

MINERAL RESOURCES DIVISION



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Nature and scope of activities

Mineral and processed mineral exports were worth approximately \$8.6 billion to NSW in 2004-05.

Within this context, the Mineral Resources Division is a major contributor to the prosperity of NSW through its stewardship of mineral resources. The Division also brings in royalty earnings, which in 2004-05 totalled \$396 million.

The majority of divisional staff work in purpose-built facilities at Maitland and the newly established Mine Safety Technology Centre close to Maitland, with the remainder based in nine regional offices.

The Division's five branches are:

- the Coal and Petroleum Resources Branch is responsible for providing an assessment of the State's coal and petroleum resources and providing advice on resource development, landuse and infrastructure planning
- the Geological Survey of NSW undertakes geological mapping and resource assessment, audits private sector mineral exploration performance, promotes exploration investment, and coordinates and assesses land use planning issues affecting exploration and mining
- the Mine Safety Operations Branch works to ensure that the mining and exploration industry satisfies community and government expectations regarding safety, health, mine subsidence and resource extraction
- Minerals Development is responsible for administering mining and exploration titles, collecting mineral, coal and petroleum royalties and facilitating new mine developments in NSW
- the Environmental Sustainability Branch guides the exploration and mining industry to improved environmental sustainable performance and works closely with other government agencies to regulate industry activities.

Major outcomes achieved

Successful relocation to Maitland

In November 2004, the Mineral Resources Division relocated to purpose-built facilities at Maitland in the Hunter region. The move from Sydney and the establishment of the Mine Safety Technology Centre at Thornton brought significant challenges and many changes in staffing structure and numbers.

A core group of experienced staff ensured that key services continued to be provided to our stakeholders. A recruitment program to complement the core group is nearly complete.

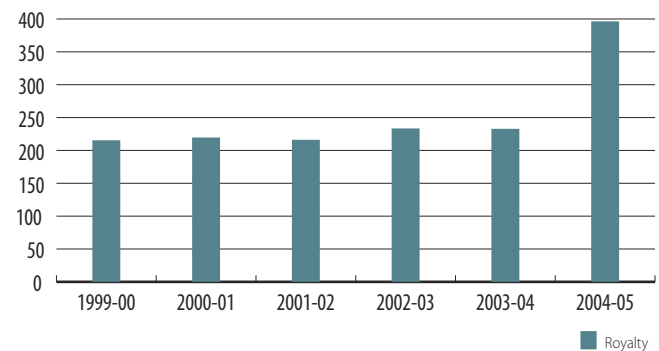
Mining development and investment

Record production and royalties

The total value of NSW mineral production in 2004-05 is estimated at a record \$9.2 billion, an increase of around 37 per cent over the previous year. Coal production, with an estimated value of about \$7 billion in 2004-05, accounted for over 76 per cent of the total production value. Metallic and industrial mineral production was also very significant, having an estimated value of \$2.2 billion in the reporting year.

NSW royalty figures for 2004-05 indicate record collections. Net royalty collected in the financial year was around \$396 million, an increase of 58 per cent over the previous year. At \$354 million, coal royalty collection was up by 62 per cent over 2003-04, largely due to the NSW Government's introduction of an ad valorem coal royalty regime on 1 July 2004. Non-coal royalties increased by around 31 per cent over the previous year to \$42 million.

Mineral royalties (\$ million)



New development

The sharp increase in coal and mineral prices from 2004 on has encouraged the development of a number of coal, mineral and petroleum mining projects. New capital expenditure in the NSW minerals industry for 2004-05 has again exceeded \$1 billion.

New major projects/operations to which the NSW Government granted consent during the year were:

- development of a \$114 million extension at depth to the Ridgeway gold/copper mine
- the first NSW commercial conventional gas production lease at the Wilga Park power plant west of Narrabri. Operated by Narrabri Power Limited, a 100 per cent owned subsidiary of Eastern Star Gas, the plant utilises gas reciprocal engines to generate power for on-sale to Country Energy
- the Werris Creek Coal Project and the Gingko Mineral Sands Project, which have commenced construction.

In May 2005, the Division received development applications for the Excel Mining Wilpinjong coal mine project near Mudgee and the East Boggabri coal mine project in the Gunnedah Basin.

Titles

Under the Titles Program, the Division processed 2487 title applications and dealings in addition to over 5000 mineral claim applications for opal mining at Lightning Ridge.

Mining leases were granted for the Tasman Coal Project and major extensions to Bulga, Hunter Valley Operations, Muswellbrook and Mt Owen coal mines.

Procedures were streamlined and, in an exercise conducted in association with the Maitland relocation, over 80 processes relating to administration of the mining and petroleum Acts were documented in detail.

Exploration

Data for exploration investment

High quality geoscience information is essential both to attraction of exploration investment and effective land use decision-making by all levels of government. Data from the Geological Survey of NSW was supplemented during the year through the NSW Government's Exploration NSW initiative, a \$30 million, seven-year program to accelerate geoscience data acquisition to increase private exploration investment for minerals and petroleum (particularly gas).

Exploration NSW aims to boost exploration investment in the State's established mineral provinces as well as in under-explored regions. In 2004-05 work included major geophysical surveys in the far west of the State as well as regional geoscience mapping and data compilation.

