coast. Covers vegetation assessment and revegetation. Available from the Hunter-Central Rivers Catchment Management Authority, Private Bag 2010, Paterson, 2421. Phone (02) 4930 1030.. Also available as a pdf file at www.hcmt.org.au/Bushland_resource_kit.php3.
- “Plan for Trees – a Guide to Farm Revegetation”(1998). See trees and forestry section of the NSW DPI’s publications catalogue in the supplementary pack
- “Grassed-Up Guidelines for Revegetating with Australian Native Grasses” See pastures and field crops section of the NSW DPI’s publications catalogue in the supplementary pack
- “Revegetating Streams in the Nambucca Catchment. A Guide to Species and Planting Methods” Available from Nambucca Landcare
- “Revegetating Streams in the Macleay Catchment. A Guide to Species and Planting Methods” Available from Macleay Landcare
- “Revegetating Streams in the Hastings Catchment. A Guide to Species and Planting Methods” Available from Hastings Landcare

Web Sites

- Rules on vegetation clearing and many other issues at www.naturalresources.nsw.gov.au
- Biodiversity information and conservation management at www.npws.nsw.gov.au
- Wetland management at www.wetlandcare.com.au and www.naturalresources.nsw.gov.au/care/wetlands/
- Riverine vegetation management at www.rivers.gov.au
- Links to local, state and federal information at www.environment.gov.au

PASTURES

Contacts

- Identification
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree
 - Coffs Harbour botanic gardens herbarium
 - Botanical Information Service, Department of Environment and Climate Change, Sydney
 - private consultants (see “natural resource” or “environmental &/or pollution” consultants in yellow pages)
- Management
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree
 - private consultants (see “natural resource” or “environmental &/or pollution” consultants in yellow pages)
 - agronomists in produce stores (see yellow pages)

Training Courses

“Landscan”. Workshops that show landholders how to assess the natural potential and limitations of their properties using soil, slope and aspect. Contact NSW DPI (agriculture) at Kempsey or Taree

“Prograze”. Workshop series designed to develop participants’ pasture and animal assessment skills, and show how to use these skills to improve on-farm grazing decisions on beef and sheep farms. Contact NSW DPI (agriculture) at Kempsey or Taree.

“Native and Naturalised Grasses” and “Paddock Plants”. Field days that cover pasture identification and management. Contact the agronomist in NSW DPI (agriculture) at Kempsey.

“TopFodder Silage”. Workshops that demonstrate how to improve the feed value of silage made on farm and minimise losses from harvest to feedout. Contact NSW DPI (agriculture) at Kempsey or Taree.

Reading

“Pastures” section in this kit

“Fertilisers for Pastures” by E Havilah et al (2005) is a free booklet available from NSW DPI (agriculture) offices at Kempsey and Taree. A free publication from designed to help landholders make better fertiliser decisions.

“Best Management Practices for Graziers in the Tablelands of New South Wales”. Describes best management practices for sustainable dryland grazing. Although designed for the tablelands, all the principles are the same for the coast. Available from the NSW DPI (agriculture) offices.

“Grasses of the Mid North Coast” is a booklet that describes the most common paddock grasses of the area. Available from NSW DPI (agriculture) at Kempsey.

“Common Pasture Plants of the Macleay Valley”, a computer CD describes some 120 common pasture grasses and herbs. Available from NSW DPI (agriculture) at Kempsey.

See other publications in the pastures section of the NSW DPI publications catalogue in the supplementary pack

Web Sites

- All aspects of pasture selection and management in NSW at www.agric.nsw.gov.au/reader/pastures
- A more tropical emphasis on pasture management at www.dpi.qld.gov.au/pastures/

IMPACTS ON NATURAL RESOURCES

CLIMATE

Contacts

- How climate affects pastures and cropping
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree
- How climate affects horticultural crops
 - horticulture officer in NSW DPI (agriculture) at Coffs Harbour

Training Courses

“Farmer’s Guide to Weather and Climate in Farming”. A 1-day workshop for land managers interested in understanding weather and climate and managing risk. Contact Paul Carberry, NSW DPI, Tamworth. Phone 6763 1132

Reading

“Climate” section in this kit

“Soil Landscapes of the Kempsey – Korogoro Point 1:100000 Sheet” by G. Atkinson (1999) and “Soil Landscapes of the Macksville – Nambucca 1:100000 Sheet by M. Eddie (2000) provide overviews of the local climate. Available from the Dept of Natural Resources, Kempsey, 2440

“Weather and Climate in Farming” describes how to manage climatic risks on farm. See the weather and climate section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Local weather forecasts, current weather and climate averages at www.bom.gov.au/weather/nsw/
- Understanding climate and weather at www.agric.nsw.gov.au/reader/nr-climate

DROUGHT

Contacts

- How to manage pastures and crops
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree
- How to manage horticultural crops
 - horticulture officer in NSW DPI (agriculture) at Coffs Harbour
- How to manage livestock
 - beef cattle officer in NSW DPI (agriculture) at Taree
- Drought support subsidies for primary producers
 - Rural Assistance Authority
- Processing of drought subsidies and providing support information
 - Rural Financial Counselling Service at Macksville
 - RLPB at Kempsey
- Disaster welfare assistance
 - Department of Community Services at Kempsey and Port Macquarie
- Financial advice
 - Rural Financial Counselling Service at Macksville
- River pumping restrictions
 - resource access officer in DWE at Grafton
- Livestock starvation/cruelty
 - Royal Society for the Prevention of Cruelty to Animals
- Injured and orphaned wildlife
 - FAWNA/WIRES

Training Courses

“Prograze”. Workshops designed to develop participants’ pasture and animal assessment skills, and show how to use these skills to improve on-farm grazing decisions on beef and sheep farms. Contact NSW DPI (agriculture) at Kempsey or Taree.

Reading

“Drought” section in this kit

“Managing Drought”. A free book for NSW farmers covering most aspects of drought, including planning, feeding, farm management and assistance. See the drought section in the NSW DPI publications catalogue in the supplementary pack

“The Drought Recovery Guide 2005”. A free book for NSW farmers that helps producers develop drought recovery strategies and make other important management decisions. See the drought section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

Drought planning, management and financial assistance at www.agric.nsw.gov.au/drought

Weed strategies following drought at www.agric.nsw.gov.au/reader/flood-frost

FLOOD

Contacts

- Flood and storm warnings
 - listen to local radio stations for updates and advice
 - State Emergency Service
- Emergency help for people and animals
 - State Emergency Service
- To determine if you are in a flood-prone area
 - local shire councils
- Local flooding knowledge
 - local State Emergency Service
 - neighbours
- Local “floodsafe” plans
 - Kempsey Shire Council
 - State Emergency Service
- Develop a household flood-action plan
 - State Emergency Services
- Develop a livestock flood-action plan
 - RLPB in Kempsey
 - livestock officers in NSW DPI (agriculture) at Kempsey and Taree
- How to manage livestock during and after flood
 - dairy officer in NSW DPI (agriculture) at Kempsey
 - beef cattle officer in NSW DPI (agriculture) at Taree
- Financial advice
 - Rural Financial Counselling Service at Macksville
- Disaster relief
 - Rural Assistance Authority
 - Department of Community Services at Kempsey and Port Macquarie
- Livestock starvation/cruelty
 - Royal Society for the Prevention of Cruelty to Animals
- Injured and orphaned wildlife
 - FAWNA/WIRES

Training Courses

“Prograze”. Workshops designed to develop participants’ pasture and animal assessment skills, and show how to use these skills to improve on-farm grazing decisions on beef and sheep farms. Contact NSW DPI (agriculture) at Kempsey or Taree.

Reading

“Flood” section in this kit

“Floodsafe: Rural Properties” in the supplementary pack

See the emergencies: bushfires and floods section in the NSW DPI publications catalogue in the supplementary pack

“Beef Cattle Health for the North Coast” by P Freeman (2002). Available from the RLPB at Kempsey.

Web Sites

- Flood management of livestock at www.agric.nsw.gov.au/reader/flood-frost
- Rainfall, river heights, nature of flooding, “Floodsafe” plans and flood links for the Kempsey Shire at <http://www.mhl.nsw.gov.au/www/kempfloodlinks.html>

FIRE

Contacts

- All fire management information, fire danger periods, burn-off permits and training
 - Rural Fire Service control centres at Macksville, Kempsey and Wauchope
- Advice on fire management on private properties
 - Rural Fire Service control centres at Macksville, Kempsey and Wauchope
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree
 - environment officers in local shire councils
 - National Parks division of the Department of Environment and Climate Change
- Disaster relief
 - Department of Community Services at Kempsey and Port Macquarie
 - Rural Assistance Authority
- Injured and orphaned wildlife
 - FAWNA/WIRES

Training Courses

A range of fire fighting courses is offered to volunteers in the Rural Fire Service. To find out more contact your local Rural Fire Service control centre or visit www.bushfire.nsw.gov.au/dsp_content.cfm?CAT_ID=291 “Hotspots: Fire Ecology” workshops. Demonstrates how to manage fire on rural properties. Contact your local Landcare office for more information

Reading

- “Fire” section in this kit
- “The Complete Bushfire Safety Book” by J Webster (2000). ISBN 1 74051 0348. Published by Random House. Available from most bookshops.
- “Managing Fire on Your Property: A Landholder Booklet”. Available from local Landcare offices.

