Primary Industries in the North Coast Region of NSW

STRATEGIC REVIEW

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Compiled by

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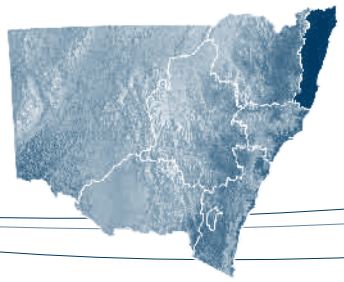

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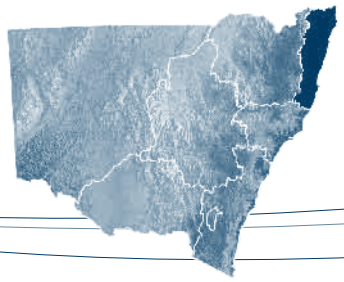
In summary

Production value: The farm gate value of primary production on the North Coast is in excess of $1 billion per annum. When processing is included, particularly in the agricultural and forest industries, this value rises to about $2 billion per annum.

The current recorded value of mineral production from the North Coast is nearly $30 million per annum, comprising predominantly construction materials ($27 m per annum). Construction materials production underpins expenditure of several hundred million dollars per annum on upgrading and maintaining the Pacific Highway plus other infrastructure and urban assets, the total replacement value of which could exceed $10 billion.

Workforce: Approximately 1 in 8 working people on the North Coast are employed in primary production. Around 8 % of the regional workforce work in agriculture and another 4.5 % work in forestry. Again, this is higher when processing is included. For example, more than 1000 people work in the North Coast's meat processing sector alone. Many more people work for timber processors, rural suppliers, transporters, machinery centres and other sectors that rely on primary industries.



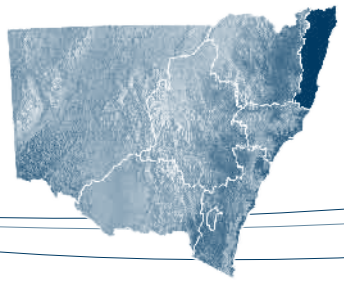
Introduction

Primary industries in New South Wales remain vital to the State and Australia's economy and social prosperity. This overview is one of a series on the regions of New South Wales summarising the primary industries and the challenges and opportunities important in each region.

Key issues for NSW Department of Primary Industries in the North Coast region:

- developing sustainable and profitable primary industries to support regional communities
- developing sustainable production systems and reducing the impacts of primary production on the environment
- maintaining access to rural land resources for primary production purposes.

TWEED HEADS
MURWILLUMBAH
WOODENBONG
MULLUMBIMBY
BYRON BAY
LISMORE
BALLINA
CASINO
MACLEAN
YAMBA
GRAFTON
WOOLGOOLGA
DORRIGO
COFFS HARBOUR
BELLINGEN
NAMBUCCA HEADS
KEMPSEY
PORT MACQUARIE
WAUCHOPE
LAURIETON
N
Major Towns
Major Rivers
Local Government Areas 2001
0
25
50
75
100 kilometers



Description of the North Coast Region

The New South Wales North Coast is a planning region comprising twelve Local Government Areas and extends some 500 kilometres from the Hastings Valley in the south to the Queensland border. This region comprises a narrow coastal plain plus parts of the adjacent New England Tableland and the intervening Great Escarpment. The region includes all of the Tweed, Brunswick, Richmond, Bellinger, and Nambucca catchments, most of the Hastings catchment and large parts of Clarence and Macleay catchments. It also comprises the eastern half of the Northern Rivers Catchment Management Area, which extends westward across the New England Tableland to the Great Divide.

Ocean waters adjacent to the North Coast are also considered to be part of the region, and are also important sites with high resource potential.

Agricultural industries

Twenty percent of the value of agricultural production comes from the 6% of agricultural lands that are found along the coastal plain.

The region supports a wide range of primary industries, including agriculture, forestry, mining and commercial and recreational fishing.

Cropping and grazing are generally carried out in the flatter, inland areas, although there are extensive plantings of sugar cane on the coastal plains.

In the north of the region, between the Richmond and Tweed valleys, lies a plateau of rich volcanic origin that supports a range of subtropical fruit and vegetable crops.

Several agricultural industries in the region, such as beef, bananas, dairying, vegetables and sugar cane, have been established for many years. Some of these are experiencing downturns in markets and returns, for a variety of reasons, however some new industries are in an expansionary phase such as macadamias, blueberries, coffee and plantation forests.

Recreational and commercial fisheries

There are substantial commercial fisheries off the eastern coastline and in the major North Coast estuaries. These include the estuarine and ocean prawn trawl fisheries and the trap and line fishery. Snapper, yellowtail kingfish, blue-eye, gemfish and morwong form the bulk of the commercial catch.

Tuna and tuna-like species, whilst taken in large quantities by line fishers off the NSW coast, are primarily

managed by the Commonwealth Government.

The region is home to the largest estuary on the east coast, the Clarence River, which supports the largest number of commercial fishers in NSW and supplies the largest percentage of seafood to the Sydney Fish Market.

There is also a substantial recreational fishing industry along the north coast based on off shore, estuarine and freshwater fishing activities.

Recreational parks and natural resources

Cape Byron Marine Park

Covering approximately 22,700 ha, the Cape Byron Marine Park extends from Brunswick Heads in the north to Lennox Head in the south.

Its diverse marine life includes many species of dolphins, seabirds, turtles, fish, seaweeds and invertebrates. The marine park is also home to threatened species, such as little terns, grey nurse sharks and leatherback turtles.

Visitors can enjoy a wide range of activities in this multiple-use park, including fishing, diving, snorkelling, boating, kayaking, windsurfing, swimming and surfing.

Lord Howe Island

Lord Howe Island Marine Park was declared on 26 February 1999 and is 48,000 hectares in size. It comprises all ocean waters and the ocean bed between mean high water mark to 3 nautical miles from the territorial sea baseline of Lord Howe Island, the Admiralty Islets, Ball's Pyramid and South-East Rock.

Lord Howe Island is located 630 km off NSW's north coast and 700 km north-east of Sydney. It is a narrow volcanic strip surrounded by several small, environmentally sensitive islets.

The marine environment of Lord Howe Island is internationally significant, having the world's southernmost coral reef. In December 1982, Lord Howe Island and its surrounding waters were declared a World Heritage site, the first in NSW.

Solitary Islands

Covering around 71,000 ha, the Solitary Islands Marine Park (SIMP), near Coffs Harbour, stretches from Muttonbird Island in the south to Plover Island in the north.

A multiple-use park operated under a balanced zoning scheme, it provides protection for marine species and habitats while also catering for a broad range of recreational and commercial activities.

Commercial and recreational fishing, diving, whale and dolphin watching, research, boating, surfing and beach activities are popular in the marine park.

Forest resources

The State forests within the Region contain a wide range of landscapes comprising natural and cultural environments important for social development of regional communities.

Vegetation ranges from moist hardwoods and rainforest on the escarpment to coastal mangroves and wetlands. Topography varies from coastal plains and hills to rugged escarpments. The forests contain a variety of waterways from steep mountain gullies and creeks to coastal rivers and lakes, some with estuarine reaches.

Mineral resources

Mineral resources broadly comprise, in order of current economic importance in the North Coast:

- Construction materials, such as crushed and broken stone, construction sand, river gravel, and unprocessed materials;
- Industrial minerals such as limestone, clays and mineral sands;
- Metallic minerals such as gold, antimony, and tin; and
- Petroleum (including coal seam methane).

Most current or historic extraction has been onshore, and has yielded a variety of construction material and mineral products. There has been only limited "offshore" extraction comprising limited shallow dredging and excavation of estuarine and river sand and gravel deposits. There has also been exploration of offshore heavy mineral sand and marine aggregate resources, and there is potential for offshore petroleum resources.

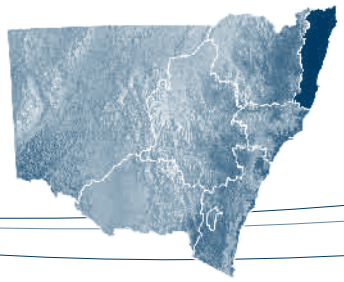
Geology ultimately controls the nature and occurrence of these mineral resources, and also controls many aspects of its physical environment.

Geological setting

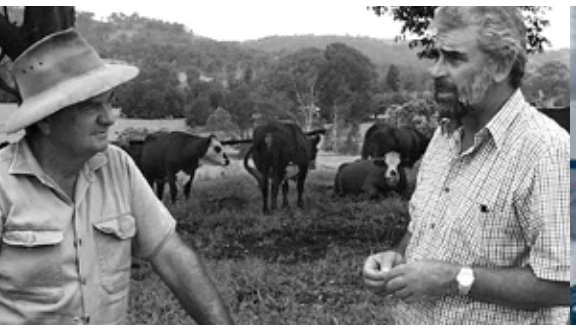
North Coast geology comprises five key elements:

- Unconsolidated sediments of Quaternary age extensively developed along the coastal plain as well as along rivers and streams of the region. These sediments continue to be important sources of sand and gravel, and historically were also important as sources of heavy mineral sands.
- Volcanic rocks (mainly basalt), localised intrusive rocks and minor gravels of Tertiary age commonly prominent as eroded remnants of lava piles capped by rich red-brown soils (e.g., Alstonville Plateau, Dorrigo Plateau) or as intrusive complexes (e.g., Mt Warning). These rocks continue to be important sources of crushed and broken stone (armour stone and aggregates) and historically were also sources of diatomite, perlite, opal, and silica gem materials.
- Sedimentary and sparse associated volcanic rocks of Triassic-Jurassic age forming the Clarence-Moreton Basin and associated infrabasins which occur at the surface or at depth in most of the region north of the latitude of Woolgoolga. These rocks continue to be sources of structural clays, historically were local sources of coal, and are currently being explored for petroleum (including coal seam methane). Certain sandstones and secondary ironstone cappings are current or historic sources of construction materials.
- Sedimentary rocks of Early Triassic age forming the Lorne Basin along the southern margin of Hastings Shire plus associated volcanic rocks and granites of Late Triassic age. The granites and volcanic rocks have been quarried or prospected as sources of armour stone or coarse aggregate and decorative aggregate is currently being produced.
- Metasedimentary (weakly to moderately metamorphosed, mainly marine sedimentary rocks) lesser metamorphic rocks, metavolcanic rocks, granites and ultramafic (high-Mg, mantle derived) rocks of mainly Palaeozoic age forming the New England Fold Belt which occur at the surface or at depth throughout the North Coast region.