The largest airborne magnetic and radiometric survey ever conducted in NSW commenced in March 2005 and will conclude in October 2005. The survey will cover 90 000 square kilometres and record 280 000 line kilometres of data in an endeavour to improve understanding of exploration opportunities for minerals and petroleum in the far north west and far south west.

In 2004-05 Exploration NSW also highlighted the opportunities for petroleum exploration via development of the Darling Basin Petroleum Data Package that includes 134 kilometres of seismic data acquired in the Wilcannia-Ivanhoe region.

Exploration activity

Strong commodity prices resulted in a substantial lift in the value of minerals exploration activity in NSW to \$70 million (preliminary), a 40 per cent increase over 2003-04. The rise in granted mineral exploration licences from 520 in June 2004 to 599 in June 2005 is another indicator of increased activity. Similarly, there was a record increase in petroleum exploration to \$31 million (preliminary), largely as a consequence of investment in coal seam methane projects in the Gunnedah and Sydney basins. This represents a 45 per cent increase over 2003-04.

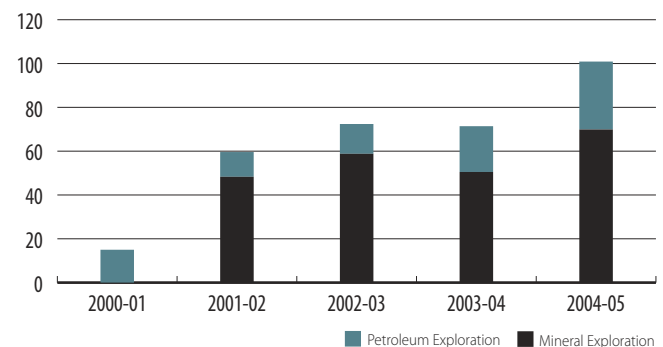
Exploration NSW

Exploration NSW is a \$30 million, seven-year government initiative to attract global investment in mineral and petroleum exploration to the State. It aims for the top – that is to provide world-class geoscience to industry and data access via the latest online systems.

Over the year Exploration NSW:

- commenced the largest, high-resolution airborne geophysical survey ever conducted in NSW over areas of mineral and petroleum potential in the north-west and south-west
- identified unexplored geological provinces under cover in the far west
- conducted seismic surveys in the Darling Basin that enhanced prospecting in the basin for oil and gas
- focused geological mapping in the far west on areas of exploration interest in the Koonenberry, Cobar and New England regions
- developed improved internet-based data delivery systems for exploration company reports, titles information and geoscience data.

Mineral and petroleum exploration expenditure in NSW (\$ million)



Another positive development for the NSW mining industry was the arrival of overseas majors and the entry of Western Australian junior explorers.

A number of very significant exploration successes were recorded over the year, particularly at Broken Hill and Cobar. Other areas of interest were the:

- Lachlan Fold Belt where exploration is beginning to lead to mine development
- New England Fold Belt, especially the Hillgrove and Tooloom areas
- Murray Basin where heavy mineral sands deposits with a value of over \$10 billion have been discovered.

Safety operations

Wran Review

One of the most important safety initiatives of the reporting period, the Wran Review of Mine Safety identified the need for better cooperation on safety by industry, unions and government. Further details on the review appear in this report in the section on the Biosecurity, Mine Safety and Compliance Division.

In 2005-06 the Minister for Mineral Resources will finalise discussions on how best to implement the review's recommendations.

Investigations and education

Inspectors and mine safety officers conducted over 1500 site assessments and over 500 investigations of safety-related incidents. In addition, they gave technical advice to major investigations. More than 400 notices were issued, including 68 that directed mining operations to stop the use of equipment or cease work until safety improvements were made.

Safety on the opal fields continued to be excellent – 2004-05 being the eighth successive year without a fatality. More than 930 opal miners attended safety awareness courses and more than 800 completed the Mine Operators Workshop.

Technical services

The Division completed a diesel particulate matter (DPM) research project funded by the Coal Services Health and Safety Trust which developed a practical method for measuring DPM emissions from mining equipment. A report was prepared and submitted to the Trust. There are plans for further testing in 2005-06 to establish an adequate amount of data for analysis that will in turn inform development of strategies to control miners' exposure to DPM.

Safety performance

Mine safety performance across the State's mining industry showed continued improvement this year, as shown in the table below, in particular a significant reduction in serious bodily injuries in the coal sector.

Mine safety statistics

	2003-04	2004-05
Fatalities	3	1
Serious bodily injuries (coal)	39	31
Serious bodily injuries (non-coal)	12	9
Notifiable incidents (coal and non-coal)	273	251
Dangerous occurrences	27	31

Environmental management

Stakeholder engagement

To ensure a whole-of-government approach to issues resolution and better align agency operations, the Division held regular meetings with the NSW Department of Environment and Conservation and the NSW Department of Infrastructure, Planning and Natural Resources. The meetings, which also involved local government, kept participants fully informed of mining proposals and the progress of mining operations. On the community front, wide consultation promoted the flow of information and improved understanding of environmental management of the mining industry.

Environmental rehabilitation

With the full cooperation of the two miners' associations and individual miners, the Division continued the rehabilitation campaign in the Lightning Ridge opal mining region. From the start of the campaign in 2002 to date, 1239 claims have been inspected and reports sent to claimholders. Planning is now under way to create extra mullock dumpsites to alleviate identified mullock handling problems.