Web Sites

- Fire affects on stock and pastures at www.agric.nsw.gov.au/reader/bushfire
- Bushfire preparedness, restrictions, permits and management at www.bushfire.nsw.gov.au/
- Fire and its management for biodiversity at www.gu.edu.au/school/asc/fire2/home.html

WEEDS

Contacts

- Identification of weeds
 - Coffs Harbour Botanic Gardens herbarium
 - Botanical Information Service, Department of Environment and Climate Change, Sydney
- Identification and management
 - agronomists in NSW DPI (agriculture) at Kempsey and Taree for pasture and crop weeds;
 - horticulture officer in NSW DPI (agriculture) at Coffs Harbour for horticultural weeds;
 - noxious weeds officers at local shire councils for noxious weeds;
 - agronomists at local agricultural produce stores for agricultural weeds;

- private consultants (see “environmental and/or pollution consultants” and “natural resource consultants” in the yellow pages) for all weeds
- Approvals may be needed in a number of circumstances (see “Weeds” section in this kit)

Training Courses

“Weed Identification and Management” field days. Contact your local NSW DPI (agriculture) office at Kempsey and Taree or local Landcare office. Tocal College at Paterson runs various weed management workshops (see www.agric.nsw.gov.au/reader/tocal-college)

Reading

- “Weeds” section in this kit
- “Common Weeds of the Mid North Coast” by C. & H. Rose (2006). See NSW DPI in Kempsey
- “Weeds: An Illustrated Botanical Guide to the Weeds of Australia” by B.A. Auld and R.W. Medd. (1987)
- “Noxious Weeds of Australia” by W.T. Parsons and E.G. Cuthbertson. (1992)
- “Poisonous Plants: Handbook for Farmers and Graziers” by E.J. McBarron (1983)
- “Bush Invaders of South-East Australia: a Guide to the Identification and Control of Environmental Weeds Found in South-East Australia” by A. Muyt (2001)
- “Noxious and Environmental Weed Control Handbook” by R Ensby (2005). Available from NSW Dept of Primary Industries district offices
- “Weed Control in Lucerne and Pastures” by JJ Dellow et al (2004). Available from NSW Dept of Primary Industries district offices
- See the weeds section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Weed identification and management at
 - www.agric.nsw.gov.au/reader/weeds
 - www.northcoastweeds.org.au
 - www.weeds.org.au

VERTEBRATE PESTS

Declared pest animals in the region include wild dogs, European rabbit and feral pigs. Landholders have an obligation to eradicate pest animals on their property and notify the RLPB of their presence. However, there are many other vertebrate pests that cause both environmental problems and agricultural losses (e.g. toads, Indian Mynas and deer).

Contacts

- Advice and assistance in eradicating declared pest species and other nuisance animals
 - RLPB at Kempsey
- Advice and assistance in controlling environmental pests
 - Landcare officers at Bowraville, Kempsey and Wauchope
- Licence to keep pest animals
 - RLPB at Kempsey
- Registration of domestic dingoes (obligatory)
 - Local shire councils
- Licence to control native pest animals on private property
 - National Parks division in the DECC at Port Macquarie

Reading

See Miscellaneous, Wildlife and Vertebrate Pests section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Pest animal control and the RLPB’s role at www.rlpb.org.au/landholder_info/pest_animal_insects.htm
- Australian agricultural portal to local, state and commonwealth information on pest animals at www.agriculture.gov.au
- Native pest animals and pests affects on native environments at www.nationalparks.nsw.gov.au/npws.nsf/Content/Pests+and+other+threats

PRIMARY PRODUCER STATUS

Eligibility for primary producer status means that expenses incurred in running the enterprise are tax deductible, tax liabilities can be spread over time and fuel rebates are available. To determine your status

Contacts

- Local taxation specialists (see Taxation Consultants in the yellow pages)
- Australian Tax Office (Phone: 13 28 66)

Reading

“The Bush Law Handbook” by T. Smith (2005). ISBN 0 947205 86 1. University of NSW Press. Available from most bookshops. Copy at NSW DPI (agriculture) at Kempsey.

Web Sites

- Australian Taxation Office. Go www.ato.gov.au > Your industry type > Business > Primary Production

LEGISLATION

Rural land and agricultural enterprises are affected by many pieces of what is often complex legislation. Included here is the link to all legislation and two books that make it all easy to understand.

Reading

- “The Bush Law Handbook” by T Smith (2005). ISBN 0 947205 86 1. Published by the University of NSW Press. Available from most bookshops. Also there is a copy at NSW DPI (agriculture) at Kempsey.
- “Rural Landholders Guide to Environmental Law in NSW 2006”. Available from the Environmental Defenders Office and on their website.

Web Sites

- Legislation
 - NSW at www.legislation.nsw.gov.au
 - Commonwealth at scaleplus.law.gov.au

ANIMAL ENTERPRISES

BEEF CATTLE

Property identification codes and identification tags must be obtained from the RLPB before buying or selling cattle. Find out about the National Livestock Identification Scheme.

Contacts

- National Livestock Identification Scheme
 - RLPB at Kempsey for information on its operation and to obtain
- Property Identification Codes and livestock identification tags
 - Beef Officer in NSW DPI (agriculture) at Taree for information on its operation
- Identification and transport
 - RLPB at Kempsey
- Management (e.g. grazing management, supplementary feeding, animal assessment, etc)
 - Beef Officer in NSW DPI (agriculture) at Taree
- Buying and selling stock
 - Stock and station agents (see yellow pages)
- Stock disease
 - Vet in RLPB at Kempsey for herd disease or a history of recurring disease only
 - Private vets (see yellow pages)
- Development consent for feedlots
 - Local shire councils

Training Courses

“Prograze”. Workshop series designed to develop participants’ pasture and animal assessment skills, and show how to use these skills to improve on-farm grazing decisions on beef and sheep farms. Contact NSW DPI (agriculture) at Kempsey or Taree.

Reading

- “Beef Cattle Health for the North Coast” by P Freeman (2002). Available from the RLPB, Kempsey and Coffs Harbour
- “Agskills Beef Cattle”. A practical guide to beef farm skills. See the Cattle section in the NSW DPI publications catalogue in the supplementary pack
- “Beef Business” booklet series. Covers animal assessment, marketing, selling, breeding, feeding, handling, yard design and many other aspects of beef cattle production. See the Cattle section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Extensive fact sheets on beef cattle at www.agric.nsw.gov.au/reader/beef
- “Beef News” newsletter at www.dpi.nsw.gov.au/aboutus/news/newsletter/beefnews. Although for the Hunter region, it is still highly relevant to the Mid North Coast
- Market information, research and development and industry programs at www.mla.com.au/AudienceHierarchy/CattleProducers/default.htm

DAIRYING

Dairying is a specialist field that requires high levels of capital as well as extensive pasture, cropping, animal husbandry and administrative skills. It is generally not suited to new landholders. Before contemplating dairying, talk to a dairy officer.

Contacts

- Dairy Officers in NSW DPI (agriculture) at Kempsey and Taree
- Other contacts for owners of a few cows are the same as for beef cattle

Reading

“Keeping a Cow” by J Wilson (2001) for anyone wanting to keep one or a few head of dairy cows. See the Cattle section in NSW DPI publications catalogue in the supplementary pack

Web Sites

- NSW DPI dairying at www.agric.nsw.gov.au/reader/dairy

HORSES

The following resources are for owners of stock horses and are not meant to meet the needs of a horse enterprise

Contacts

- Government departments do not have extension officers who provide advice about horse management. Nor is there any one private body that deals with all aspects of horse ownership. Horse owners will need to contact veterinarians, horse associations, industry bodies and local horse owners to obtain advice. Also, see the yellow pages for horse-based services
- Animal health
 - Vet in RLPB at Kempsey for multiple animals or a history of recurring disease only
 - Private vets for individual animals (see yellow pages)
- Branding and brand registration
 - RLPB at Kempsey

Training Courses

“Horse Care & Handling”. Introductory horse handling short course. Contact Tocal College, NSW DPI (agriculture).
For those wishing to enter any sector of the horse industry, both Trenayr TAFE campus near Grafton and Tocal College in NSW DPI (agriculture) at Paterson offer diploma courses for those wishing to enter the horse industry.