Construction materials, limestone and clay are currently being produced from certain metasedimentary rock units. Tin is currently produced from one granite, and has historically been produced, along with molybdenum, tungsten, and various base metals from mines in or around various granites or from various metavolcanic rock units. Gold and antimony have been produced from numerous vein systems particularly hosted by metasedimentary rock units. Laterites developed on serpentinite (an altered Mg-rich or ultramafic rock) near Port Macquarie host large proven resources of nickel, cobalt and scandium.



Providing Services to North Coast Primary Industries



These are the factors shaping the strategic direction of the NSW Department of Primary Industries on the North Coast:

NSW DPI charter

The charter of the NSW Department of Primary Industries (NSW DPI) is to develop profitable and sustainable primary industries which build vibrant communities. The Department delivers on this charter through five strategic directions.

1. NSW DPI contributes to the strong economic performance of primary industries by growing productivity, investing in research and development, and facilitating the use of innovative technologies. Additionally, NSW DPI contributes to economic performance of the State through its Government Trading Enterprise, Forests NSW.
2. NSW DPI demonstrates the principles of sustainable development in its policies and operations. NSW DPI works with primary industries to ensure that their operations reflect these principles and they have appropriate access to natural resources.
3. NSW DPI supports the development of healthy products and safe primary industries by proactively managing risks presented by pests, weeds, diseases, chemicals and natural disasters, and by regulating health and safety in the mining industry.
4. NSW DPI creates a stronger voice for primary industries in government decision-making by leading an informed debate on primary industries issues, and conveys the potential social and economic benefits of sustainable primary industries to regional communities.
5. NSW DPI provides a safe, satisfying and fair work environment, and a skilled workforce, providing services that our clients require.

The values that guide delivery of these strategic directions encompass integrity, professionalism, innovation and respect.

Challenges

NSW DPI faces a variety of challenges in delivering on these strategic directions. To maintain and enhance profitability, NSW DPI and its clients are faced with challenges arising from globalisation, including the need to maintain and expand access to international markets and reduce costs of production. The Department and its clients face threats and risks at both local and international scales in relation to climate change, seasonal conditions, pest, disease and weed management, and biosecurity.

The ability to access and use resources will remain

an ongoing challenge. Population growth and redistribution is creating competition between primary production and other forms of resource use, such as urban and industrial use of land and water, and competition for resource access is even evident between primary industry sectors.

Pressure on primary industries to demonstrate sound environmental management is increasing in areas such as water use efficiency, soil management, land rehabilitation, waste product disposal, chemical use, and maintenance of plant, animal, fish and insect biodiversity. Some of this pressure originates from land use change and the conflict created by land subdivision. NSW DPI faces challenges associated with establishing contact with new clients that manage lifestyle farms and increasing awareness amongst the NSW public of how primary industries are adopting sound environmental practices to protect their resource base and ensure that they provide 'clean and green' product.

The challenge for primary industries on the North Coast is to maintain economic viability while operating sustainably, given the more demanding environmental and product quality standards of the community.

The role for NSW Primary Industries is to assist these industries meet this challenge by strategically applying the Department's research, extension, education and regulatory resources.

Clients

The clients of the NSW DPI include a broad range of groups and individuals on the North Coast, and, in particular:

- farmers – who seek reliable, risk-reducing, cost-effective technologies to meet business goals
- fishers – who seek access to sustainable managed fisheries and aquaculture and the enjoyment of a plentiful recreational fishery
- timber processors – who seek a reliable source of timber from sustainably managed forests
- extractive industry operators, mineral and petroleum explorers, and miners - that seek access to known resources or opportunities to explore for potential gain
- industry – that seeks an innovative and adaptive membership, and environmentally and socially acceptable production systems that offer it a profitable competitive advantage
- community – which seeks primary industries that contribute to the amenity, economy and environment of its region
- government – that seeks to improve the long-term sustainability and economic contribution of primary industries through government policy, initiatives and legislation.

Resources

Wollongbar Agricultural Institute (WAI) is the regional headquarters for industry relations.

WAI accommodates several separate facilities including the organic and inorganic chemistry analytical laboratories, the regional veterinary laboratory, the Cattle Tick Program, the Aquatic Habitat Rehabilitation Unit, the Aquatic Habitat Protection Unit and the Centre of Excellence for the Environment. Other facilities linked to WAI include the Pearces Creek Substation and the Duck Creek Substation.

Research is focused on the feed base for the subtropical dairy industry, breeding tea trees of high yield and quality, food safety and managing agricultural impacts on the environment.

Frontline resource staff at WAI includes extension and project staff working on:

- protection and rehabilitation of aquatic habitats
- land use management
- floodplain management and water quality, water use efficiency and irrigation management

- soil biology and health
- rehabilitation of contaminated land
- environmental management systems
- development of sustainable agricultural systems that minimise environmental impact.

Alstonville Centre for Tropical Horticulture

Research at the Centre is conducted into the sustainable production of macadamias, bananas and nurseries with an emphasis on integrated pest management (IPM). Research expertise includes tree physiology, entomology, plant nutrition and soil health.

Frontline extension resources include three horticultural advisers and one regulatory officer.

Grafton Agricultural Research and Advisory Station (GARAS)

Research: The Forest Technology Centre specialises in technologies to improve subtropical and temperate hardwood and softwood timber plantations.
The focus of the Centre is on tree improvement, nursery, plantation establishment and management technologies for the production of high value and novel products. The Centre consolidates Forests NSW technology services into a single site.

GARAS is also the centre for national research into the freshwater aquaculture industry, particularly silver perch, and is a centre for weed management resources, including two advisory staff and a biological weed control unit supplying pest agents to Councils.

Research is also conducted into coastal cropping industries, in particular soybeans and adzuki beans, and coastal weeds, particularly giant Parramatta grass.

Extension resources include an agronomist, a water use efficiency adviser, a national aquatic weeds advisory unit, a regional weed control coordinator and a regulatory officer.

Agricultural advisory services from five district offices in the region

Murwillumbah: horticulturist, general inquiries officer, regulatory officers (2) and centre for Queensland border operations

Casino: livestock officer (beef) and agronomist

Kyogle: livestock officer (dairy), agronomist and centre for cattle tick control field operations

Coffs Harbour: two horticulturists, regulatory officer and field assistant

Kempsey: livestock officer (dairy), agronomist, regulatory officer, field regulatory officer.

Fisheries resources

Fisheries compliance officers are located at Tweed Heads, Ballina, Maclean, Coffs Harbour and Port Macquarie.

Marine Park Rangers who are also authorised fisheries officers are located at Byron Bay and Coffs Harbour.

Two Fisheries Managers are located at Maclean, and a gear technology research unit works from the National Marine Science Centre at Coffs Harbour.

A team from the Sustainable Fisheries and Threatened Species Unit has been relocated from Ballina to Wollongbar.

Forestry resources

Forestry regional headquarters and the Native Forest Operations Office and Research Centre are located at Coffs Harbour. Field operations are also coordinated from the Centre of Excellence at Grafton Agricultural Research and Advisory Station. Planted Forests Northern Region for hardwood as well as softwood plantations, native forests, carbon research, tree improvement and nursery services are all provided from Grafton. Mechanical workshops are located at Coffs Harbour and Casino.

Forestry resources are used to provide a range of services including:

- Maintaining natural heritage values across the forested landscape, including Aboriginal and non Aboriginal cultural values, and
- Maintaining or enhancing the health and productivity of the forests to supply timber in a

long-term ecologically sustainable manner and contribute to the social well-being of the regional community.

- Maintain a reliable supply of logs and other products to industry.

Mineral resources

Mineral Resources is based in Maitland, and has a regional office at Armidale between which north coast minerals issues are dealt.

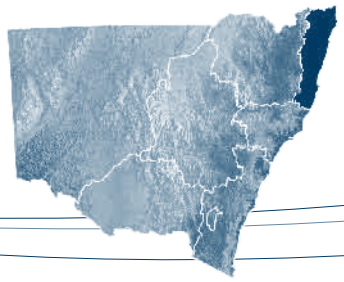
The major roles and responsibilities of the Mineral Resources Division include:

- providing geoscientific information to attract investment for mineral and petroleum exploration and development, and helping inform land use decision making;
- strategically assessing and allocating resources to advance sustainable development;
- regulating mining operations to achieve safe and responsible mining, optimal resource recovery, and effective environmental management and rehabilitation.

Co-providers

NSW Department of Primary Industries works closely with a broad range of other organisations in the North Coast region to achieve its goals:

- NSW government agencies including NSW Department of Natural Resources, NSW Department of Planning, NSW Department of Environment and Conservation, NSW Department of State and Regional Development and the Premier's Department
- Northern Rivers' Catchment Management Authority
- local government councils
- tertiary institutions such as Southern Cross University
- industry research and development corporations
- industry associations, bodies, small groups and consultants
- community organisations and groups such as Landcare.