Projects for rehabilitation works at around 50 derelict mine-sites across the State received funding during 2004-05. There was major rehabilitation work on nine sites and minor rehabilitation works on a further 22 sites. Additionally, the Division completed environmental assessments, including bat surveys, heritage inspections and soil and water investigations, at a number of sites.

Subsidence management plans

The Division received 21 subsidence management plans (SMPs), of which 16 were assessed and approved. The Beltana Colliery second workings SMP application was of a high standard and will serve as the industry benchmark in future.

An interagency committee will review the subsidence management plan requirements, specifically those relating to monitoring and risk assessment, in consultation with an industry working group. Broad agreement has already been reached on the required changes.

Operational and regulatory compliance

All mines under mining leases must prepare and comply with a mine operations plan. The plan sets out how the leaseholder will meet the conditions imposed on operation, minimise the environmental impacts and rehabilitate any disturbance. The plan also outlines the proposed mining operations, land and environmental management strategies and details progressive rehabilitation works.

During the year, the Division undertook 41 environment assessments and advised external authorities regarding 28 development assessments under the *Environmental Planning and Assessment Act 1979*.

Legislative change

The NSW Government has carried out a review of the environmental provisions of the *Mining Act 1992* and identified areas where legislative amendment will strengthen administration of mining in NSW. The next stage of the review process is release of a position paper for public comment. The paper, which should be available later in 2005, will set out the Government's preferred approach to amendment of the Act.

Divisional performance				
	Units	2002-03	2003-04	2004-05
Outcomes:				
NSW share of private mineral exploration in Australia	%	8.0	6.4	7.2
Value of NSW mineral production	\$m	6 775	6 700	9 200
Royalties collected	\$m	233	250	396
Lost time injuries	no.	566	443	565
Fatal injuries	no.	1	3	1
Mines operating to agreed Mining Operation Plans	%	90	90	95
Environmental security deposits held	\$m	375.4	474	473
Outputs:				
Coverage of State by new standard series geoscience maps and data	km ²	51 000	45 000	30 000
Titles and dealings processed within published time frames	%	90	90	90
Royalty debt level - % of total royalties	%	0.42	0.29	0.20
Safety regulation				
Investigations (safety operations)	no.	n.a.	n.a.	494
Enforcement actions	no.	n.a.	n.a.	394
Environmental regulation				
Audits, assessments and reviews	no.	633	784	798
Investigations and enforcements	no.	40	30	45
Rehabilitation of derelict mine sites	no.	37	44	50



CASE STUDY

Stronger voice for primary industries in government decision-making

NSW DPI plays a major part in achieving simultaneous protection of economic and conservation interests

FINDING THE RIGHT BALANCE IN THE PILLIGA

Long-term economic and conservation interests can be protected simultaneously – that’s the message coming from whole-of-government negotiations on future management of the Pilliga region in which NSW DPI played a major part.

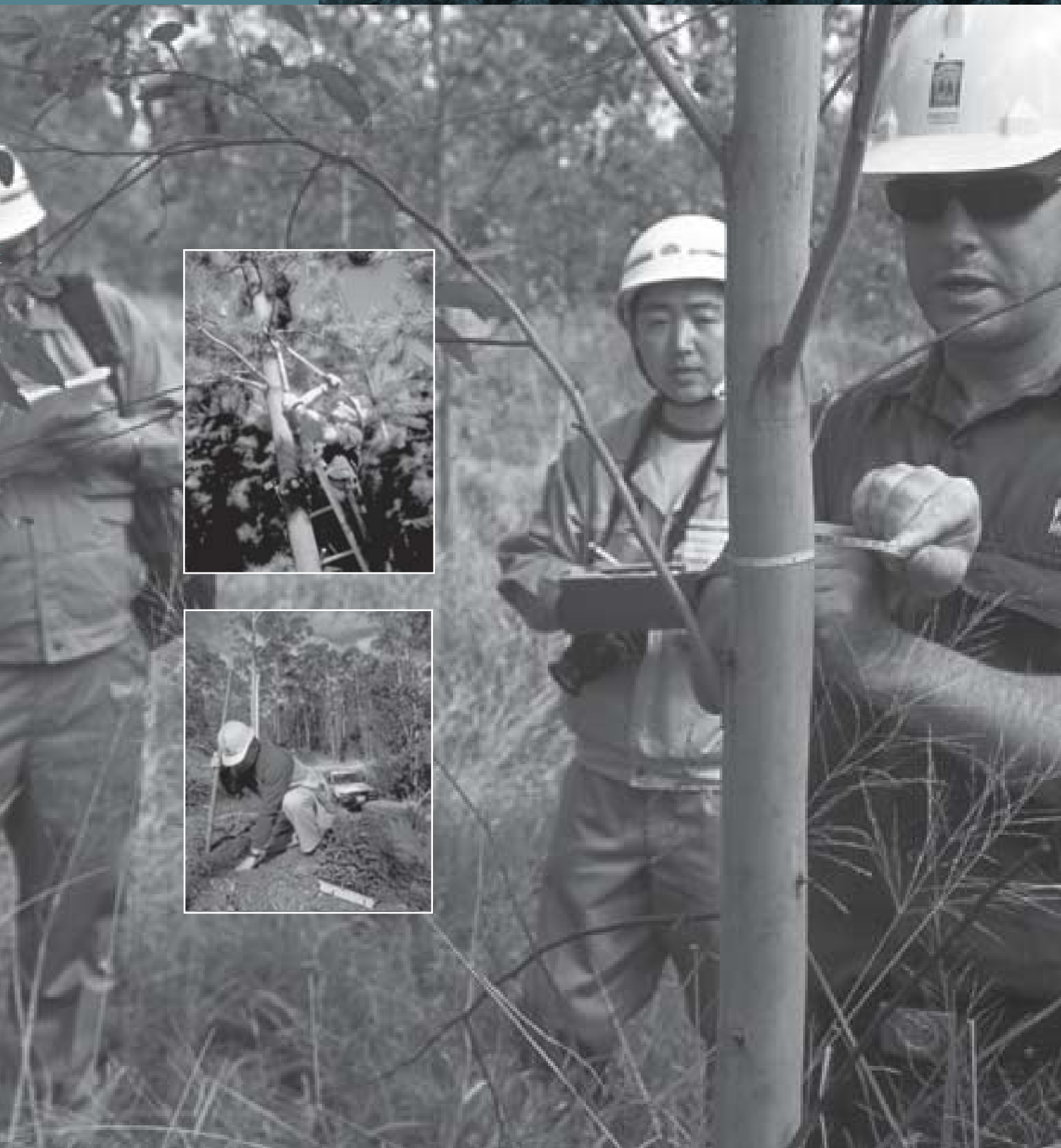
Located near Narrabri, the Pilliga region contains one of the largest tracts of continuous natural vegetation in the State, with white cypress and narrow leafed ironbark the major species. As such it has high conservation values. The region is rich in resources, namely timber and gas, the latter identified recently through private exploration. There are also potential reserves of coal, gold and gemstones.