Reading

“Healthy Land Breeds Healthy Horses”. Provides best practice guidelines in landcare, horse health and economic feeding for horses. Available from the Rural Industries Research and Development Corporation.
“Horse Sense: The Guide to Horse Care in Australia and New Zealand” by P Huntington et al (2004). ISBN 0643065989. Landlinks Press. Available from most bookshops.
“Managing Horses on Small Properties” by J Myers (2005). ISBN 0643090673. Landlinks Press. Available from most bookshops
See the Horses section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- NSW Dept of Primary Industries at www.agric.nsw.gov.au/reader/horses
- The Australian Horse Industry Council with extensive links to sites on health, management, horse industries and horse associations at www.horsecouncil.org.au
- Rural Industries Research and Development Council's horse research program at www.rirdc.gov.au/programs/hor.htm
- Horse Industry Directory at www.horsedirectory.com.au/nsw/
- Horse associations at www.australianwesternhorshowcase.com.au/Association_links.htm

PIGS

Contacts

- All aspects of management
 - Livestock Officers (Pigs) in NSW DPI (agriculture) at Tamworth
- Development consent for piggeries
 - local shire councils
- Producer groups
 - Australian Pork Ltd
 - NSW Farmers Association
 - Meat and Livestock Australia

Training Courses

Courses covering most aspects of commercial pig production (Batch Farrowing, Ecosheds and Deep Litter Management, Environmental Issues for Piggeries, Environmental Plans for Piggeries, Environmental Principles for Piggeries, Feed Check, Mating and Reproduction, Pigs for Profit, Pig Health Management, PrimePlus and ProHand). Contact NSW DPI (agriculture) at Tamworth.

Reading

See the Pigs section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- NSW DPI's pig information at www.agric.nsw.gov.au/reader/pigs
- More pig industry and management information from Qld DPIF. Go www.dpi.qld.gov.au > Animal Industries > Pigs
- Australian Pork Ltd at www.apl.au.com

POULTRY

“Burrawong”, Grain fed free-range poultry. Ph 6569 0901, Fax 6569 0441. Web www.poultryofburrawong.com.au. They also have a certified organic processing facility there.

Contacts

- All aspects of management
 - Poultry Officer in the NSW DPI (agriculture) Tocal Paterson advisory office
- Development consent for commercial production
 - Local shire councils
- Producer groups
 - NSW Free Range Egg Producers Association

Reading

“A Guide to Keeping Poultry in Australia” by D Reading (1990). ISBN 0 670 90273 X. Viking Publishing. Available from most bookshops
“Backyard Poultry – Naturally” by A Moore (1998). ISBN 09585590 1 5. Python Press. Available from most bookshops
“Model Code of Practice for the Welfare of Animals: Domestic Poultry”. ISBN 0643068678. CSIRO Publishing. Available from most bookshops
See the Poultry section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- NSW DPI's poultry web site www.agric.nsw.gov.au/reader/poultry
- Australian Egg Corporation at www.aekl.org/public/content/home.asp?xcid=1
- Meat poultry issues and publications at www.nswfarmers.org.au/commodities/poultry_meat
- Egg production at www.nswfarmers.org.au/commodities/eggs/publications
- Qld DPIF's poultry web site. Go www.dpi.qld.gov.au > Animal Industries > Poultry
- University of Sydney's poultry information gateway at <http://vein.library.usyd.edu.au/links/poultry.html#general>

BEES

Contacts

- All beekeeping advice
 - apiary officer in NSW DPI (agriculture) at Tamworth
- Registration as a beekeeper (compulsory)
 - regulatory officers in NSW DPI (agriculture) at Coffs Harbour and Kempsey
- Beekeeping regulations and notifiable diseases
 - regulatory officers in NSW DPI (agriculture) at Coffs Harbour and Kempsey
- Beekeeping associations
 - NSW Apiarists' Association Inc.

Training Courses

“Bee Keeping”. Designed for new entrants to the industry. Contact Tocal Agricultural College, Paterson.
“Queen Bee Breeding”. For beekeepers with some experience. Contact Tocal Agricultural College, Paterson.

Reading

See the Bees section in the NSW DPI publications catalogue in the supplementary pack
“Australian Beekeeper”, a monthly magazine on beekeeping available from c/- Pender Bee Goods Pty Ltd, 34 Racecourse Rd, Rutherford, 2320. Phone (02) 4932 7244 or email penders@nobbys.net.au
“Honeybee News”, a bimonthly magazine available from, PO Box 352, Leichhardt, 2040. Phone (02) 9798 6240 or email honeybee@accsoft.com.au.

Web Sites

- All aspects of beekeeping at www.agric.nsw.gov.au/reader/honeybees/
- Directory of all beekeeping services at www.agric.nsw.gov.au/honeybees/directory-beekeeping-services.htm#NSW

AQUACULTURE

Contacts

- Aquaculture advice and details on funding schemes and contacts
 - Aquaculture Extension Officer in NSW DPI (fisheries) at Grafton
- Aquaculture permits and the application process
 - Aquaculture Administration Centre
- Whether development consent is needed
 - local shire councils
- Information on aquaculture markets
 - NSW Aquaculture Association
- Sydney Fish Market Authority
- Links to the regions aquaculture sector
 - Mid North Coast Regional Development Board
- Aquaculture producers group
 - NSW Aquaculture Association

Training Courses

“Intensive Recirculating Systems” and “Introduction to Water Quality” TAFEPLUS short courses. Contact Trenayr TAFE Campus at Grafton.

Reading

“Australian Fish Farmer: A Practical Guide to Aquaculture” by J Mosig and R Fallu (2004). ISBN 0643068651. Published by Landlinks Press. Available from most bookshops

Web Sites

- NSW DPI extension services, freshwater and saltwater aquaculture fact sheets and “NSW Aquaculture Industry Directory” at www.fisheries.nsw.gov.au/aquaculture
- Qld DPIF's aquaculture web site. Go www.dpi.qld.gov.au > Fisheries > Aquaculture
- NSW Aquaculture Association at www.nswaqua.com.au
- “FisheNews”, an eNewsletter about aquaculture in Australia at www.austasiaaquaculture.com.au/sector.php?sectorID=43

FIELD CROPS, HORTICULTURAL AND FORESTRY

FIELD CROPS

Contacts

- Agronomists, NSW Department of Primary Industries at Kempsey or Taree

Reading

See the Field Crops section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- NSW Dept of Primary Industries at www.agric.nsw.gov.au/crops

GENERAL HORTICULTURE

These resources are relevant for most horticultural crops

Contacts

- Horticulture Officers in NSW DPI (agriculture) at Coffs Harbour

Reading

See horticulture section in the NSW DPI publications catalogue in the supplementary pack
“Hortguide 2006”. A magazine listing products, services, suppliers, organizations and web sites for the horticultural industry. Available from newsagents
“Coastal Fruitgrowers Newsletter”. Available by subscription (phone Sandra Hardy on 02 4348 1900) or on the web at www.agric.nsw.gov.au/reader/hort-coastal

Web Sites

- Management advice for a wide range of horticulture crops, NSW DPI (agriculture) services, newsletters and related web links at www.agric.nsw.gov.au/reader/horticulture
- Qld DPIF's horticultural site.
Go www.dpi.qld.gov.au > Plant Industries > Fruit and Vegetables
- Links to horticulture at the federal, state and local level via the Department of Agriculture, Fisheries and Forestry's agricultural portal at www.agriculture.gov.au
- Rural Industries Research and Development Corporation's New Crops book at www.rirdc.gov.au/NewCrops/Contents.html
- Horticulture Australia at www.horticulture.com

AVOCADOS

In addition to General Horticulture resources

Contacts

- Producer body
 - Avocados Australia Ltd

Reading

“Talking Avocados” is the official magazine of Avocados Australia. Contact the industry manager to get on the mailing list.

The “Agrilink Avocado Information Kit”, the computerised management package Avoman and the avocado reference database AvolInfo are all available from Qld DPIF

“Avocado: Botany, Production and Uses” edited by AW Whiley et al. ISBN 0 85199 357 5. CABI Publishing, New York. Available from bookstores.

Web Sites

- Avocadosource – a free electronic library of avocado knowledge at www.avocadosource.com
- Avocados Australia Ltd at www.avocados.org.au

BANANAS

In addition to General Horticulture resources

The Mid North Coast is a “banana protected area”. In this area no bananas may be planted without a permit (including backyard bananas). Bananas plants infected with bunchy top, black sigatoga and Panama disease must be destroyed immediately. No banana plant material may be removed from any place without a permit. Growers must notify a regulatory officer within 24hrs of the presence of notifiable diseases or pests.

Contacts

- Permits and advice about disease control measures
 - Regulatory Officers in NSW DPI (agriculture) at Coffs Harbour and Kempsey
- Advice about management
 - BananasNSW
- Producer representative body
 - Australian Banana Growers Council is the peak body of the industry

Reading

- Newsletters
 - “Australian Bananas”. Contact the Australian Banana Growers Council
 - “Banana Bulletin”. Contact BananasNSW

Web Sites

- Industry contact list at www.abgc.org.au/pages/IndustryContacts/IndustryContacts.asp

CITRUS

In addition to General Horticulture resources

Contacts

- Producer representative body
 - Australian Citrus Growers Inc.
- Auscitrus (The Australian Citrus Propagation Assoc.) at www.auscitrus.com.au.