Agricultural Industries on the North Coast

Beef

At a glance

- more than 600,000 head
- the region's biggest single income earner ($140 million annually)
- 13% of the production of New South Wales
- important source of cattle for sale to the fattening areas of eastern Australia

Key issues

- viable returns
- overseas market uncertainty

The North Coast beef cattle industry (607,000 head) is spread over the entire region and is based largely on running breeding herds. Most herds still produce store weaners, with the rest providing vealers and growing out or finishing steers.

Most herds producing store weaners are run on native, lower quality pasture areas and calves are sold in store condition at 5–7 months of age at low liveweights (165–180 kg). The weaner producing herds grazed on improved pasture areas based on the better soil types turn off calves at 7–9 months of age weighing on average 200–260 kg. Store weaners move to more favourable grazing areas for growing out and finishing as prime cattle.

There has been a steady increase in the number of stock, traditionally sold in the store market, being grown to heavier market weights (for example as feedlot steers both for domestic and export feedlots) and sold for higher value. This has been in response to the poor returns from selling weaner age animals.

The number of calves marketed as light veal (i.e. less than 100 kg) has increased significantly in the last 5 years. The Northern Cooperative Meat Company, Casino, processes in excess of 120,000 head of veal calves per year. Heavy (butcher) vealer production is confined to properties on higher fertility soils, generally with improved pastures. Calves are sold in prime slaughter condition straight from their mothers at six to ten months of age.

Most breeding herds calve in late winter–spring and the progeny are turned off in autumn. This management program matches the seasonal availability of paddock feed, as most North Coast pastures grow vigorously during the wetter, warmer months.

Major store cattle sales are held throughout the coastal area in autumn to market the annual turn-off, with buyers attending from all areas of eastern Australia.

Industry viability

Returns for cattle breeders are highly variable because the demand for store cattle depends on seasonal conditions in the growing out and finishing areas.

Dairy

At a glance

- 330 dairy farms (28% of NSW total)
- average farm size: 120 ha
- average herd size: 140 cows
- herd production: 5500 litres/cow/year
- total annual milk production: 258 million litres
- total gross farm milk income: $86 million
- average gross farm milk income: $260 000.

Key issues

- fluctuating farm gate milk prices
- pressure of urban expansion
- improving dairy cow nutrition and reproduction
- future of international and Australian processors
- environmental management legislation
- maintaining critical mass to sustain support industries
- financial management and profitability
- farm ownership and succession planning
- entry of young people into dairying
- availability of irrigation water and water use efficiency
- National Livestock Identification System
- spiralling land prices

The North Coast dairy industry is a major contributor to the region's economy, earning approximately $86 million from milk income.

Dairy farmers supply milk to regional factories at Wauchope, Raleigh, and Lismore, which process whole milk as well as manufacturing products such as cheeses, ice creams, yoghurts and milk powder. This value-adding earns substantial income and generates significant employment throughout the region. Since deregulation, up to 30% of regional production is processed outside the region.

The dairying industry also provides approximately $10m of inputs to the beef industry through the sale of cull cows and bobby calves.

Industry viability

Increased costs of production and variable farm gate milk prices have emphasised the importance of sound financial and resource management.

The future

Marketing forces will play a major part in the future viability of the North Coast dairying industry and that of NSW as a whole.

Increasingly, the industry is positioning itself through dairy co-operatives, mergers and joint ventures to maximise return on capital invested. Farmers need to assess the sustainability of production systems and the adoption of cost-effective technology to maintain profits and improve productivity.

Such refocussing will enhance the industry's viability and ensure it remains a prominent rural industry in northern NSW.

Horticulture

The farm gate value of North Coast horticulture is around $280 million, with 3000 growers farming over 16,000 ha. These figures do not take into account the hundreds of people employed directly and those in the horticulture service and processing industries.

The North Coast's subtropical climate and range of soil types allow a diversity of crops to be grown. The traditional plantings of bananas and avocados have declined, and many new crops have emerged. In recent years these include coffee, olives, blueberries, pecan nut, persimmon, flowers, hydroponic vegetables, a vast

array of medicinal and culinary herbs and native bush foods.

There is much interest in organically grown produce, with all industries now promoting sustainable best management practices and safe food production through on-farm quality assurance programs.

Nursery production

Nursery production is valued at up to $70 million, including cut flowers and cultivated turf. It is an intensive high value enterprise that requires a high level of management and a large work force. The production of nursery plants continues to expand, with hundreds of species, from African violets to zantedeschias, being propagated. Palm trees are widely grown.

The attraction for new operators moving into the area is the subtropical climate: favourable growing temperatures, a high number of sunlight hours and water for irrigation available.

One management issue that requires attention is the collection, clean-up and recycling of run-off nursery water. With water licensing and environmental controls on polluting waterways there will be an increase in building on-farm wetlands to reduce nutrient load and control diseases transmitted in recycled water.

Macadamias

Macadamia production is around 19,000 tonnes (nut in shell) with a value of around $70 million, and this will increase, as many trees have not yet reached peak production. Around 70% of the processed kernel is exported.

The two main growing areas are on the Alstonville plateau and around Dunoon, north of Lismore.

Macadamia growing is a highly mechanised crop. This helps to reduce production costs. The industry has a high number of managed orchards, farm machinery and silo manufacturers, consultants and farm advisers.

The main industry concerns include the loss of soil from plantations and the need to establish groundcover crops to correct this, canopy management of mature trees, varietal selection and evaluations, and the adoption of integrated pest management (IPM) practices.

Bananas

Banana production on the North Coast is declining as it is competing with cheaper fruit from large scale production in north Queensland.

NSW production is now less than 20% of national sales. Grower numbers have fallen to below 550, with 2400 ha planted. However, there is a niche market for a smaller, tastier subtropical banana – the 'lunch box' size. The newer varieties Goldfinger and Bananza are also proving popular with consumers. Lady Finger production has held firm but is threatened by the spread of Panama Disease, a root fungal disease.

Fruit and vegetables

The main vegetable growing areas are found on the fertile krasnozem soils at Cudgen in the Tweed and at Dorrigo. Lettuce, cucumbers, strawberries and tomatoes are grown hydroponically up and down the coast.

Vegetable productivity fluctuates due to seasonal market prices and climatic conditions. Presently vegetables occupy 1900 ha and provide an income for 220 growers. With an estimated farm gate value of $30 million, potatoes including sweet potato are valued at $8 million, followed by tomatoes, carrots, onions and lettuce each worth around $2 million. Other crops include beans, watermelons, peas and zucchinis.

Blueberries are a relatively young industry on the North Coast. This area produces 70% of the national crop. Three large growers account for the bulk of the production. Mechanical fruit harvesting, integrated pest management, bird netting, improved nutritional practices, higher yielding and rust resistant varieties, and better disease control have greatly enhanced the economics of this crop. Around 50% of the crop is exported as fresh or frozen product.

The low chill peach and nectarine industry was established in the 1980s based on Florida-bred varieties. Plantings peaked in the 1990s and have declined since due to the removal of many orchards at Halfway Creek, near Coffs Harbour, and the high cost to net orchards against birds, flying foxes and hail. Low chill trees require a large labour input for flower thinning, and for fruit size and colour harvesting. A high level of management is required, particularly for pre and post- harvest disease control.

Avocado production has declined on the North Coast except for the later producing areas at Stuarts Point and on the Comboyne Plateau. The reasons for the decline include phasing out of the green skin varieties Fuerte and Sharwil, phytophthora root disease in wet years, the shift to macadamias, the difficulty in regulating canopy size in large trees and the large plantings at Bundaberg that have impacted on harvest time and market price. Hass is the variety wanted by supermarkets, but there is some interest in the Reed variety.

Passionfruit is a crop that traditionally goes through 'peaks and troughs'. It is labour-intensive, as fruit must be hand picked from the ground regularly, but a newly designed mechanical harvester may revolutionise the industry. Viral and fungal diseases have caused major problems over the years. Locally bred varieties produce well for a few years, but then have a tendency to 'break down', producing smaller, diseased fruit.

The mango industry on the North Coast has always been small, but tree numbers have increased in recent years. Growing areas are spread over a wide range of soil types and microclimates. The main variety Kensington Pride is subjected to fluctuating production from year to year due primarily to low spring temperatures at flowering and fruit set, and fungal diseases in wet seasons. This crop capitalises on the high market price for mangoes at the end of the growing season.

Custard apples are a small but 'go ahead' industry. Harvested during winter, the newly released varieties will boost the industry. Ongoing research into internal fruit disorders, and trellising and tree training systems to increase per hectare yield, along with consumer education, will enhance the future of this crop.

Coffee plantings started as smallholdings that were hand harvested. High prices were paid for this 'niche' product. Several large plantings with irrigation have now been established. These trees are mechanically harvested and pruned.

Coffee requires a frost-free site. It can be grown with minimum pesticides. Much interest has been shown in processing and promoting locally grown coffee for local and export markets.

As well as these crops, a raft of other crops grow very successfully on the North Coast including limes, mandarins, wine grapes, lychees, guava, raspberries, strawberries, clumping bamboo and tea. The farm gate value for these crops is estimated up to $16 million. Pecans and olives have a low farm gate value presently due to the high percentage of non-bearing trees. The North Coast region produces a 'fruit salad' of tropical and subtropical horticultural crops.