NSW DPI’s role in finding the right balance for the Pilliga initially involved undertaking two studies. One aimed to establish the mineral and petroleum (gas) potential of the area using techniques such as new geological and mineral deposit mapping, airborne geophysics and investigative drilling. The other study assessed the value of timber resources in the state forests and crown land sections of the Pilliga that are managed by Forests NSW.

Subsequent negotiations on achieving an economic/conservation balance brought NSW DPI together in discussions with a wide range of community groups and government agencies, including the NSW Department of Environment and Conservation.

The final outcome saw the creation of a series of conservation reserves in areas with low mineral resource potential and preservation of access to the remainder of the Pilliga for mineral exploration and timber production.

FORESTS NSW



FORESTS NSW

Nature and scope of activities

Forests NSW is a public trading enterprise operating within NSW DPI.

Our role is to sustainably manage more than 2 million hectares of native state forests and plantations to achieve a range of economic, environmental and social objectives. These objectives include ensuring the supply of timber to processing industries, protecting the biodiversity of state forests and providing community amenities – all within the framework of a profitable business.

Forests NSW is also developing new business services related to our primary role as a forest manager, such as private forestry and plantation management services, carbon sinks and carbon trading, salinity mitigation, eco-tourism, land repair and mine site rehabilitation.

There are five branches:

- Native Forests Operations
- Planted Forests Operations
- Land Management and Technical Services
- Commercial Services
- Finance and Operational Business Services.

Major outcomes achieved

Business improvement

Increasing returns to the NSW Government

Organisational focus over the past year was on delivery of ongoing improvement in operational performance. The target, which the NSW Government set in the mini budget of March 2004, was to produce increased dividend payments of \$20 million per annum additional to budgeted dividends.

To this end, Forests NSW embarked on a program to develop new revenue streams and achieve sustainable operating and capital expenditure savings. Improvements to systems and purchasing arrangements were also part of the package.

Some of the means identified for improving operational performance were:

- introducing new forest products
- revising pricing and charges for some services
- reduction of some activities
- reducing staff numbers through voluntary redundancy
- selling non-strategic sites and co-locating to fewer operational sites
- re-investing asset sale proceeds in technology and equipment to further enhance profitability.

Better financial controls

At the same time, Forests NSW introduced new financial controls across the organisation including a more formal review and approval process for major operating and all capital expenditure. The process includes formal reviews of all:

- capital expenditure proposals and tenders (regardless of value)
- operating expenditure with a value greater than \$100 000
- consultants, contractors, extensions and new appointments
- procurement tenders and contracts, timber and contract harvesting and haulage proposals
- future financial budgets and plans.

A full business case targeting resources and activities for any of the above is now required prior to any decision regarding implementation. All proposals must also take account of the public trading enterprise status of Forests NSW and national competition policy requirements.

The implementation of the new financial controls is an important step towards achieving sustainable business improvement and financial targets.

Profits for 2004-05

The downturn in the housing market resulted in reduced timber sales in the latter part of the financial year. However, Forests NSW was still able to deliver a \$32.5 million dividend for distribution to the NSW Government, meeting the set target.

This has been achieved through putting identified performance improvement strategies in place as well as the sale of the former Forests NSW head office building.

New business development

Forests NSW develops investment products in partnership with managed investment schemes and establishes new plantations for third party investors. As well as meeting investment needs, such products expand the State's plantation estate and help meet timber supply needs.