Reading

“Australian Citrus News”. Subscribe by contacting Australian Citrus Growers Inc or by downloading their subscription form at www.auscitrus.org.au > Communication > Australian Citrus News

“Australian Citrus Information CD”. Comprehensive information on growing citrus in Australia. See the Horticulture section in the NSW DPI publications catalogue in the supplementary pack.

Web Sites

- Citrus contacts in Australia at www.agric.nsw.gov.au/reader/citrus-contacts/cit-contact.htm and at www.auscitrus.org.au/internal.php?page_id=74
- Citrus management resources at www.auscitrus.org.au > Resources

CUT FLOWERS

In addition to General Horticulture resources

Contacts

- Producer Groups
 - Native Flower Growers' Association Inc.
 - Australian Native Flower Growers and Promoters Association
 - Blandfordia Research and Extension Group – Contact the Horticulture Officer (Greg Ireland) in NSW DPI (agriculture) at Coffs Harbour

Reading

“Commercial Flower Growing in NSW – an Industry Snapshot”. An agfact available from NSW DPI (agriculture) offices. This provides an overview of the industry as well as recommended reading and a long list of contacts

“Growing Australian Native Flowers Commercially”. An agfact available from NSW DPI (agriculture) offices.

“NSW Flower News”. Published on the NSW DPI web site www.agric.nsw.gov.au/reader/nsw-flower-news and sent to members of each industry association in NSW

Web Sites

- Australian New Crops at www.newcrops.uq.edu.au

MACADAMIAS

In addition to General Horticulture resources

Contacts

- Peak industry body
 - Australian Macadamia Society

Reading

“Macadamia Growers Handbook” by P O'Hare et al (2004) and “Field Guide – Macadamia Problem Solver & Bug Identifier” by E Gallagher et al (2003) are available from the Australian Macadamia Society

“MacMan” farm recording software. Order from the MacMan team on (07) 5441 2211 or email macman@dpi.qld.gov.au

Web Sites

- Australian Macadamia Society at <http://macadamias.org>

VEGETABLES

In addition to General Horticulture resources

Contacts

- Horticulturalist in NSW DPI (agriculture) at Narara for greenhouse and hydroponic vegetables
- Horticulturalists in NSW DPI (agriculture) at Yanco for larger scale field vegetables

Reading

“Australian Vegetable Growers Handbook”. For commercial growers and home gardeners. Available from the NSW DPI (agriculture) bookshop

Web Sites

- “Lettuce Leaf” newsletter for Australian lettuce growers. Available on the NSW DPI (agriculture) web site www.agric.nsw.gov.au/reader/lettuce-leaf
- “Vegiebites” newsletters discussing all issues affecting vegetable producers. Available on the NSW DPI (agriculture) web site www.agric.nsw.gov.au/reader/vegiebites

TEA TREE

In addition to General Horticulture resources

Contacts

- Advice on management
 - Bede Clarke, Agronomist in NSW DPI (agriculture) at Casino
- Producer organization
 - Australian Tea Tree Industry Association

Web Sites

- Research and/or publications -Rural Industries Research and Development Corporation www.rirdc.gov.au/programs/tto.html
- Tea Tree Group at www.meddent.uwa.edu.au/teatree

FORESTRY

Contacts

- Initial contact and source of information for those interested in forestry investment
 - Office of Private Forestry
- Native farm forestry approvals and plantation (>30 hectares) approvals
 - Farm Forestry Extension in DWE at Grafton
- Farm forestry and its integration with agricultural production
 - Forestry Officer in NSW DPI (agriculture) at Tamworth
 - Mid North Coast Farm Foresters (producer group)
- Harvesting timber for on-farm use (routine agricultural management activities)
 - NRCMA offices
- Hardwood and softwood plantations joint ventures
 - Forests NSW joint venture hotline
- Private farm forestry network on the mid north coast
 - Mid North Coast Farm Foresters (producer group)

Training

“Master Tree Growers” course. Contact your local Landcare office for more details

Reading

“Private Native Forestry and the Native Vegetation Act 2003” information sheet available from NRCMA offices

“What are the Exemptions for Routine Agricultural Management Activities in Coastal CMAs?” in the native vegetation section of this kit.

See publications in NSW DPI publications catalogue” in the supplementary pack

Websites

- Agroforestry fact sheets and agroforestry contacts at www.agric.nsw.gov.au/reader/agroforestry
- Timber plantations in northern NSW at www.nio.com.au/forestry/timber_plantations_in_northern_n.htm
- Joint venture agroforestry program at www.rirdc.gov.au/aft.htm
- How to establish forest plantations with State Forests at www.forests.nsw.gov.au/planting/default.asp
- Mid North Coast Farm Foresters producer group at www.mncff.org.au

NEW AND EMERGING INDUSTRIES

Government departments tend to concentrate their expertise on larger established industries. Hence, there is often little research and expertise available for landholders taking up new and emerging industries. Always check with your local NSW DPI office first to find out what advice is available. However, often you will need to seek out producer networks or associations for support.

Contacts

- Local NSW DPI (agriculture) offices
- Mid North Coast Regional Development Board lists a wide range of contacts for new and emerging industries and is developing a range of discussion groups
- Australian New Crops. Contact about information on potential, new or emerging crops and who is working in the area
- Rural Industries Research and Development Corporation. Many publications and links to new and emerging industries
- North Coast Bushfoods Group Co-operative.
- Native Flower Growers Association

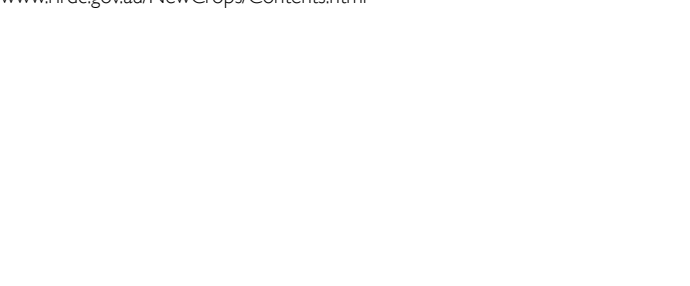
Reading

“The New Rural Industries. A Handbook for Farmers and Investors” by K Hyde

“The New Crop Industries Handbook” edited by S Salvin et al (2005). Available from the Rural Industries Research and Development Corporation

Web Sites

- Mid North Coast Regional Development Board at www.betterbusiness.nsw.gov.au
- Qld DPIF's list of discussion groups for many small and new industries at <http://lists.dpi.qld.gov.au>
- The New Crop Industries Handbook at www.rirdc.gov.au/NewCrops/Contents.html



ORGANIC FARMING

Organic farming covers production in all areas of agriculture. If there is an advisor for the particular enterprise (see above) refer to them first. However, many organic enterprises involve small and emerging industries that do not have a specialist government advisor. In this case, you will need to contact local and state and national organizations to develop the networks and knowledge required.

Contacts

- Organic Farming Liaison Officer, NSW DPI (agriculture) at Yanco
- Mid North Coast Regional Development Board in Port Macquarie for a full list of all organic organizations and networks
- Mid North Coast Organics Inc.
- Hastings Organic Group Inc.
- Coffs Regional Organic Producers Organisation Inc (CROPO)
- Biodynamic Agriculture Australia
- Organic Federation of Australia
- Organic Growers of Australia
- Australian Certified Organic & Biological Farmers of Australia

Reading

“Organic Farming – An Introduction”. Describes the principles and benefits of organic farming and how to convert existing farm practices. See the Organic Farming section in the NSW DPI publications catalogue in the supplementary pack.

“Organic Farming – Soils, Crops, Fruit and Vegetables”. Looks at growing and marketing organic vegetables, fruit and grain. See the Organic Farming section in the NSW DPI publications catalogue in the supplementary pack.

“Organic Farming – Livestock”. Shows how to produce livestock using organic methods, with an emphasis on sheep and wool. See the Organic Farming section in the NSW DPI publications catalogue in the supplementary pack.

Web Sites

- NSW DPI (agriculture) “Organic News” and organic links at www.agric.nsw.gov.au/reader/organic

- Rural Industries Research and Development Corporation’s organic produce research program at www.rirdc.gov.au/programs/org.html

- QDPIF’s “OrganicNews” newsletter. Go www.dpi.qld.gov.au > Services > Newsletters

- The Organic Federation of Australia and its newsletter “Organic Updates” at www.ofa.org.au

FARM BASICS

Pesticide Usage
Certification is required to use pesticides

Contacts

- Pesticide usage in pastures or crops
 - Agronomists in NSW DPI (agriculture) at Kempsey and Taree
- Pesticide usage in horticulture
 - District Horticulturalists in NSW DPI (agriculture) at Coffs Harbour
- Pesticide usage for stock
 - Private vets (see Veterinarians in the yellow pages)
 - Livestock Officer in NSW DPI (agriculture) at Taree

Training Courses

“SmartTrain: Chemical Application (AQF level 3)”. A 2-day course that provides accreditation for those who use pesticides with powered and handheld application equipment. Contact Tocal College in NSW DPI (agriculture) at Paterson or TAFE NSW.