North Coast horticultural crops

Crop	Estimated farm gate value ($million)	Number of growers	Hectares
Nurseries[1]	70	400	800
Macadamia	70	600	7000
Bananas	50	534	2400
Vegetables	30	220	1900
Blueberries	22	30	310
Stone fruit	10	80	250
Avocado	7	260	360
Passionfruit	3	100	760
Mango	3	140	75
Custard apples	2	90	240
Pecan nut	0.5	60	400
Olives	0.5	60	230
Other crops[2]	16	320	970
	284+	**2894**	**15695**

1 includes cut flowers and cultivated turf.
2 includes herbs, bush foods, kiwi fruit, persimmon, citrus, tea, coffee, wine grapes, lychees, clumping bamboo, guava, raspberries, strawberries, almonds.

Pork

At a glance

- 135 piggeries
- about 8,500 sows (nearly 10% of NSW total)
- annual gross value of production is $26 million (2000/01).

Key issues

- widespread industry hardship resulting from drought-affected feed grain prices and weaker pig market
- The strength of the Australian dollar could potentially devalue the industry's export trade and

any opportunities for the newly established Japan and Singapore markets.

- Quality assurance, occupational health and safety and food safety programs along with environmental and animal welfare pressures continue to be at the forefront.

Background

North Coast piggeries range from sideline operations of less than 10 sows to large intensive units of up to 1000 sows. Most are family owned. Sixty per cent of pigs produced locally come from 10% of the piggeries which have 50 or more sows. Most commercial piggeries are fully intensive, which makes starting a piggery expensive ($3800 to $4500 per sow).

Most pig farmers are on mixed farms and the piggery has generally subsidised other farm enterprises because of its regular cash flow. The producers who rely on pigs alone run the larger operations.

Up to 70% of piggeries with 50 or more sows mix their own feed; the remainder buy feed from local stock feed mills. In excess of 50,000 tonnes of stock feed worth at least $20 million is used annually. Grain constitutes 80–85% of this feed, most of which is sourced outside the region.

Over 90% of pigs are sold on direct consignment through a verbal contract with the buyer. Most pigs in NSW are sold for bacon (60–85 kg DW). Backfat is recorded at the abattoirs and growers are penalised for overfat pigs.

Annual consumption of pig meat in Australia (19 kg/person) has increased by 35% in the last 25 years despite a reduction in total meat consumption over the same period.

Research today is directed towards improving the environment within piggery buildings, providing for the behavioural needs of the pig and minimising disease. NSW Department of Primary Industries has a program to help producers implement quality assurance programs.

Industry viability

The high feed prices from the drought combined with a depressed market made 2003 a very harsh year for the pork industry. Returns for pigs were negatively affected by several external factors. Primarily responsible was the increasing value of the Australian dollar which reduced export prices and made imported pork comparatively cheaper.

For 2003, Australian pork exports totalled 64,500 tonnes (up 3% on 2002) and were valued at $236 million (down 12% on 2002). Japan and Singapore are the major markets for Australian pork exports.

The future

Environmental and welfare pressures on pig production will increase as producers are required to satisfy more stringent requirements.

Feed costs make up to 60 to 70% of total costs and therefore have a large impact on profitability.

The prices paid for pigs are now heavily influenced by imported pigmeat. Canada and Denmark have been major exporters, with the USA likely to enter the trade.

A positive future for the Australian pig industry will rely upon maintaining a globally competitive cost of production, improving Australian per capita consumption of pig meat and maintaining the 'clean and green' and 'disease free' image. Piggeries will need to continue to adopt new technologies and management practices to ensure their viability.

Poultry

At a glance

- $50 million in processed poultry meat
- fewer than 20 broiler-growing farms from 60,000 to 240,000 bird capacity
- one main integrated producer, Sunnybrand Chickens at Byron Bay, processing 32,000 fresh chickens a day
- two smaller producers and some backyarders producing a very small percentage of local chicken meat
- a relatively insignificant egg-laying industry based mainly on backyarders.

Key issues

- neighbour relations
- disease management
- imports of chicken meat

Background

The North Coast chicken meat industry represents two to three per cent of national production but is very important to the local economy, creating hundreds of jobs and earning more than $50 million from fresh chicken sales.

The vast majority of the North Coast industry revolves around the integrated producer Sunnybrand Chickens and the farms they contract to grow out the chickens. This company's chicken meat breeder operation at Yorklea and Casino produces 300,000 fertile eggs a week: these go to McKee's Hill hatchery for incubation and hatching. About 230,000 day-old chicks are sent from the hatchery weekly to 15 contract growers and Sunnybrand's own farms: they grow out the birds to about 2.2 kg over a 43-day period. Farms are cleaned out, disinfected and sanitised after each batch of chickens, receiving new batches on a 60-day cycle.

The industry in the region is growing at about 18% a year based on the increasing per capita consumption of chicken and the growing local population. Three new farms have been started up in the last two years, two existing farms have been extended and two farms are under construction, all to cope with the greater demand. These farms have incorporated the latest technology and are all located within 100 kilometres of the Byron Bay processing factory. They are fully enclosed with tunnel ventilation and evaporative cooling systems. The birds roam the shed floor with continual access to feed and water.

Industry viability

Chicken meat production is profitable given the growth in consumption and improvements in production techniques, as long as management practices are good.

The future

The future looks good given increased demand and improved growing technology. There are, however, issues requiring management by chicken producers including neighbour relations, disease management and cooked chicken meat imports.

Due to the isolation of North Coast poultry farms, producers are less affected by the encroachment of urban and rural lifestyle development that is of concern in traditional poultry farming areas (such as western Sydney). Issues raised by some poultry farm neighbours include odour, dust, noise and visual amenity. By managing these issues and locating new farms in isolated areas, the expansion of the local poultry industry can occur with good neighbour relations.

The isolation of North Coast farms is also beneficial for disease management. Cooked chicken meat imports have been of concern to the Australian poultry industry since 1990 when AQIS was first approached by Denmark, the USA and Thailand to allow their product to be exported to Australia. With the exception of New Zealand, all other countries have an inferior poultry disease status to Australia. The introduction of exotic diseases of poultry into Australia has the potential to severely undermine the poultry industry and the Australian native bird population.

Soybeans

At a glance

- The North Coast is the largest soybean production area in Australia. The 2004/2005 crop area represented 70% of NSW's crop and 40% of the Australian crop.
- The Richmond and Clarence valleys are the principal production areas. Small areas are grown in the Tweed, Macleay and Manning valleys.
- Since 1999/2000 the soybean area has declined by 60% due to drought and low soybean prices. Resurgence began in 2003/2004 following high prices for beans for human consumption.
- The 2004/2005 crop was 25,000 tonnes. Gross value was approximately $13.15 million.
- Production peaked at 33,000 tonnes in 1998/1999.

Key issues

- In 2004/2005, 70% of the crop area was sown to varieties targeting the premium human consumption market.
- Price premiums of up to $800/tonne above crushing bean prices for organic certified beans has resulted in the organic crop representing 10% of the total soybean area for Casino and Kyogle districts.
- In March 2002, NSW Agriculture released the variety Cowrie. Cowrie is suitable for tofu, soydrink and soy flour markets.

Since 2001/2002, silverleaf whitefly has threatened crops in the near coastal areas. An IPM strategy is being developed to counter this threat.

Background

The North Coast began soybean production in the Dungarubba, Casino and Kyogle areas in 1971. The region has since grown to be a major soybean production area. In 2004/2005 the North Coast crop area represented 70% of NSW's crop and 40% of the Australian crop.

The three crops from 2000/2001 to 2002/2003 have been small in area (<4500 ha) because of drought and unattractive prices. These crops averaged 1.9 tonnes per hectare and were worth about $3 million annually. Resurgence began in 2003 and the 2004/05 crop was worth over $13 million.

Soybean growing is largely confined to the better class alluvial soils of the valley floors and floodplains. In recent years, less undulating hill country has been direct drilled because of the difficulty in achieving break-even yields on shallow, drought-prone soils. 'Beef and beans' practitioners invariably grow soybeans on the more fertile, flatter and deeper soils. Ryegrass/oats is aerially seeded into the soybean crop at early leaf fall, usually late March-early April. The high quality cool season forage benefits, from the residual nitrogen, is used to grow out or finish cattle that normally would be sold as stores.

Grain growers double crop soybeans with winter cereals.

Soybean is a popular rotational crop with sugar cane farmers. It is grown in the period between ploughing-out cane and replanting cane. Up to 85 kg of residual nitrogen per hectare is of tremendous benefit to the following 'plant cane'.

Research in soybean agronomy and variety selection is conducted at the Grafton Agricultural Research and Advisory Station. Breeding is carried out at Narrabri by NSW Department of Primary Industries.

The soybean breeding program for the North Coast has the following objectives:

- grain weathering tolerance
- acid soil tolerance
- disease resistance
- adaptability to latitude, climate and sowing dates
- suitability for the human consumption market
- improved varieties for the mid North Coast.

Sugar

At a glance

- 650 producers
- a cane crop of 2.31 million tonnes in 2003
- total raw sugar production in 2003 was 276,279 tonnes, which is only slightly above the five year average production level
- a high level of services in agronomy, variety selection and disease control
- one of the region's biggest employers
- $230 million of regional economic output per annum
- total production area over 37,000 ha.

Key issues

- decline in world prices.
- management of ratoon stunting disease and Fiji disease.
- management of acid sulfate soils.

Background

The North Coast sugar cane industry is a significant contributor to the economy of the area and provides the community with employment opportunities, growth and prosperity. It is one of the region's biggest employers and accounts for $230 million of regional economic output per annum. Total direct and indirect employment in the region is estimated at 2200 people. This includes 450 mill and refinery employees and 650 cane farmers.