A managed investment scheme involving Australian Forest Management Pty Ltd, a subsidiary of Rothschilds, and Forests NSW operated in 2004-05 and resulted in the establishment of 850 hectares of new plantations. Forests NSW also managed plantations on a fee-for-service basis for international companies such as Tokyo Electric Power Company and Italian electronics company ST Microelectronics.

Forests NSW intends to develop more investment products as they provide new sources of revenue and an improved return on capital. They also allow expansion of plantations without the usual upfront establishment costs.

Additionally, where Forests NSW is contracted to sell mature timber from investment plantations, it will be able to count the volumes sold toward fulfilling supply commitments to industry.

Finalisation of wood supply agreements

Following the regional forest agreements and subsequent reservation of further forests for conservation, the NSW Government offered 20-year wood supply agreements to north and south coast saw millers. The agreements, which are close to finalisation, will provide unprecedented security of supply and underpin industry employment and investment in the two regional areas.

On the North Coast, new contracts replaced previous supply agreements for high quality sawlogs. Along with these changes, Forests NSW introduced two new types of wood supply agreements to maintain supply of specialty high quality logs (small logs, poles, piles and girders) and lower quality sawlogs (thinnings from plantations and native forests).

The south coast agreements provide long-term security of supply for a range of sawlog quality grades and maintain the balance created by the Southern Regional Forest Agreement between environmental conservation and continuing industry viability.

Trading results

Timber sales

Nearly 3 million cubic metres of softwood sawlogs and pulpwood were produced during 2004-05, generating \$86.1 million in softwood timber sales. This result was down in volume by 50 000 cubic metres but an increase in sales value of \$100 000 when compared to the previous year.

Production of hardwood and cypress sawlogs and pulpwood amounted to over 1.4 million cubic metres and generated \$41.9 million in sales. This result was down in both volume, by nearly 100 000 cubic metres, and value by nearly \$2.7 million when compared to the previous year.

Softwood and hardwood sales were strong early in the financial year but tapered off towards the end of the year due to the slowdown in the housing market.

Sales of sawn softwood products are closely linked to the cyclical nature of the housing construction industry. To enable better management of market trends, Forests NSW reviewed the system through which timber is allocated for supply commitments. The resulting strategies allow customers to boost processing capacity to meet market demand, thus promoting full utilisation of softwood resources.

Carbon trading

In 2004-05 Forests NSW achieved a world record in carbon trading. It achieved this distinction through becoming the first agency to create and sell certificates of carbon sequestration from forests under an approved trading scheme. Electricity generators and other companies buy the NSW greenhouse abatement certificates that certify the sequestration of measurable quantities of carbon and offset the certificates against carbon emissions from their operations. Further details appear in the case study on page 26 of this report.

Delivered sales

Sales of logs sorted at the harvest site and delivered to the mill door are known as 'delivered sales'.

The rollout of a merchandising approach to such sales across all Forests NSW operations is nearing completion. The approach, under which Forests NSW directly engages harvest and haulage contractors, enables better differentiation between logs of different quality. Whereas previously there had been wastage of some log types, the new approach ensures that each log can be sold for its highest value application.

Expansion of delivered sales in the Forests NSW southern region commenced during the year and, when finalised, will complete the log merchandising rollout to all coastal native forest regions. With softwood harvesting approaching 100 per cent delivered sales, the combined revenue from hardwood and softwood delivered sales reached \$150 million in 2004-05.

Growth of plantation-related industries

The softwood industry is a major driver of economic growth in many NSW regional areas. And, as indicated by recent investments in timber processing, the industry will underpin future regional development. Investments include:

- Norske Skog's \$130 million upgrade to the Albury paper mill
- Hyne Timber's \$110 million capacity upgrade at the Tumbarumba sawmill
- ATP's \$12 million 'green-field' sawmill at Bathurst
- McVicar's \$10 million 'green-field' sawmill at Quirindi.

Several companies also announced planned investments: Visy, an investment of \$360 million to speed up production at its Tumut mill and install a second paper machine, and Weyerhaeuser, a further investment of \$10 million at its Tumut sawmill.

With the official opening of the upgraded Hyne Timber mill by the Minister in April 2005, Forests NSW pine plantations now support the largest sawmill in the southern hemisphere. The mill has the capacity to process sufficient pine timber to build more than 20 000 new homes annually.

A recent study commissioned by the Riverina Development Board's Softwoods Working Group demonstrated the importance of the industry to the south-west slopes of NSW. The study predicts that, as the result of recent expansion in Tumut, Tumbarumba and Albury, the timber industry will generate \$2 billion for the regional economy and create jobs for more than 3500 people within the next five years.

Together with expansions in Bathurst, Oberon, Bombala and Quirindi, the softwoods industry will continue to play an important role in the future economic development of regional NSW.

Forest management

Government decision supports sustainable industry development in western NSW

In May 2005, the NSW Government announced its decision on the future management of Brigalow Belt South and Nandewar bioregions in western NSW. The announcement came after five years of analysis and extensive stakeholder and community consultation.

The decision, which will establish the basis for an ecologically sustainable timber industry, is to make 264 000 hectares in the bioregions available for timber harvesting and set aside 348 000 hectares for new conservation reserves. Under the decision the NSW Government will:

- allocate \$80 million over the next five years for job creation, timber industry development and conservation management
- make available up to 57 000 cubic metres of cypress pine per year to the cypress industry, with only minor reductions to the remaining mills. The Government will also underwrite 20 year wood supply agreements
- provide employment for up to 50 people in cypress thinning programs that will be extended to private and Crown lease lands to boost timber supplies for industry.