SmartTrain: Chemical Risk Management (AQF level 4). A 2-day course for

contractors, landholders and managers that concentrates on risk management. Contact Tocal College, Paterson, 2421. Phone 1800 025520 or email Contact Tocal College in NSW DPI (agriculture) at Paterson

See the Environmental Protection authority’s web site for a list of other organizations providing pesticide training at www.environment.nsw.gov.au/internet/pesticides/trainers.htm

Further organizations providing pesticide training can be found in the yellow pages

Reading

See Pesticide Usage in the Weeds section of this kit

See publications in “NSW DPI Publications Catalogue” in the supplementary pack

Web Sites

- All aspects of the requirements for pesticides use at www.environment.nsw.gov.au/internet/pesticides

FENCING

Adjoining owners are jointly responsible for maintaining a sufficient dividing fence between properties (Dividing Fences Act 1991). If you damage the fence then you are solely responsible. For disputes, the Act spells out your rights and obligations. Where a neighbour won’t contribute to the repair or erecting of new dividing fence, the matter can be heard by your local land board. Government bodies are not obliged to contribute to the maintenance of dividing fences. You are required to maintain an adequate boundary fence (fence type depends on the type of livestock) and to undertake immediate repair to avoid liability for straying stock. To minimise the loss of fences during flooding, use plain wire fencing along streams liable to flooding. Funding is sometimes available for fencing streams and native vegetation.

Contacts

- Advice and construction
 - Local fencing contractors (see under “fencing contractors” in the yellow pages)
- Funding for streamline and native vegetation fencing
 - NRCMA
 - Landcare community support officers

Training Courses

“Fencing” by NSW Dept of Primary Industries. Fencing layout, designs and types for different classes of stock and property. Contact NSW Department of Primary Industries (Tocal Agricultural College, Paterson)

Reading

“Cattle Yards: Design, Materials and Construction” by E Powell (1998). ISBN 0724222596. Published by Qld DPIF. Available from Qld DPIF or most bookstores.

“Agskills: Fencing”, “Fencing” and “Electrical Fencing”. See the Fencing, Gates and Gear section in the NSW DPI publications catalogue in the supplementary pack

Web Sites

- Cattle yards and equipment design at www.agric.nsw.gov.au/reader/yards

- Goat fencing at www.agric.nsw.gov.au/reader/goats

EQUIPMENT

A permit is required from the RTA to drive an unregistered vehicle (e.g. tractor) on public roads. 4WD tractors are needed to safely work much of the steeper country in the region. All tractors weighing more than 560kg are required to have Roll Over Protection Structures (ROPS)

Contacts

- Tractor PTO guarding subsidies
 - WorkCover

Training Courses

Operate Chainsaws. Contact Tocal College in NSW DPI (agriculture) at Paterson

Chainsaw Operations. Contact NSW TAFE

Safe Use of Tractors. Contact Tocal College in NSW DPI (agriculture) at Paterson

Safe operation and maintenance of tractors. Contact Tocal College in NSW DPI (agriculture) at Paterson

Reading

Tractor Agskills: A Practical Guide to Farm Skills. Available from the NSW DPI (agriculture) book store

See the Farm Machinery section in the NSW DPI publications catalogue in the supplementary pack

Websites

- Rural farm safety, training and training course providers at WorkCover www.workcover.nsw.gov.au/Industry/Rural/Default.htm and at FarmSafe Australia www.nohsc.gov.au/OHSInformation/NOHSCPublications/factsheets/farm1.html

Contacts

Aboriginal Land Councils and Corporations

Bowraville Aboriginal Land Council

High St. Bowraville.
Phone: (02) 65 647 812

Birpai Local Aboriginal Land Council

PO Box 876, Port Macquarie NSW 2444
Phone: (02) 65849066
Fax: (02) 65838172
Email: birpailalc@midcoast.com.au
Services include: Land acquisition, claims and community

Booroongen Djugun Aboriginal Corporation

Locked Bag 3, Kempsey NSW 2440
Phone: (02) 65 621 572
Services include: Accommodation, Cultural Education & Training, Health & Welfare and Aboriginal Extension Project Officer: Birpai, Dunghutti and Thungutti communities
Amie McElroy
Phone: (02) 65 621 729
acso@booroongencollege.nsw.edu.au

Bunyah Local Aboriginal Land Council

PO Box 90, Wauchope NSW 2446
Phone: (02) 65 853 882

Dunghutti Elders Council Aboriginal Corporation

2 John Street, Kempsey, PO Box 179, Kempsey
Elders Contact: Ruth Maruca
Phone: (02) 65 622 855

Kempsey Local Aboriginal Land Council

PO Box 540 Kempsey NSW 2440
Phone: (02) 65 628 688

Nambucca Heads Local Aboriginal Land Council

2/3 Sussex Street, PO Box 358, Nambucca Heads NSW 2448
Phone: (02) 65 689 281
Fax: (02) 65 689 161
Email: nhlalc@bigpond.com
Services include: Land acquisition, claims and community housing

Ngurrala Aboriginal Corporation

PO Box 62
Macksville NSW 2447
Phone: (02) 65 684 400
Services include: Cultural, Education & Training, Land Councils

NRCMA Aboriginal NRM Facilitator

PO Box 1417, Coffs Harbour NSW 2450
Ph: (02) 66 530 150

Thungutti Local Aboriginal Land Council

c/- Bellbrook Post Office, Bellbrook NSW 2440
Phone: 6567 2050
Fax: (02) 65 672 169
Services include: Land acquisition and claims

Unkya Local Aboriginal Land Council

Suite 7, 17-19 Wallace Street
PO Box 319
Macksville NSW 2447
Phone: (02) 65 682 786
Fax: (02) 65 682 610
Email: unkyalalc@tsn.cc
Services include: Land acquisition, claims & Housing for Aboriginal People

Agriculture, Fisheries and Forestry, Department of (Commonwealth) - DAFF

Responsible for agriculture, fisheries and forestry at the national level. Provides an internet portal to government information at local, state and commonwealth level for agricultural natural resource management, industries, products and agribusiness
GPO Box 858, Canberra, ACT, 2601
Agriculture enquiries (02) 62 725 680
Fisheries enquiries (02) 62 725 777
Forestry enquiries (02) 62 724 679
Web sites: home page www.affa.gov.au, agricultural portal www.agriculture.gov.au

Apiarists' Association (NSW)

Represents commercial beekeepers' interests and produces a bi-monthly newsletter for members. Has a north coast branch in Kempsey.
Julie Lockhart (State Secretary/Treasurer)
PO Box 3018, Toongabbie East, NSW, 2146
Phone: (02) 96 313 934
Email: nswaa@bigpond.net.au

Aquaculture Association, NSW

Peak industry body that represents land-based aquaculturalists in NSW. Includes marketing, research, fact sheets, etc
Web site: www.nswaqua.com.au/
Margaret Grose (North Coast branch)
Phone: (02) 65 615 204

Australian Banana Growers Council

Peak body that represents the Australian banana industry. Includes marketing, research, fact sheets, etc
PO Box 309, Brisbane Market, Qld, 4106
Phone: (07) 32 784 786
Email: abgc@abgc.org.au
Web site: www.abgc.org.au

Australian Citrus Growers Inc.

Peak body of the Australian citrus growing industry. Includes marketing, research, fact sheets, events and seasonal updates
PO Box 5091, Mildura, Vic, 3502
Phone: (03) 50 236 333
Email: admin@australiancitrusgrowers.com
Web site: www.australiancitrusgrowers.com

Australian Macadamia Society

Peak macadamia industry body. Provides statistics, grower guides, contacts, fact sheets, etc
Suite 1, 113 Dawson St, Lismore, 2480
Phone: (02) 66 224 933
Email: admin@macadamias.org
Web site: http://macadamias.org

Australian Native Flower Growers and Promoters

Producer group providing news, events and promotion regarding the native flower industry
PO Box 4327, East Gosford, 2250
Phone: (02) 43 655 510
Email: olgab@netseek.com.au
Web Site: www.anfgpa.com

Australian New Crops (University of Queensland Gatton)

Contact about information on potential, new or emerging crops and who is working in the area.
Dr Rob Fletcher, School of Agriculture and Horticulture, The University of Queensland Gatton, 4343
Phone: (07) 54 601 311
Email: r.fletcher@mailbox.uq.edu.au
Web site: www.newcrops.uq.edu.au/

Australian Pork Ltd

National representative body for Australian pig producers. Includes marketing, research, fact sheets, events and seasonal updates
PO Box 148, Deakin West, ACT, 2600
Phone: 1800 789 099
Email: apl@australianpork.com.au
Web Site: www.apl.au.com

Australian Tea Tree Industry Association

Peak body of the Australian tea tree growing industry. Includes market data, research, links, etc
PO Box 20, Tweed Heads, 2485
Phone: (02) 66 742 925
Email: enquiries@attia.org.au
Web site: www.teatree.org.au

Avocados Australia

Peak industry body in Australia Includes marketing, research, fact sheets, events and seasonal updates
PO Box 663, Stones Corner, Qld, 4120
Phone: (07) 33 912 344
Email: admin@avocado.org.au
Web Site: www.avocado.org.au

BananasNSW

A statutory body set up to aid and advise NSW banana growers. They employ an agronomist as an Industry Development Officer.
PO Box 775, Murwillumbah, 2484
Phone: (02) 66 726 633
Web Site: www.bananasnsw.org.au

Biodynamic Agriculture Australia

A not-for-profit producer-based organization that promotes the biodynamics in agriculture
PO Box 54, Bellingen, 2454
Phone: (02) 66 550 566.
Email bdoffice@biodynamics.net.au
Web Site www.biodynamics.net.au.