The NSW sugar industry occupies over 37,000 ha on the lower floodplains of the Tweed, Brunswick, Richmond and Clarence rivers and associated streams. Most cane farms range in size from 30 to 250 ha, with the average 80 ha farm producing around 6000 tonnes of sugar cane.

Cane is planted between mid-August and October. Cane stalks are cut into 300 mm long 'setts' and planted 100 mm below the soil surface in rows 1.5 m apart.

Fertiliser is added and weeds are controlled for the next three to four months.

The crop is harvested in the July to November crushing season, either one or two years after planting. Most NSW crops are harvested when they are two years old.

After harvest, a 'ratoon' crop grows from the belowground parts of the previous crop. Two or three ratoon crops are grown from each planting.

Industry viability

Price and profit projections are not encouraging. During the financial year 2004/04 world sugar prices continued their decline. At the same time the value of the Australian dollar rose from US$ 0.70 to US$ 0.79. Their combined impact was to substantially reduce returns to Australian growers. By mid year the outlook was very bleak with some predicting an exodus from the industry.

Despite this, the NSW Sugar Milling Cooperative returned a higher than expected profit due to a temporary surge in world market prices in late 2003/04. This was associated with the expiry of the May futures contract, sugar shortages in China and India and the fall of the Australian dollar to below US$ 0.70.

The major share of raw sugar was sold to the Manildra Harwood Sugars partnership, and 25,000 tonnes was sold for an export shipment.

The future

Negotiations under the US Free Trade Agreement failed to deliver any benefits to Australian sugar producers. However the Dispute Panel of the World Trade Organisation ruled against the European Union's sugar export policy which is expected to result in the withdrawal of between two and four million tonnes of subsidised sugar from the world market.

Tea tree

At a glance

- Oil production increased from 10 to 15 tonnes per annum before 1980 to around 800 tonnes in 1999/2000.
- Oil prices since 1999/2000 have been at or below the cost of production for many plantations.
- Sale of spent leaf has kept many tea tree plantations operating.
- Unless tea tree oil is used in high-demand, market-leading products, world demand may recede from the estimated 2003 level of 500 tonnes.
- The harvested plantation area has dropped from the estimated 5000 ha in 1998/1999 to about 3000 ha in 2002/2003.
- Australia will continue to be the major producer of Melaleuca alternifolia essential oil. Significant competition from other countries has not eventuated.
- The industry's forecast of a world market of 1000 tonnes by 2000 was unrealised.
- Over the next few years the industry will stabilise at a level that provides a reasonable return to producers. Growers will begin to replace old fields with high yielding genotypes from the joint NSW Primary Industries and CSIRO tea tree-breeding program. In the short term this will help maintain Australia's competitive advantage.

Key issues

- low plantation profitability due to overproduction
- slow or little growth in demand
- Commercialisation of research, particularly in the medical field, may turn the fortunes of the industry around.

Background

Tea tree (*Melaleuca alternifolia*) is native to the North Coast. It is found in greatest abundance on the northern rivers of NSW where natural stands have been cut and distilled for essential oil since the 1920s. Melaleuca alternifolia essential oil has achieved a wide reputation for its remarkable therapeutic properties.

The industry gained new momentum in the 1980s with increasing interest in the use of 'natural' medicines. Oil tea tree plantations were established based on experimental work by Brian Small, former NSW Agriculture Research Agronomist and previously with the Museum of Applied Arts and Sciences, Sydney.

Plantation tea tree is harvested in late winter. Once distilled the oil is stored, sold and used in various pharmaceutical products. About 80% of the oil is exported.

Industry viability

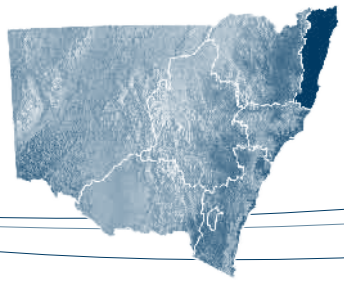
During the 1990s, high returns from oil tea tree production attracted farmers and prescribed investment scheme promoters. The industry saw a rapid development in area and production. Australian production went from 120 tonnes in 1990 to more than 500 tonnes in 1998/99. Production peaked at 834 tonnes in 1999/2000 (ATTIA industry audit October 2002).

High carry-over stocks and production levels far in excess of demand resulted in prices falling from $45kg in February 1999 to $23kg in June 2000. Since June 2000 oil prices have been close to or below the cost of production. Growers cut costs in order to survive. Yields and production declined due to reduced inputs, flooding, frosts and drought. The sale of spent leaf for landscaping mulch has kept many tea tree farm businesses afloat but growers cannot continue to rely on this source of additional income to buffer their businesses against low returns from oil production.

According to a grower survey by the Australian Tea Tree Industry Association, production for the financial years ending June 2001, 2002 and 2003 was 387 tonnes, 294 tonnes and 387 tonnes (estimate) respectively. On-farm carry-over stocks were still high and influencing prices in 2003/2004. There have been few tea tree plantings since 1999.

The future

Unless prices rise above the cost of production growers will continue to leave the industry. To resurrect the industry, research must be converted into commercialisation of market leader products.



Fisheries on the North Coast

Estuary prawn trawl fishery

The estuary prawn trawl fishery in NSW has an annual catch of around 500 tonne valued at approximately $3.5 million at the point of first sale.

The fishery also contributes significantly to the NSW regional economy through employment, industry related infrastructure (mooring, slipways etc), and the processing, transport and marketing of seafood.

Prawn trawling is permitted in four estuaries in NSW, the Clarence River, Hunter River, Hawkesbury River and Port Jackson. The Clarence River is the only one of these estuaries located in the northern part of the state.

The Clarence River is the most productive of the four estuaries, producing around 300 tonne of product annually valued at approximately $2 million.

Seafood harvested in the Clarence River prawn trawl fishery is predominately school prawns, with small catches of king prawns and finfish (those species not subject to size limits). School prawns make up around 95% of the total catch.

Rainfall has a major effect on catches of prawns in the Clarence River. Juvenile school prawns spend a significant portion of their time in the upper reaches of the Clarence River and migrate to the lower reaches and ocean waters during the warmer months or during times of high river discharge. Good water quality and the protection of habitat (e.g. wetlands) are important to the sustainability of prawns stocks. The largest catches are taken during the 'dark' of the moon (between the last and first quarter).

110 fishing businesses are authorised to participate in the Clarence River prawn trawl fishery, however only 60 or so operate in the fishery each year.

Lake Wooloweyah is open to prawn trawling between October and May each year, inclusive. The Clarence River opens early December.

Approximately 60% of the Clarence River (including Lake Wooloweyah) is open to trawling. The upper reaches of the river (above the Ulmarra ferry wires) is closed to trawling, as are other small pockets in the lower reaches of the river.

In the Clarence River 'twin trawl gear' (2 nets) is used to harvest prawns. All nets must also be fitted with one of the five bycatch reduction devices (BRDs) to reduce incidental catches of finfish.

School prawns are also taken in the 'Estuary General' fishery using prawn set pocket nets. They are also taken in ocean waters by fishers authorised to operate in the ocean trawl (inshore prawn trawl) fishery.

The bulk of the school prawns harvested from the Clarence River is packaged for bait, and the remainder

sold for human consumption through regional and Sydney markets.

The fishery is currently experiencing difficult times due to a combination of factors including rising costs (eg. fuel), low catch rates, and low returns as a result of competition with cheaper imported product.

Ocean prawn trawl fishery

The ocean prawn trawl fishery is the most valuable commercial fishery in NSW with an annual catch of around 3.5 tonne valued at approximately $32 million at the point of first sale.

The fishery also contributes significantly to the NSW regional economy through employment, industry related infrastructure (mooring, slipways etc), and the processing, transport and marketing of seafood.

Seafood harvested by prawn trawlers of northern NSW includes king prawns, school prawns, royal red [deepwater] prawns, red spot & stout whiting, bugs, octopus, cuttlefish and squid. Prawns make up approximately 50% of the catch.

Rainfall and the level of river discharge have a major effect on catches of prawns in NSW ocean waters. Juvenile king prawns spend a significant portion of their time in estuaries and migrate to ocean waters during the warmer months or during times of high river discharge. Good water quality and the protection of estuarine habitat (e.g. wetlands) are important to the sustainability of prawns stocks. Prawns are highly fecund and short-lived - school prawns live to around 18 months and king prawns to 3 years.

Off northern NSW the ocean prawn trawl fishery extends from the coastal baseline to the 4000 m-depth contour (approximately 80 nautical miles).

Access to the fishery is restricted and the gear used is tightly regulated. All nets must be fitted with a bycatch reduction device (BRD) to reduce incidental catches of finfish.

Closures to trawling located in waters off Tweed Heads, Brunswick Heads, Ballina, Evans Head, Yamba and Crowdy Head are used to protect juvenile prawns so that they grow before being harvested at a larger size as they migrate to deeper waters.

The fishery is currently experiencing difficult times due to a combination of factors including rising costs (eg. fuel), low catch rates, and low returns as a result of competition with cheaper imported product.

The fishery is currently being environmentally assessed, and it is expected that the Minister will make his determination during December 2005

Silver perch aquaculture

The silver perch (*Bidyanus bidyanus*) is a freshwater fish native to the Murray–Darling Basin. Habitat destruction and fishing have caused natural populations to drastically decline, leading to the species being listed as vulnerable.

During the early 1990s, scientists at NSW Fisheries Grafton Aquaculture Centre developed techniques for the production of silver perch in ponds. Silver perch have biological characteristics suited to intensive culture including an ability to tolerate high densities, general hardiness, willingness to accept artificial feeds, non-cannibalistic nature, excellent eating qualities, and an omnivorous diet. Techniques developed by the then NSW Fisheries were commercialised by industry, making silver perch the most valuable freshwater aquaculture sector in NSW.