The decision also guarantees security for the local farming, apiary, coal and gas industries.

New conservation areas on the south coast

In December 2004, the Minister for Primary Industries announced the creation of 7135 hectares of new national parks and state conservation areas in the south-east of NSW. The announcement increases the total forested area of national park in the region to more than 812 000 hectares. Over 366 000 hectares of native state forest still remain available for timber harvesting which will support sustainable local timber production.

The Minister also announced the lifting of a moratorium on harvesting over a large area of state forest in the Eden and southern regional forest agreement areas that had affected industry access since February 2003. Lifting of the moratoriums will lead to a more secure investment climate for value-adding by industry. Forests NSW, the NSW Department of Infrastructure, Planning and Natural Resources and the NSW Department of Environment and Conservation negotiated changes to regulations that will maintain productivity without jeopardising environmental protection.

Fire management

Due to the severe drought, Forests NSW initially prepared for an early and severe bushfire season, particularly in southern NSW. Fortunately good rain through spring and into early summer reduced fire risk and there were average levels of fire activity in the north and centre of the State in both periods.

Conditions became dangerous in southern NSW in January with major fires in South Australia and Victoria, but there were no major NSW outbreaks.

The National Climate Centre's seasonal outlook report to Forests NSW and Bureau of Meteorology rainfall predictions indicate the likelihood of an early and potentially long and severe fire season in 2005-06. Forests NSW is making preparations accordingly. It is also working to extend the Fit to Fight voluntary fire fighting training program across NSW DPI.

Forests NSW took advantage of the dry autumn to conduct significant bushfire hazard reduction in strategic zones.

New recreation policy and strategy

In March 2005, the Minister launched the new recreation policy and strategic framework *Living, working, playing ... forests 2005-2009*. Forests NSW consulted widely in developing the framework as a response to growing demand for recreational, sporting, tourism and training use of state forests.

Part of the package is a strategy to align forest management for recreational and other purposes with the primary objectives of providing a sustainable timber supply to NSW and protecting environmental values.

The strategy aims to:

- develop and promote partnerships with recreation, tourism and other groups
- ensure safe, long-term access to both native forests and planted forests for group activities and organised events
- apply more consistent fees and administration for events and organised groups
- improve public access to information on state forest recreation.

Access for individuals, families and small groups is free to all state forests across NSW but fees apply for organised events. In 2004-05 there were over 275 organised events held in state forests, each providing an economic boost to regional communities and helping to encourage tourism.

Preparing for forest certification

Forests NSW continued to prepare for forest certification. Certification – which entails independent assessment of an organisation's forest management against specified criteria – gives consumers assurance that their timber comes from sustainably managed forests.

Preparations included the release for public comment of draft ecologically sustainable forest management plans for the next five years. The plans set out broad strategies, performance indicators and measurable outcomes for forest management in key areas. These include:

- natural heritage
- Aboriginal cultural heritage
- forest health

- sustainable timber supply
- economic and social development.

The plans build on important ecological data collected and analysed in comprehensive regional assessments and, when completed, will form a vital part of the framework for achieving certification.

Forests NSW is currently assessing the two internationally renowned certification schemes to determine which scheme would best meet customer demands.

The aim is to achieve certification by the end of 2006.

Safety

Comprehensive new safety management system

Forests NSW is a self-insurer for workers compensation. As such it is required to have safety systems that are audited by WorkCover.

Forests NSW completed an exhaustive review of safety systems, documentation and communication during the year. The review resulted in development of a comprehensive new safety management system launched in May 2005 with the slogan 'Think Safe, Act Safe, Stay Safe'.

Under the new system, specialist safety and training coordinators across the State will cover all Forests NSW regions and all operations. The safety team will report directly to the chief executive – a fundamental change in safety management.

All staff have a role in maintaining the highest possible level of safety across the forest industry. To ensure their commitment to the new safety arrangements, Forests NSW held workshops in all branches.

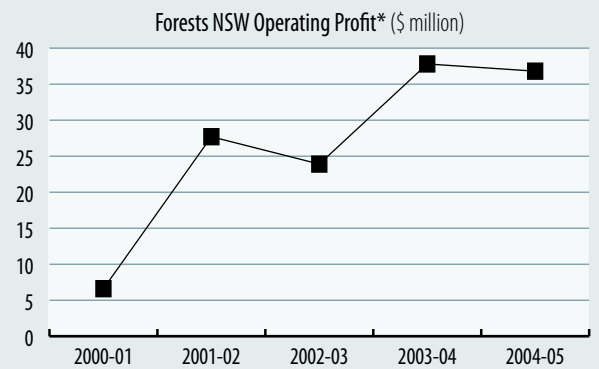
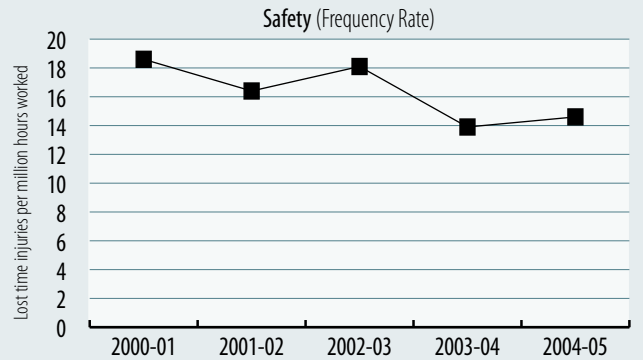
Another important achievement in 2004-05 was the clocking up of a record three years without time lost to injuries in the Monaro Planted Forest Region.