Biological Farmers of Australia and Australian Certified Organic

A representative organic body that provides assistance in market intelligence, exporting requirements, and development of contacts and networks.
Head Office, PO Box 530 – L1/766 Gympie Rd, Chermside, Qld, 4032
Phone: (07) 33 505 716
Email : info@australianorganic.com.au and info@bfa.com.au
Web Site www.bfa.com.au

Coffs Harbour Botanic Gardens Herbarium

Provides free plant identification. Plants can be posted or left at the herbarium from 9-12am on Monday, Tuesday or Friday. Up to 5 plants are identified for free in any 3 month period
Via Hardacre St or PO Box 648, Coffs Harbour, 2450
Phone: (02) 66 484 898

Coffs Regional Organic Producers Organisation (CROPO)

A largely small scale and backyard organics producer group
PO Box 363, Coffs Harbour, 2450
Phone: (Desnee McCosker) (02) 66 516 880
Email: bes.bunyip@bigpond.com

Community Services, Department of

Lead government agency responsible for providing immediate welfare assistance to victims of disasters including drought, flood and bushfire
Web Site: www.community.nsw.gov.au

Kempsey Community Services Centre
33-37 Smith St, Kempsey, 2440
Phone: (02) 65 621 385

Port Macquarie Community Services Centre
143a Horton St, Port Macquarie, 2444
Phone: (02) 65 833 622

State Disaster Recovery Centre
Phone: 1800 018 444

Country Women's Association - CWA

A voluntary organization that works to improve conditions for country women and their families. Provides a support network and a voice to government. There are branches at Bonny Hills, Bowraville, Eungai-Stuarts Point, Kempsey, Kendall, Macksville, Nambucca Heads, Port Macquarie, South West Rocks, Wauchope and Willawarrin.
Web site: www.cwaofnsw.org.au

Mid North Coast Group
Mrs Margaret Oswald (Group President)
Phone: (02) 65 835 506
Email: Oswald@tsn.cc

Environment and Climate Change, Department of (NSW) - DECC

Web site: www.environment.nsw.gov.au
Coast and Estuary - (02) 65 614 975
Flora and Fauna Protection - See NPWS
Private Native Forests - (02) 66 530 103

Botanical Information Service, National Herbarium of NSW, Botanic Gardens Trust

Identifies plants for the public. Prices are currently \$11 for 1 plant and \$110 per hour thereafter. At the time of printing, limited numbers of samples could be sent for free through NSW DPI (agriculture)
Mrs Macquaries Rd, Sydney, 2000
Urgent enquiries (e.g. poisonous plants): (02) 92 318 111
Email: botanical.is@rbgsyd.nsw.gov.au
Web site: www.rbgsyd.nsw.gov.au/information_about_plants/botanical_info

Environment Protection Authority - EPA

Responsible for administering the Protection of the Environment Operations Act 1997. Contact for information on the regulations regarding pesticide usage (Pesticides Act 1999) and air, water, land or noise pollution.

Sydney Office
59 Goulburn St, Sydney, 2000
Information line 131 555
Email: info@environment.nsw.gov.au
Web site: www.epa.nsw.gov.au

Coffs Harbour Office
24 Moonee St.
Phone: (02) 66 515 946

Grafton Office
49 Victoria St.
Phone: (02) 66 402 500

National Parks & Wildlife Service - NPWS

Responsible for maintaining the parks and reserve system, and conserving natural and cultural heritage in NSW. Contact for information on native plants, animals and habitats; their identification, management, regulations and licensing requirements. They also offer a number of incentive schemes for landholders interested in nature conservation
Information line 1300 361 967
Email: info@npws.nsw.gov.au
Web site: www.npws.nsw.gov.au

Mid North Coast Regional Office
152 Horton St, Port Macquarie, 2444
Phone: (02) 65 868 300

Coffs Harbour Office
24 Moonee St.
Phone: (02) 66 507 100

Coffs Area Office
Marina Drive
Phone: (02) 66 520 900

Environment and Heritage, Department of (Commonwealth) - DEH

Responsible for matters of national environmental significance. It administers the Environment Protection and Biodiversity Conservation Act 1999 and manages the National Heritage Trust. Provides an internet portal to government information at the local, state and commonwealth level on environmental issues covering atmosphere, biodiversity, coasts and oceans, environment protection heritage, inland waters and land.
GPO Box 787, Canberra, ACT, 2601
Phone: (02) 62 741 111
Email via enquiry page at www.deh.gov.au/erin/comments.html
Web sites: home page www.deh.gov.au, environmental portal www.environment.gov.au

Environmental Defender's Office (NSW) - EDO

A not-for-profit community legal service specialising in public interest law, assisting individuals and community groups working to protect the natural and built environment. Provides easy to read fact sheets and other publications on environmental law
Level 9, 89 York St, Sydney, 2000
Phone: 1800 626 239
Email: edonsw@edo.org.au
Web site: www.edo.org.au/edonsw/site/

EPA Environment Protection Authority (See DECC)

Farmers Association (NSW)

A voluntary industry body representing the farming community. Contact for information on farmer education and training, matters affecting rural industries, industrial relations, rural issues and local agricultural events
Phone: (02) 82 511 700
Email: emailus@nswfarmers.org.au
Web site: www.nswfarmers.org.au

North Coast Region
Regional Service Manager
Phone: (02) 65 642 355
Email: burtm@nswfarmers.org.au
Web site: www.nswfarmers.org.au/about_us/regional/region_7_nc

FAWNA (For Australian Wildlife Needing Aid)

A volunteer group that rescues and rehabilitates orphaned and injured wildlife
PO Box 218, Wauchope, 2446
Phone : (02) 65 814 141.
This covers Hastings and Macleay shires. For Nambucca see WIRES.

Free Range Egg Producers Association

A producer group
Phone: (02) 45 723 315

Growsearch Australia

Growsearch is an information database of over 28,000 articles for producers of ornamental, horticultural and nursery crops. Searches are free, but photocopying of articles are charged. Articles are cheaper if you become a member.
PO Box 327, Cleveland, Qld, 4163
Phone: (07) 38 213 784
Email: growsearch@dpi.qld.gov.au
Web site: www2.dpi.qld.gov.au/growsearch

Horticulture Australia

A national research, development and marketing organization for the horticulture industry. Includes reports, news and events.
Level 1, 50 Carrington St, Sydney, 2000
Phone: (02) 82 952 300
Email on the form at www.horticulture.com.au/contactus/contactus.asp
Web site: www.horticulture.com.au

Land & Water Australia (Commonwealth) - LWA

Provides a wide range of information about land, water and vegetation management (fact sheets, guidelines, manuals, etc)
GPO Box 2182, Canberra, ACT, 2601
Phone: (02) 62 636 000
Email: public@lwa.gov.au
Web site: www.lwa.gov.au

Land Boards

Community-based tribunals that deal with local disputes, complaints, appeals and inquiries about such matters as dividing fences, road closures, crown land (permits, rents and leases) and appeals against RLPBs regarding carrying capacity decisions. For more information on their roles visit
Armidale (02) 67 725 488
Grafton (02) 66 402 046

Landcare

A nationwide program funded by the federal government for the purpose of facilitating community activities in environmental land management. Each catchment has a community support officer, who can provide regular news on land management funding, workshops and field days in your catchment.
Web: www.landcarensw.org

Nambucca Valley Landcare
PO Box 239, Bowraville, 2449
Phone: (02) 65 647 838
Email: tryan@nvlandcare.org.au
Website: www.nvlandcare.org.au

Macleay Landcare Network
PO Box W48, West Kempsey, 2440
Phone: (02) 65 622 076
Email: macleaylandcare@tsn.cc

Hastings Landcare Inc.
PO Box 126, Wauchope, 2446
Phone: (02) 65 864 465
Email: hastingslandcare@midcoast.com.au
Website: www.hastingslandcare.org.au

Lands, Department of (NSW)