Silver perch are best suited to pond culture, with current trials investigating culture in intensive recirculation systems and cage culture systems. The optimum region for production is northern NSW, with its warmer water temperatures, but silver perch are grown across NSW. Under optimum conditions, silver perch can be grown to market size (up to 800 g) within 18 months. There are over 130 licensed silver perch farms in NSW, of which over 50 farms produced silver perch in 2001/2002, and production has grown steadily. Research has shown silver perch can be grown at densities of 10 t/ha.

The silver perch aquaculture industry is still in its infancy, with a number of issues in production still to be resolved. Significant research has been undertaken to reduce feed costs by replacing expensive fishmeal with agricultural produce such as soy and lupins. Work has also commenced on selective breeding of silver perch strains, and understanding health management issues during winter growing cycles.

Silver perch is a new species to Australian seafood markets. To date the fish has appealed to Asian tastes,

and a strong live fish trade has developed around Chinatown restaurants (live 600–800 g fish for 'banquet' style cooking). However, this market is easily saturated, and growers have started developing alternative markets. Large volumes of fish are sold whole chilled, although market prices are substantially less for this product. Some growers sell fillets and value-added product such as smoked fish.

Average farm gate prices for silver perch have dropped steadily in recent years, although it is expected these will stabilise over coming seasons. Average prices on the Sydney Fish Market floor have been much lower than average farm gate prices, averaging $7.58/kg for mostly whole chilled product for 2002. At this price many growers avoid the Sydney Fish Market, instead concentrating on live or other direct markets such as restaurants and cooperatives.

It is expected that supply will continue to increase as farms intensify production. Ultimately, there are opportunities for silver perch to help replace imported white flesh fillets such as Nile perch, hoki, and hake, provided costs of production through technology advancement and economies of scale can be reached. Some export sales have occurred, with trial containers to the US and Asia, but this requires further development.

Water availability for aquaculture can be an issue with an embargo on new licences for extraction. New entrants will have to purchase licences if available from other licence holders.

Trap and line fishery

The trap and line fishery is a multi-method, multi-species fishery targeting demersal and pelagic fish along the entire NSW coast, in continental shelf and slope waters.

Snapper, yellowtail kingfish, blue-eye, gemfish and morwong form the bulk of the commercial catch. Tuna and tuna-like species, whilst taken in large quantities by line fishers off the NSW coast, are primarily managed by the Commonwealth Government.

The fishery also includes the taking of spanner crabs by dillies, which are permitted to be used north of Korogoro Point (near Hat Head on the mid north coast of NSW).

Many of the species taken in the fishery are also taken by recreational fishers.

The ocean trap and line fishery extends from the Queensland border in the north to the Victorian border in the south. The fishery extends from NSW coastal baselines seaward to the 4000-metre isobath (approximately 60 to 80 nm offshore).

The ocean trap and line fishery is a multi-species fishery. The proportions of species taken vary depending on the geographical location of fishing activities. In the north of NSW, the main species targeted are snapper (*Pagrus auratus*) and yellowtail kingfish (*Seriola lalandi*). School shark (*Galeorhinus australis*) and gummy shark (*Mustelus antarcticus*) are also extensively fished by line methods along much of NSW's coastline.

Estuary general fishery

The Estuary General Fishery includes all forms of estuary fishing other than prawn trawling. Estuarine fishing has been undertaken in NSW since the mid-1800s and today is still best described as an "artisanal" (a small subsistence) fishery. It comprises small fishing boats that operate predominantly in just 24 of the State's 130 major estuaries.

The Estuary General Fishery is the most diverse commercial fishery in NSW, with approximately 700 fishers operating in 102 estuaries along the NSW coast and employing more than 17 types of fishing gear. About half of the State's commercial fishing businesses are entitled to operate in the Estuary General Fishery. In 2000/01 the value of the 5,043 tonnes of fish harvested in this fishery was approximately $19 million at first point of sale.

Up to 87 species are taken in the Estuary General Fishery with the main species targeted being sea mullet, luderick, bream and school prawns. The most used estuarine fishing methods are meshing and hauling nets. Other methods include trapping for crabs, eels and some other finfish, and a small amount of hand-lining and hand-gathering. Gathering of pipis and beachworms by hand on ocean beaches is included in the Estuary General Fishery for administrative reasons and because hand-gathering also occurs in estuaries.

The Department has records of reported estuarine commercial fishing catches for the last 50 years and

over this period the recorded catch has remained relatively stable. Fishing effort over the same period is more difficult to estimate, although it appears that the total amount of time spent fishing has also remained relatively constant. The available fishing effort data should be treated with caution, however, as they do not allow for increases in effort associated with improved technology, including the introduction of outboard motors, modern refrigeration techniques, motorised net haulers, or synthetic net materials.

The estuary general fishery is managed predominantly by limiting the amount of effort commercial fishers put into their fishing activities. These controls include restrictions on the numbers of fishers endorsed to operate in the fishery, restricting the operation of fishers to one region, a range of seasonal, weekend and area fishing closures, and a range of restrictions on the size and dimensions of the fishing gear used. Size limits also apply to some species, while others are totally protected.

A Fisheries Management Strategy has been prepared for the Estuary General Fishery and was approved by the Minister. The strategy includes a comprehensive description of the fishery and the management arrangements that apply. The strategy was approved only after the environmental impact of the fishery was assessed, and the community had an opportunity to review the environmental impact statement for the fishery. The Strategy has also been approved in accordance with the environmental requirements of Commonwealth legislation. A number of changes have been introduced through the Strategy including division of the fishery to seven regions and adoption of a state wide code of conduct for the fishery.

The estuary general fishery is now a category 1 share management fishery. This framework provides greater security for fishers and enhanced recognition and confidence by other stakeholders that the resource is being managed in a sustainable manner through the allocation of longer term fishing rights and implementation of a statutory management plan.

Ocean hauling fishery

Ocean Hauling targets approximately 20 finfish species using commercial hauling and purse seine nets from sea beaches and in ocean waters within 3 nautical miles of the NSW coast. Sea mullet, luderick and bream are the predominant species harvested within this region with smaller catches of pilchards, and whitebait. The Fishery in NSW has an annual catch of approximately 3,500 tonnes valued at $6 million at the first point of sale.

The bulk of sea mullet harvested from the Ocean Hauling fishery is sold directly to processors supplying the export market for sea mullet roe and frozen fish. Other species are sold domestically for human consumption and bait. The fishery also contributes significantly to the NSW regional economy through employment, industry related infrastructure and the processing, transport and marketing of seafood.

Ocean haulers mainly target sea mullet between late summer and early winter as they make their annual spawning run north along the open coastline. This behaviour appears to be triggered by strong westerly winds and falling water temperatures. Heavy rainfall, causing flooding has an effect on this migration and catches of sea mullet. Sea mullet are also taken in the Estuary General Fishery using mesh nets with catches dominating the autumn months.

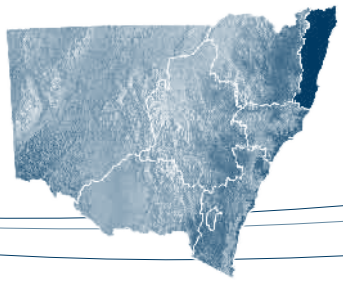
The fishery is separated into seven regions, including the north coast as follows: Upper north coast (Region 1) - Queensland border to Jerusalem Creek i.e. south of Evans Head; Clarence (Region 2) - Jerusalem Creek to Sandon River i.e. south of Yamba; and North Coast (Region 3) Sandon River to Diamond Head i.e. south of Camden Haven. Region three is the most productive of these three regions.

Fishers are authorised to work in one of these areas and may be endorsed either to use one or more net types or to assist in the operation as "crew". There are approximately 23 fishing businesses with entitlements for endorsement in Region 1, 32 in Region 2 and 41 in Region 3, although all are not active at the same time.

The goal of management is to foster a profitable Ocean Hauling Fishery which carries out fishing in an ecologically sustainable manner. To achieve this, the fishery is managed by input controls at a level that minimises the risk of overfishing. Input controls include limiting the number of operators who may access each part of the fishery under a zoning scheme, special criteria for new entrants, controls on the size and dimension of fishing gear that can be used and

also limits on vessel and engine size. In addition there are seasonal and weekend closures and size limits that are applicable to a number of species harvested in the Ocean Hauling Fishery. An environmental impact statement was prepared on the ocean hauling fishery after extensive community consultation. As a result, a new management strategy was introduced for the fishery on November 1, 2002.

Commercial fishers have been utilising NSW beaches for many years and operate under a mandatory code of conduct to facilitate good relations with other beach users. The codes of conduct summarise the broad principles under which fishers operate and specific requirements are contained in legislation, closures or licence conditions.



Forests on the North Coast

At a glance

From the small area of public and private native forests and plantations managed for timber production within the State, NSW is able to supply most of its domestic needs for sawn timber and panel board products. Much of this production is met from the forests of the North Coast of NSW.

Land tenure of the North Coast

Forests NSW operates as a public trading enterprise within the NSW Department of Primary Industries (DPI), to manage approximately 2.8 million hectares of native State forests and plantations for the supply of timber, along with a wide range of other social, environmental and economic values.

Four cornerstones of the business

1. Social - building partnerships and generating economic and social benefits within the community, especially for rural and regional communities; developing and valuing staff.
2. Environmental - ecologically sustainable management of native and planted forests to protect and enhance environmental and conservation values and to help meet the demands of future markets for environmental services.
3. Economic - ensuring an adequate return to the government and community from the marketing of a range of values from native forests and plantations; developing innovative products, services and mechanisms to facilitate investment in new planted forests and the environmental values of forests.
4. Sustainable - managing State forests for the long-term and retaining opportunities for future generations to meet their needs and expectations, while providing for the present.