Road safety award

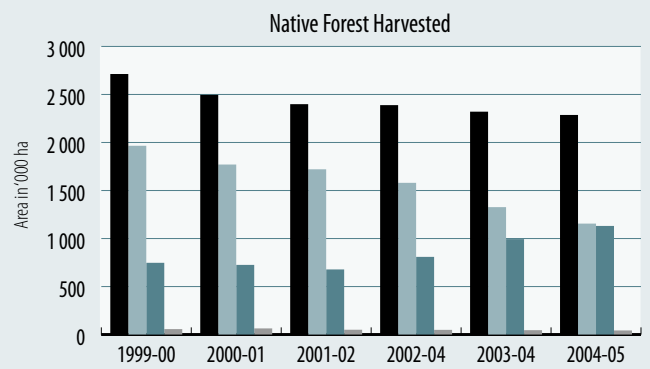
Forests NSW is a key member of the Forest Industry Council for the south-west slopes. The council, together with the Tumut, Tumbarumba and Gundagai shire councils, established the joint project Sharing the Road with Trucks. In May, the project won the 2005 Local Government Excellence in Road Safety Award conferred by the Institute of Public Works Engineering Australia.

The project included a media campaign, information packs and the *Safety First* newsletter for log haulage companies, and a reporting line for road users. Another feature was the installation of special road markers at one-kilometre intervals along high-use forestry roads in the region. The markers, which are the innovation of Forests NSW, enable drivers to report such information as the location of their vehicle to other road users over the UHF radio network. Forests NSW is funding marker installation.

Forests NSW performance



*Operating profit exclusive of forest revaluation, capital grants and superannuation fund interest and significant items



*Operating profit exclusive of forest revaluation, capital grants and superannuation fund interest and significant items

■ Total Native Forest (ha) ■ Native Forest available for harvesting (ha)
■ Native Forest not available for harvesting (ha) ■ Actual area of native forest harvested (ha)





CASE STUDY

Strong economic performance of primary industries

Research underpinning carbon trading

An applied research program, undertaken by the Science and Research Division, has provided Forests NSW with species-specific biomass and carbon relationships for use in the carbon accounting system. In addition, the Carbon in Forests research project funded by the Cooperative Research Centre (CRC) for Greenhouse Accounting aims to develop a low cost method to estimate carbon sequestered by different types of forest plantings – thus minimising the trading transaction costs and optimising returns to forest growers.

Current returns from carbon trading under the NSW abatement scheme are limited by lack of recognition of continued carbon storage, after harvest, in wood products. The Carbon in Wood Products research project, also funded through the CRC, has however demonstrated that wood products in landfill constitute a long-term store of carbon. NSW DPI researchers have proposed a method for estimating long-term carbon storage in wood products after harvest, during processing and manufacture, during service life, and at disposal.

CARBON TRADING SCHEME A FIRST FOR FORESTS NSW

In 2002 the NSW Government announced plans for a mandatory reduction in greenhouse gas emissions by the electricity sector underpinned by trading in abatement certificates. Forests NSW was quick to spot the commercial potential. And, having put years of work into its carbon accounting system, Forests NSW was ideally placed to gain accreditation as an abatement certificate provider under the trading scheme.

In line with the Kyoto Protocol, the NSW trading scheme recognises reforestation as an eligible greenhouse gas abatement activity – forests reducing the levels of carbon dioxide in the atmosphere. The scheme works by allowing electricity generators to offset carbon emissions from their operations by purchasing abatement certificates that reflect the worth of carbon sequestered in new forests. In effect, the certificates provide a new form of currency, one that realises both the financial and environmental value of our forests.

Forests NSW has already registered 166 005 certificates which represent the carbon sequestered during 2004 from approximately 10 000 hectares of planted hardwood forests. EnergyAustralia was the first buyer, purchasing over \$1 million of certificates. The sale confirms that there is a market for forest-based carbon credits and should give companies added incentive to partner with Forests NSW in new plantation investments.

A significant benefit in trading abatement certificates is the substantial income generated from planted forests early in their life, well before income is received from harvesting.

Forests NSW's experience as an abatement certificate provider, coupled with our ongoing research, will put the agency in a strong position when a state-based national trading scheme is eventually established. Forests NSW could also become a player in international carbon trading.

In the meantime, Forests NSW continues to increase revenues and allow the flexible implementation of the Government's greenhouse gas reduction plans.

SCIENCE AND RESEARCH DIVISION



SCIENCE AND RESEARCH DIVISION

Nature and scope of activities

NSW DPI, through the Division, is the largest government provider of science and research services in NSW. A total of 900 professional and technical staff undertake science-based research from a network of 23 centres of excellence and stations.