Web site: www.lands.nsw.gov.au

Crown Lands

Provides information on the Dividing Fences Act 1991 and crown lands, which it administers and manages under the Crown Lands Act 1989.
98 Victoria St, Taree, 2430
Phone: (02) 65 522 788
Email via the enquiry form at www.lands.nsw.gov.au/crownlandsenq.htm

Land and Property Information

Provides land title registration, property information, valuation, surveying and mapping.
GPO Box 15, Sydney, 2001
Phone: (02) 92 286 666
Email via the enquiry form at www.lands.nsw.gov.au/LPIenquiry.htm

Map Sales

Provides aerial photographs of properties
PO Box 143, Bathurst, 2795
Phone (02) 63 328 123
Email at www.lands.nsw.gov.au/MapsAndPhotos/mapsalesenq.htm

Soil Conservation Services

Provides professional and technical services in conservation earthworks, erosion control, water resource management, rural property planning and soil and water testing
John St, Singleton Town Centre, Singleton, 2330.
Phone: (02) 65 721 707
Email via the enquiry form at www.lands.nsw.gov.au/SoilServices/Soilservenq.htm

Legislation Online

Lists all government legislation
NSW www.legislation.nsw.gov.au
Commonwealth scaleplus.law.gov.au

Meat and Livestock Australia

Producer-owned company that provides services such as marketing, research and development, market intelligence and tips and tools for a wide range of farm management issues.
Locked Bag 991, North Sydney, 2059
Phone (free call): 1800 023 100
Web site: www.mla.com.au

Mid North Coast Farm Foresters

MNCFs are landowners operating in the mid north coast who have an interest in farm forestry. Contact for information, training, research and development in farm forestry
PO Box 239, Bowraville, 2449
Phone: (02) 65 647 916
Email: mncff@tsn.cc
Web site: www.mncff.org.au

Mid North Coast Organics Inc

MNC Organics Inc is a producer network designed to help organic and biodynamic farmers on the mid north coast. Contact to network with other producers and for information and training opportunities
Phone: (Simone Winter – President) (02) 65 617 402

Mid North Coast Regional Development Board

The boards role is to advance the economic development of the mid north coast. The board has some of the best contacts for new and emerging agricultural enterprises, farm forestry and organic agriculture (including an organics industry email discussion group).
Suite 1, 133-137 Gordon St, PO Box 2537, Port Macquarie, 2444
Phone: (02) 65 835 647
Email: mncrdb@betterbusiness.nsw.gov.au
Web site: www.betterbusiness.nsw.gov.au

National Parks & Wildlife Service – see Department of Environment and Climate Change (DECC)

Services: Cultural Heritage Officers to assist with identifying whether your land harbours places of importance to Aboriginal people and how you can manage them best.

Mid North Coast Regional Office
152 Horton Street, Port Macquarie NSW 2444
Ph: (02) 65 868 300

Native Flower Growers’ Association Inc.

The NFGA are a producer group based on the mid north coast who commercially grow native flowers. Contact them to network with other growers and access technical and cultural information.
Harry Kebbler, 23 Plover Lane, Kempsey, 2440
Phone: (02) 65 674 266
Email: nfga@australiannativeflowers.com.au
Web site: www.australiannativeflowers.com.au

Natural Resources, Department of (NSW) - DNR

See Water and Energy, Department of (NSW) - DWE and Environment and Climate Change, Department of (NSW) - DECC

North Coast Bushfoods Group Co-Operative

Bushfoods producer group
Phone: Margaret Grose (02) 65 569 656

Northern Rivers Catchment Management Authority (NSW) - NRCMA

Responsible for developing the regions catchment action plan, as well as providing education, training and funding in natural resource management. The CMA is the primary contact for anything to do with native vegetation, property vegetation plans and many other natural resource management issues
Email: northern@cma.nsw.gov.au
Web site: www.northern.cma.nsw.gov.au

Coffs Harbour Office AMP Centre, 24 Gordon St, Coffs Harbour, 2450 Phone: (02) 66 530 150	Kempsey Office 41 Belgrave St, Kempsey, 2440 Phone: (02) 65 614 960
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Office of Private Forestry

Initial contact point and source of information for those interested in forestry investments in NSW
GPO Box 39, Sydney, 2001
Phone: (02) 92 286 437
Fax: (02) 92 286 458
Email: jonathan.clark@dwe.nsw.gov.au
Web site: www.opf.nsw.gov.au/

Organic Federation of Australia

Peak body for the organic industry in Australia
Phone: (02) 92 998 016
Email: info@ofa.org.au
Web site: www.ofa.org.au

Organic Growers of Australia

A national organic body providing certification for farmers and processors
Phone: (02) 66 220 100
Email: ohga@nrg.com.au
Web site: www.organicherbs.org/ohga.html

Port Macquarie Neighbourhood Centre Inc.

Provides information, assistance, advice and referral on the range of community services available in the Hastings
Web site: www.pmninfo.org.au

Community Information and Referral Centre

Shop 6, Peachtree Walk Arcade, 78-82 Horton St Port Macquarie, 2444
Phone: (02) 65 841 914
Email: pmncinfo@midcoast.com.au

Primary Industries, Department of (NSW) – NSW DPI

Web site: www.dpi.nsw.gov.au

Agriculture division

Primary contact for information regarding agricultural production: pastures, crops, horticulture, dairying, beef cattle, soils, etc
Web: www.agric.nsw.gov.au

Bookshop
For purchasing of departmental publications
Orange Agricultural Institute, Orange, 2800
Phone: 1800 028 374
Email: bookshop@agric.nsw.gov.au
Online purchases: www.bookshop.nsw.gov.au/agencydetails.jsp?agency=27

Camden Office – Floriculture Development Officer
Contact for cut flower industry enquiries
Elizabeth Macarthur Institute, PMB 8, Camden, 2570.
Phone: (02) 46 406 437
Email: bettina.gollnow@dpi.nsw.gov.au

Casino Office – Agronomist
Contact for tea tree enquiries
PO Box 376, Casino, 2470.
Phone Bede Clarke on (02) 66 621 107

Coffs Harbour Office – District Horticulturalist and Regulatory Officer
Contact for horticulture and beekeeping regulations enquiries
Suite 5/Level 1, “City Square”, 76 Harbour Drive, Coffs Harbour, 2450.
Phone: (02) 66 503 111

Gosford Office – Horticulturalist (vegetables)
Contact for greenhouse and hydroponic vegetables
Gosford Horticultural Institute, Research Rd, Narara, 2250
Phone: (02) 43 481 900
Email: jeremy.badgery-parker@dpi.nsw.gov.au

Grafton Office – Waterwise Officer
Contact for irrigation information
Agricultural Research & Advisory Station
Trenayr Rd, Junction Hill, 2460
Phone: (02) 66 401 600

Kempsey Office – Dairy Officer, Agronomist and Regulatory Officer
Contact for dairying, pastures, cropping, beekeeping regulations and notifiable diseases
31 Elbow St, West Kempsey, 2440
Phone: (02) 65 626 244
Email: kempsey.office@dpi.nsw.gov.au

Tamworth Office – Apiary, Forestry and Pig Officers
Contact for beekeeping, agroforestry and pig enquiries
Tamworth Agricultural Institute, 4 Marsden Park Rd, Calala, 2340
Phone: (02) 67 631 100
Email: john.rhodes@dpi.nsw.gov.au for beekeeping, brendan.george@agric.nsw.gov.au for forestry and greg.roese@dpi.nsw.gov.au for pigs

Taree Office – Agronomist, Beef Cattle Officer and Dairy Officer
Contact for dairying, beef cattle, pastures and cropping
1 Macquarie St, Taree St, West, 2430.
Phone: (02) 65 527 299
Email: taree.office@dpi.nsw.gov.au

Tocal College
Contact for agricultural training courses
Web site: www.tocal.com
‘Tocal’, Paterson, 2421
Phone: 1800 025520
Email: info@tocal.com

Tocal Paterson Office – Poultry Officer
Contact for poultry
‘Tocal’, Paterson, 2421
Phone: (02) 49 398 888
Email: tocal.office@dpi.nsw.gov.au

Yanco Office – Organic Farming Liaison Officer and Horticulturalists (vegetables)
Yanco Agricultural Institute, Yanco, 2703
Contact For organics advice
Robyn Neeson: phone (02) 69 512 611
or email robyn.neeson@agric.nsw.gov.au
Contact for larger scale field vegetable growing information
Tony Napier: phone (02) 69 512 796 or email tonynapier@dpi.nsw.gov.au
Mark Hickey: phone (02) 69 512 523 or email mark.hickey@dpi.nsw.gov.au

Fisheries division

Contact for all information regarding fisheries and aquaculture
Web: www.fisheries.nsw.gov.au
Aquaculture Administration
Information on aquaculture permits
Port Stephens Fisheries Centre, Taylors Beach Rd, Taylors Beach, 2316
Phone: (02) 49 821 232