The recent round of wood supply agreements reached between Forests NSW and the timber industry has provided certainty for producers to remain viable and allowed the industry to invest in modern equipment to add value to their products.

In return for this contribution to their own and the regional economy, they have gained a long-term supply of wood.

Furthering its regional involvement, Forests NSW statement of affairs identifies its management objectives as to:

- Sustain its financial performance;
- Deliver ecologically sustainable management of natural resources;
- Provide accountability to the community; and
- Support its people.

Forests NSW regions

The region discussed in this overview as the North Coast Region is serviced by Forests NSW regional offices as follows:

Central Region
Wauchope office

North East Region
Coffs Harbour office

Northern Planted Forests Region
Grafton office

The principal timber species of the north coast are blackbutt, spotted gum and flooded gum from native forest and various softwood and eucalypt species from plantations. These timbers contribute to a consistently higher value product from local producers, who have developed flooring products, veneers and plywood as well as structural timbers to feed the local and Australian housing industry. A number of producers have established export markets that are increasingly showcasing northern New South Wales and New England highlands timbers to markets in Asia and Japan.

Upper North East Forest agreement region (UNE)

The Upper North East Region of the North East Regional Forest Agreement extends from approximately Sawtell to west of Guyra, then north to the Queensland border.

The draft Ecologically Sustainable Forest Management (ESFM) plan for the Upper North East region summarises the resources of the region as follows:

The 428,823 ha of State forests within UNE Region (2004) contain a wide range of landscapes comprising natural and cultural environments important for social development of regional communities.

Vegetation ranges from high altitude snow gum and New England hardwoods, through moist hardwoods and rainforest on the escarpment to coastal mangroves and wetlands. Topography varies from coastal plains and hills to rugged escarpments and open tablelands. The forests contain a variety of waterways from steep mountain gullies and creeks to coastal rivers and lakes, some with estuarine reaches.

Commercial use of State forests contributes $250 million (4.2%) to the regional economy and contributes about 4.5% of regional employment.

Lower North East Forest agreement region (LNE)

The Lower North East Forest Agreement region extends from approximately Sawtell to Newcastle, and west to the Wollemi National Park and New England tablelands..

The draft Ecologically Sustainable Forest Management (ESFM) plan for the Lower North East region summarises the resources of the region as follows:

The 489,322 hectares (ha) of State forests in the LNE Region provided revenue of $42.6 million to Forests NSW in 2002/3 and are a valuable asset for fostering economic development in northern regional NSW. In the same period, in managing the forests, Forests NSW spent $42.8 million directly into the Regional economy.

Commercial use of forests and forest products and the servicing of industry and families contribute $356 million (1.6%) to the regional economy and employ about 1.9% of the workforce. An estimated 850,000 people specifically visited State forests and spent $23.99 million locally.

Northern Planted Forests Region

The Regional Office at Trenayr, near Grafton, manages in excess of 50,000 hectares of softwood and joint venture eucalypt plantations on the north coast and northern tablelands, and markets a wide range of plantation products.

Commercial native forest products sold annually from State forests in the UNE and LNE Regional Forest Agreement Areas

Commercial Enterprise	How Authorised	Unit	Quantity
High Quality Sawlogs (large and small)	Wood supply agreement	Cubic metre	280,000
Low Quality Sawlogs	Wood Supply Agreement	Cubic metre	230,000
Poles Piles Girders	Wood Supply Agreement	Cubic metre	30,000
Veneer logs	Wood Supply Agreement	Cubic metre	15,000
Domestic Pulpwood	Timber Licence	Tonnes	20,000
Export Pulpwood	Timber Licence	Tonnes	170,000
Fencing timber	Timber Licence	Cubic metre	4,000
Firewood	Timber Licence	Tonnes	1,000
Smelter vat sticks	Timber Licence	Number	96,000
Plants	Forest Products Licence	Number	1500
Seed	Forest Products Licence	Kilogram	20
Wildflowers	Forest Products Licence	Number	4,000
Gravel	Forest Materials Licence	Tonnes	2,000
Grazing – Annual	Renewal Occupation Permit	Hectares	150,000
Grazing	Crown land tenure	Hectares	125,000
Apiculture	Bee Permit	Sites	1500
Special Events	Special Purpose Permit	Number	100
Infrastructure	Occupation Permit	Number	200
Tourism	Special Purpose Permit	Number	30

Plantation statistics of the north coast

Area of softwood plantation	24,350 hectare
Area of hardwood	26,691 hectares
Total softwood sales 2005/06	**227,000 cubic metres valued at $4.5 million, comprising:**
Veneer	96,000 cubic metres
Sawlogs	121,000 cubic metres (240,000m^3 in 2006/07)
Preservation timber	5,000 cubic metres
Pulpwood	5,000 cubic metres
Total softwood sales 2006/07	**350,000 cubic metres valued at $7.0 million**

The Ecologically Sustainable Forest Management (ESFM) Plans for the native forest Regions address the following matters:

Natural heritage values

Maintain the full suite of natural heritage values across the forested landscape.

Ecosystems maintained over a range of successional growth stages and Forest Management Zones.

Fragmentation of ecosystems by non-forest uses minimised.

Forest dwelling species of the region identified and viable regional populations maintained.

Threatened, rare, vulnerable and endangered species at risk from forestry operations identified and adaptive management applied.

Endangered populations and communities identified and protected.

Ecological processes associated with soil and water maintained.

Positive contribution to Australia's net emission reduction program for carbon dioxide

Aboriginal cultural heritage

Manage Aboriginal cultural heritage values and issues in cooperation with the Aboriginal community.

Aboriginal community engaged about Aboriginal cultural heritage management.

A database of Aboriginal heritage sites maintained while respecting the confidentiality of the Aboriginal community.

Aboriginal heritage incorporated into environmental training programs.

Forests NSWstaff and contractors trained in Aboriginal cultural heritage awareness.

Aboriginal people employed to deliver Aboriginal cultural heritage programs, identify Aboriginal sites and liaise with Aboriginal communities.

Agreements for Aboriginal co-management of forests, and access for products and activities developed with local Aboriginal communities.

Non-Aboriginal cultural heritage

Manage non-Aboriginal cultural heritage values in cooperation with local communities.

Database of cultural sites in State forests maintained.

Forests NSW Section 170 Heritage and Conservation register maintained and updated.

Forests NSW staff and contractors trained in cultural heritage awareness.

Protected areas

Conserve natural and cultural values within State forests.

Ecosystems in the reserve network on State forest protected, as far as practicable, from inappropriate disturbance.

Essential components of threatened species habitat protected by adaptive management.

Forest health

Maintain or enhance the health and productivity of the forests.

Weeds and animal pests managed through active coordinated and cooperative programs.

Fire managed through integrated and cooperative fuel management and wildfire suppression programs.

Rehabilitation of forest that has failed to regenerate as funds allow.

Research and monitoring program implemented to foster ESFM.

Sustainable timber supply

Supply timber in a long-term ecologically sustainable manner.

Net area of forest land available for timber production maintained.

Total growing stock of tree species on land available for timber production monitored.

Cumulative removal of wood products maintained within ecologically sustainable levels.

Removal of non-timber products maintained within sustainable levels.

Plantations established to maintain the timber supply strategy.

Harvested areas effectively regenerated where that was an objective of harvesting.

Plan of Operations for harvesting developed to disperse disturbance, in space and time, across the region.

Economic development

Maximise economic returns and contribute to the regional economy.

Wood supply agreements for major products completed with industry.

Log merchandising managed to procure timber for wood processing industries.

Additional plantation established to foster a plantation-based timber industry.

Forest areas rented for commercial ventures in apiary, grazing and other uses appropriate to forests.

Ecotourism in State forests fostered through partnerships with tourism and recreation businesses.

Aboriginal cultural heritage tourism opportunities facilitated in collaboration with the Aboriginal community.

Social development

Contribute to the social well-being of the regional community.

Employment by State Forests and industry encouraged including Regional Forest Agreement initiatives.

Public and commercial access to forests maintained through a road management program.

Sustainable recreation in the forests encouraged and recreation facilities maintained for public enjoyment.

Environmental education fostered and facilitated.

Forests continue to provide for appropriate regional infrastructure.

Forestry operations

Use adaptive management to ensure forestry operations are ecologically sustainable.

Environmental factors assessed at appropriate levels and results incorporated in operational plans.

Forestry operations implemented by appropriately trained and accredited staff.

Forestry operations appropriately monitored and audited by State Forests.

Consultation, monitoring and reporting

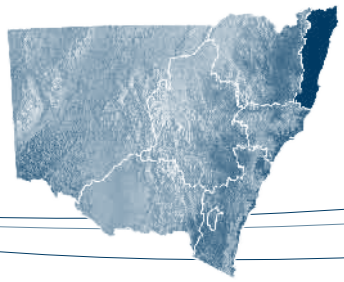
Ensure transparent and accountable professional forest management.

Appropriate stakeholders consulted on strategic and operational issues.

Appropriate access to planning data and operational plans by the public maintained.

Environmental assessment and planning and implementation of operations monitored and audited.

Social, environmental, and economic outcomes reported to Parliament, regulators and the public.



Mineral Resources on the North Coast

Recorded production of mineral resource products in 2002-2003 was dominated by construction materials ($27.3 m). Production of industrial minerals and metallic minerals each amounted to several hundred thousand dollars (estimated), and there was no production of petroleum resources. In contrast exploration spending on petroleum resources was highest, reflecting high potential in the northern half of the region plus latent demand.