Grafton Aquaculture Centre, Grafton, 2460 –
Aquaculture Extension Officer
Contact for aquaculture information
Phone: (02) 66 401 692
Email: readp@fisheries.nsw.gov.au

Port Macquarie Office
Contact for fisheries and aquaculture
16 Jindalee St, Port Macquarie, 2444.
Phone: (02) 65 814 084
Email: hastings@fisheries.nsw.gov.au

Taree Office
Contact for fisheries and aquaculture
Tuncurry, 2 Palm St Tuncurry 2428.
Phone: (02) 65 916 300

Forests NSW division

Contact for joint venture forestry information. Farm forestry information is on the agriculture web site www.agric.nsw.gov.au/reader/agroforestry
Locked Bag 23, Pennant Hills, 2120
Phone (02) 99 804 100
Hardwood Joint Venture Hotline: (02) 66 430 400
Softwood Joint Venture Hotline: (02) 60 431 007
Email: Cumberland@sf.nsw.gov.au
Web site: www.dpi.nsw.gov.au/forests

Primary Industries and Fisheries, Department of (Qld) - QDPIF

Queensland’s equivalent of the Department of Primary Industries (NSW). More tropically orientated, but has a large amount of information that is relevant to the mid north coast
GPO Box 46, Brisbane, Qld, 4001
Phone: (07) 34 046 999
Web site: www.dpi.qld.gov.au
Specialty crops web site: www2.dpi.qld.gov.au/themaclists/1073.htm

Regional Land Council Office

Suite 7, 2nd Floor
54 Belgrave Street, PO Box 305, Kempsey NSW 2440
Phone: (02) 65 626 395
Fax: (02) 65 627 322
Service include: Servicing local Aboriginal Land Councils and providing administrative support

Royal Society for the Prevention of Cruelty to Animals (RSPCA)

An animal welfare organization, which can be contacted for information on animal welfare and to report cases of animal cruelty
Web site: www.rspcansw.org.au

Kempsey Branch PO Box 301, Kempsey, 2440 Phone: (02) 65 621 644 Email: kempseyrspca@midcoast.com.au Web site: www.rspcansw.org.au/branches/kempsey/index.htm	Port Macquarie Branch PO Box 5504, Port Macquarie, 2444 Phone: (02) 65 810 382	Taree Branch PO Box 33, Taree, 2430 Phone: (02) 65 517 111
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Rural Assistance Authority (NSW)

Responsible for administering assistance measures to rural producers and small businesses on behalf of the Commonwealth and State Governments.
Locked Bag 23, Orange, 2800
Phone: 1800 678 593
Email: rural.assist@raa.nsw.gov.au
Web site: www.raa.nsw.gov.au

Rural Financial Counselling Service

Provides free and independent financial advice for farm families, fishers and small rural businesses in financial difficulty. Includes assistance with identifying financial options and negotiating with lenders, information about government assistance schemes and referrals to professional services.
Web site: www.ruralcounselling.org.au
Mid North Coast Rural Counselling Service
PO Box 456, Macksville, 2447
Phone: (02) 65 683 888
Email: ruralc@nor.com.au

Rural Fire Service (NSW)

Responsible for fire suppression and prevention in rural NSW. Contact for all information about fires - management, emergencies and training in fire fighting
Web site: www.rfs.nsw.gov.au
For public enquiries Phone: 1800 NSW RFS or 1800 679 737
For fire reporting Phone: 000

Nambucca Fire Control Centre Kelly Close, Macksville, 2447 Phone: (02) 65 682 536
Macleay Fire Control Centre North St, West Kempsey, 2440. Phone (02) 65 621 964
Hastings Fire Control Centre Cameron St, Wauchope, 2446 Phone: (02) 65 864 565

Rural Industries Research and Development Corporation

A government organization that is responsible for funding research on, and helping develop, rural industries. They supply a range of reports, newsletters and other publications on new and established rural industries.
Level 1, AMA House, 42 Macquarie St, Barton, ACT, 2600
Phone: (02) 62 724 819
Email: rirdc@rirdc.gov.au
Web site: www.rirdc.gov.au

Rural Lands Protection Board (NSW) - RLPB

Responsible for the administration and management of stock identification (NLIS), stock movement, travelling stock reserves, livestock disease control, pest animal/insect control and natural disaster relief
Web site www.rlpb.org.au

Kempsey Office 83 Belgrave St, Kempsey, 2440 Phone: (02) 65 627 822 Email: kempseyrlpb@midcoast.com.au Web site: www.rlpb.org.au/Kempsey
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Shire Councils

Contact about rates, roads, bridges, waste, community services, water and sewage services, flood mitigation, noxious weeds, tree clearing, acid sulphate soils and all development applications

Kempsey Shire Council Community services available in the shire are listed at www.kempsey.nsw.gov.au/shireserv.htm Elbow St (cnr Tozer St), West Kempsey, 2440 Phone: (02) 65 663 200. Email: ksc@kempsey.nsw.gov.au Web site: www.kempsey.nsw.gov.au
Nambucca Shire Council Princess St, Macksville, 2447 Phone: (02) 65 682 555 Email: council@nambucca.nsw.gov.au Web site: www.nambucca.nsw.gov.au
Port Macquarie-Hastings Shire Council Community services in the shire are listed by the Port Macquarie Neighbourhood Centre at www.pmninfo.org.au/community-directory.htm Burrawan St (cnr Lord St), Port Macquarie, 2444 Phone: (02) 65 818 111 Email: council@hastings.nsw.gov.au Web site: www.hastings.nsw.gov.au

State Emergency Service (NSW) - SES

A volunteer emergency and rescue service that is the lead response agency for floods and storms across NSW. Contact when requiring assistance for storms and floods and about preparing for them (However, see Kempsey Shire Flood-safe guides at www.mhl.nsw.gov.au/www/kempffloodlinks.html
For emergencies phone: 132 500
For volunteering and safety information phone: 1800 201 000
Email via the enquiry form at www.ses.nsw.gov.au/contacts.htm
Web site: www.ses.nsw.gov.au

For general enquiries phone: Camden Haven (02) 65 598 202 Gladstone (02) 65 674 369 Kempsey (02) 65 622 228 Nambucca (02) 65 681 136 Port Macquarie (02) 65 832 322 South West Rocks (02) 65 666 675 Taree (02) 65 525 866 Wauchope (02) 65 850 155 Kempsey SES web site: www.midcoast.com.au/~kempses .

TAFE NSW – North Coast Institute

Provides training in computing, accounting, agriculture, aquaculture, environmental studies, horticulture, horse management and other areas.
Email: nci.courseinfo@tafensw.edu.au
Web site: www.nci.tafensw.edu.au
For course information Phone: 131 601

Campuses Coffs Harbour (02) 66 485 000 Trenayr (Grafton) (02) 66 414 400 Kempsey (02) 65 627 255 Macksville (02) 65 682 222 NCI Open (02) 65 882 177 Port Macquarie (02) 65 803 500 Taree (02) 65 923 500 Wauchope (02) 65 853 688
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University of New England

Offers a range of publications on vegetation identification and natural resource management
Web site: www.une.edu.au

United Campus Bookshops

Madgwick Building, University of New England, Armidale, 2351
Phone: (02) 67 723 468
Email: armidale@ucb.net.au
Web site: www.ucb.net.au

Wetland Care Australia

A not-for-profit organization that aims to improve the value of wetland environments. Contact for information on: wetlands and their management; technical advice; guidance on on-ground works; and funding assistance.
PO Box 114, Ballina, 2478
Phone (02) 66 816 069
Email: ballina@wetlandcare.com.au
Web site: www.wetlandcare.com.au

Water and Energy, Department of (NSW) - DWE

Farm dams, licensing, irrigation, water sharing plans, river bank works.

Kempsey Office 41 Belgrave st, Kempsey, 2440 Phone: (02) 65 614 977
Coffs Harbour Office 24 Gordon St, AMP Centre, Coffs Harbour, 2450 Phone: (02) 66 530 100
Farm Forestry Extension 76 Victoria St, Grafton, 2460 Phone: (02) 66 402 000
Licensing Section 76 Victoria St, Grafton, 2460 Phone: (02) 66 402 000
Taree Office 98 Victoria St, Taree, 2430 Phone: (02) 65 522 788

Wildlife Information and Rescue Service (WIRES)

A volunteer group that rescues and rehabilitates orphaned and injured wildlife. Covers Nambucca only (for Hastings or Macleay see FAWNA).
PO Box 936 Coffs Harbour 2450.
Phone: (02) 66 527 119
For enquiries only, email: info@wires.org.au
Web site: www.wires.org.au

Workcover NSW

A statutory body, whose purpose is to achieve safe work places (including farms). Contact for information about how to manage safety risks, OH&S training and legal obligations as an employer
For enquiries phone: 131 050
Email via the enquiry form at www.workcover.nsw.gov.au/ContactUs/default.htm
Web site: www.workcover.nsw.gov.au

Port Macquarie Office 15 Horton St, Port Macquarie, Phone: (02) 65 887 000
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