Construction materials

At a glance

- Annual production (recorded) exceeding $27 m and 2.7 million tonnes
- Annual production value per hectare of disturbance far higher than other existing primary industries.
- About 176 significant sources and potential sources including 119 active sites.
- Several individual quarry sites producing > 100 000 tonnes per annum.
- Direct employment of over 300 people plus contractors.
- Essential supply of materials for maintenance and development of infrastructure including the Pacific Highway upgrade (notionally $2.2 billion over 10 years from 1996).

Key issues

- Declining identified resource base.
- Declining access to resources.
- Sensitivity to transport costs.
- Uncertainty over long-term sustainability of supply.

Background

Construction material quarries and resources are a significant component of the socio-economic environment of the North Coast. Major commodity groups include crushed and broken stone ($21.3 million), construction sand ($5.6 million), river gravel ($0.9 million), and other materials ($1.5 million).

Construction materials are natural or artificial rock and soil materials used with little or no processing in road and civil construction. Extraction typically involves digging, ripping or blasting, optionally followed by crushing, screening and/or blending (for example, mixing with other natural materials, lime or cement to improve certain material characteristics). Construction materials are characterised by:

- use in large volumes (recorded production of approximately 2.7 million tonnes in the North Coast region in 2002/2003);
- low unit cost (ex-pit prices averaging about $11.40 per tonne and ranging to about $30 per tonne in the

North Coast region in 2002/2003); and

- sensitivity to transport cost (only a few tens of kilometres transport can add 50% or more to ex-pit prices).

The North Coast currently yields five broad classes of construction material products:

- rock products including armour stone and flagging stone;
- coarse aggregates including coarse crushed rock and processed river or beach gravel;
- construction sand including manufactured sand, processed and unprocessed sand;
- graded gravels including graded road base/sub-base which may be crushed (prepared road base) or uncrushed (unprocessed road base);
- other, commonly earthen, materials (including unprocessed fill).

There are currently approximately 176 significant construction material sites in the North Coast region (119 operating, 21 pending, 9 not operating, 27 prospects/resources), that belong to five broad classes:

1. **sand and gravel deposits** – sources of coarse and fine aggregate (11 sites), construction sand (34 sites) and unprocessed road base (3 sites);
2. **hard rock deposits** – sources of rock products (8 armour stone, 2 flagging stone), course aggregate (30 sites) plus prepared road base (43 sites);
3. **weathered/soft rock deposits** – sources of unprocessed road base (27 sites) and unprocessed fill materials (2 sites);
4. **friable granular rock deposits** – sources of construction sand (3 sites) and unprocessed road base (6 sites); and
5. **soil material deposits** – sources of unprocessed road base (6 sites).

Industry viability

Cost and uncertainty in gaining consent is the largest single issue faced by industry.

The future

The sustainability of construction material supply in the North Coast region is problematic, despite abundant potential resources.

Few existing sources of supply are naturally replenished, and therefore most sources would eventually be depleted.

Many existing sources of supply will apparently exhaust their resources within the term of their existing development consents, which will generally be within a generation (20-25 years).

Even with unlimited development consent, most existing sources would be exhausted within two generations (40-50 years), leaving only a few very large sources still active.

Not all existing sources would be fully exploited because of the cost and uncertainty of gaining additional development consent owing to land use pressures and environmental sensitivities in the North Coast and to provisions for third party appeals.

Sensitivity to transport costs plus access constraints elsewhere will limit the feasibility of supply from neighbouring regions or distant parts of the North Coast.

Population growth and development in the region are likely to maintain or increase demand for construction materials over time.

Industrial minerals

At a glance

- Several active sites
- Annual production value of several hundred thousand dollars (estimated)
- Annual production of about 100 000 tonnes (estimated)
- Essential raw materials for several active brickworks
- High levels of processing and value adding at a few sites (mainly brickworks).

Key issues

- Production largely for markets in the region, and limited by external competition
- Huge clay resources, but lack of domestic energy source to underpin development and possible export.

Background

Industrial minerals are minerals whose specific physical

and/or chemical properties enable industrial use with little or no beneficiation other than concentration.

Clay and limestone are the only two industrial mineral commodities of current economic significance in the region.

Heavy mineral sand deposits were formerly mined along much of the North Coast, and some operations have only recently closed. Potential for further mineral sand mining is limited due to depletion of available resources and to environmental and land use constraints.

Numerous other industrial mineral commodities (some historically important) have been produced or recorded in the region including barite, decorative aggregate (see construction materials section), diatomite, feldspar, garnet, iron oxide, manganese oxides, mineral pigments, peat, perlite, opal, sea shells, talc, topaz, and wollastonite.

Clay is currently produced at South Kempsey, South Grafton, Nymboida and Coombell, and development recently was approved at East Kempsey. Clay occurrences and potential resources are widespread in the North Coast, especially in Mesozoic basins and Early Permian sedimentary sequences. The collective potential for development is huge, but would require availability of cheap local energy sources to compete with external sources.

Limestone is currently mined for agricultural purposes near Toms Creek west of Wauchope, and another deposit has been delineated nearby. A limestone mine is under development near Wauchope. A prospect with identified resources occurs at Gowings Mountain west of Kempsey, and a highly prospective limestone belt extends north and south from the recently (1992) abandoned Yessabah limestone mine. Limestone has also been mined historically near Tabulam, and the residual resource is large.

Industry viability

The cost of gaining access to resources plus competition from external sources area the major constraints to industry viability.

The future

Limestone and clays are likely to remain in demand in the region for the foreseeable future. Other commodities that could potentially attract interest include decorative aggregate, industrial garnet, iron oxide, and wollastonite.

Limestone demand in the region is limited by competition from external sources, where economies-of-scale significantly offset the cost of transport. Cost and uncertainty of consent also inhibit resource assessment and development in the region. Increasing use of lime products in agriculture and for managing coastal acid sulphate soils could provide the stimulus for a gradual increase in the development of limestone in the region.

Clay occurrences and potential resources are widespread, especially in Mesozoic basins and Early Permian sedimentary sequences. The collective potential for development is large, but would require availability of cheap local energy sources to compete with external sources.

Heavy mineral sands in the North Coast are unlikely to be developed on a significant scale in the foreseeable future.

Metallic minerals

At a glance

- Negligible current production
- Subdued exploration
- Significant resource potential.

Key issues

- Access to land is critical to encourage exploration potentially leading to resource discovery and development.

Background

Metallic mineral production in the North Coast has been negligible in recent decades. However, pockets of enhanced potential exist in some areas, particularly around Willi Willi, Birdwood, Coffs Harbour, the Hastings River, Gundle and south of Port Macquarie. Exploration expenditure for metallic minerals in the North Coast has averaged about $0.25 million per year over the last decade.

The most important metallic commodities within the North Coast historically have been gold, antimony, tin, copper, molybdenum, silver and tungsten. Past

production of metallic minerals is of the order of A$50 million (2003), mostly during the later 1800s to early 1900s. In the last two decades most exploration and assessment for metals has been for nickel, cobalt, and scandium; and to a lesser extent gold, antimony, tin, molybdenum and copper. Identified metallic resources equate to over A$2.5 billion.

Development of metallic resources is heavily dependent on international metal prices, access, environmental issues, technology, local metallurgical complexity, and government and community perceptions. International prices for most metallic minerals are projected to increase over the medium to long term. However from an international perspective, the Northern Comprehensive Coastal Assessment area could only be considered a low to moderately prospective metallic mineral province. However, there are pockets where prospectivity is enhanced, particularly around Willi Willi, south of Port Macquarie, Birdwood, Coffs Harbour, the Hastings River and Gundle.

Most metallic mineral prices have surged during 2003 and 2004, and consequently there has been an increased level of exploration interest for various metallic minerals in the NCCA area. There are currently (September 2004) metallic mineral exploration titles or applications in the Port Macquarie, Willi Willi, Munga Creek, Taylors Arm, and Valla-Nambucca areas. Exploration expenditure for metallic minerals in the NCCA area has averaged around $0.25 million per year over the last decade.

Large, but currently uneconomic resources of nickel-cobalt-scandium have been identified near Port Macquarie. The projected outlook for these three commodities is good to excellent. However the resources at Port Macquarie would have high processing costs and are subject to a range of social and environmental issues and possible constraints.

Industry viability

Viable resources need to discovered and developed for there to be significant production.

The future

Access to potential resources is declining, inhibiting exploration and reducing the potential for future discoveries and developments.

Petroleum resources

At a glance

- No current production, but significant exploration and potential
- Identified sub-economic resources
- Proximity to markets that are large enough to encourage exploration and resource development.

Key issues

- Access to land for exploration and mining

Background

The term *petroleum* includes both conventional oil and gas, and coal seam methane (CSM). Coal seam methane is the natural gas formed during coalification whereby peat and other organically-rich sediments are transformed into coal as a consequence of compaction and heat associated with the processes of ongoing deposition and burial.

The Clarence-Moreton Basin is prospective for petroleum (including coal seam methane) in both its onshore and offshore extents. There has been significant exploration for petroleum over the last decade.

Coal seam methane (CSM) extraction is a relatively new technology that has been recognised commercially in the last ten to fifteen years. In Australia, pioneering CSM projects in Queensland (Fairview) and New South Wales (Camden) are at an advanced stage of development or assessment, whilst the first commercial production of natural gas for power generation commenced at Narrabri in 2004.

Industry viability

There has been no commercial production to date but the region has significant potential and active exploration is in progress.

The future

Future production will depend on favourable exploration results, or to improvements in technological or price.

Further Information

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