The Division's role is to:

- provide strategic science to enhance the growth, sustainability and biosecurity of NSW primary industries
- undertake research and development
- advise on research and science policy and issues
- coordinate research investments and foster alliances and cooperative ventures
- develop innovative solutions and technologies
- underpin creative solutions to enhance public policy.

Within six months of the creation of the Department, the Science and Research Division had circulated capability statements for each branch in the Division to industry, research and development institutions and other stakeholders.

The branches and their responsibilities are:

- Systems Research – responsible for research on wild fisheries, aquatic ecosystems, agricultural farming systems, pastures and rangelands
- Rural Innovation which undertakes research on plant and animal genetics, biotechnology, climate science and precision systems
- Resources Research – with responsibility for research on the sustainable management of natural resources utilised by primary industries and for the impacts created such as salinity and environmental contamination
- Production Research which conducts research relating to the horticulture, viticulture, animal production and aquaculture industries
- Health Sciences, Science Alliances and Evaluation – responsible for research into animal and plant health, food science and safety, weeds and vertebrate pest control as well as alliances with research institutions and cost-benefit analyses
- Research Operations – with responsibilities for biometrics, taxonomy, scientific collections, commercial diagnostic laboratories for veterinary pathology, analytical chemistry, residues analysis and plant health, and research centres, institutes and stations.

Major outcomes achieved

Research planning and advice

Ensuring the future of research

In July 2004, the NSW Minister for Primary Industries announced a \$25 million reinvestment plan called *Towards 2020*. The plan aims to attract and retain the scientists at key regional locations to support profitable agricultural, fisheries, forestry and mining industries. Implementation is however tied to the sale of under-utilised NSW DPI assets.

Protracted negotiations involving the Minister, NSW DPI, NSW Farmers' Association, local government, industry and the Public Service Association led to an agreement on the short-term future of assets at Grafton, Trangie, Gosford, Temora and Deniliquin which had initially been proposed for sale. All parties committed to work together over the next three years to attract funds to support industry research, the target being to match the government investment at each location.

Strategic directions

The Minister and Director-General released the *Primary Industries Science and Research Directions Statement* to stakeholders for comment in late 2004. The statement, which resulted from internal and external reviews of departmental research, underpins the *Towards 2020* reinvestment plan.

There are three parts:

- an analysis of key strategic issues and relevant national and state trends
- a review of NSW DPI's research capacity, areas of strength and competitive advantage
- a plan for the future, including a framework for investment, proposed research priorities, and actions to deliver those priorities such as service delivery methods and a reinvestment plan.

A large number of submissions on the statement came in from a cross-section of stakeholders. These indicated strong support for the Division's general strategic directions – 70 per cent of stakeholders supporting the proposed overarching research priorities.

The feedback is being incorporated in the Primary Industries Science and Research Strategy 2005-08, which is due for public release in the second half of 2005.

New advisory body established

A new body, the Ministerial Advisory Council on Primary Industries Sciences, will advise on science and research across the agricultural, fisheries, forestry and minerals resources businesses.

Chaired by Dr John Keniry of the Ridley Corporation, the council includes leading industry members, scientists

experienced in industry development and representatives of NSW DPI and the NSW Food Authority. Its terms of reference are to:

- advise on stakeholder science and research needs
- advise on the alignment of NSW DPI's research portfolio with stakeholder needs and state and national priorities
- review and recommend strategies for the optimal communication and uptake of research findings to stakeholder groups and the wider community
- advise on the impact of the science being contemplated or carried out
- advise on the *Towards 2020* science and research reinvestment program.

Research priorities for fisheries

The Minister launched *Planning Strategic Research for Fisheries, Aquaculture and Aquatic Conservation in New South Wales, 2004-2009* at Ballina Fishermen's Co-operative in November 2004.

This lists research priorities gathered from over thirty stakeholder groups in NSW, including the commercial fishing industry, recreational fishing groups, Indigenous groups, conservationists, aquaculture industry, universities and government departments. Research providers and funding bodies will use the document when setting priorities for future scientific activity in NSW.

International certification for laboratories

Eighteen research laboratories have now been certified under the international quality standard ISO900, the most recent being the Citrus Pathology and the Research Virology labs at the Elizabeth Macarthur Agricultural Institute (EMAI) and the Australian Legume Inoculum Research Unit at Gosford. A further 22 laboratories should be accredited in the second half of 2005.

NSW DPI is the first such organisation to attempt whole-of-agency certification for research laboratories in Australia. The increased level of certification has already helped us to win the National Variety testing contract for cereals and, through independent assurance of our ability to meet international quality management standards, will confer a competitive edge in bidding for other research contracts.

Partnerships

EH Graham Centre for Agricultural Innovation

The Minister for Primary Industries initiated the first in a series of partnership investment ventures when he opened the Wagga Wagga Agricultural Innovation Park, subsequently renamed the EH Graham Centre for Agricultural Innovation. NSW DPI's Wagga Wagga Agricultural Institute and Charles Sturt University at Wagga are the partners. Through the venture, Wagga gains a critical mass of scientists with the ability to attract competitive project funding for research, extension and education.

Dr Deirdre Lemerle is the first director of the Centre and, in this capacity, also assumes the role of Professor of Agricultural Innovation.

Coastal Agricultural Landscapes joint venture

The Centre for Coastal Agricultural Landscapes, a joint venture between our Wollongbar Agricultural Research Institute and Southern Cross University, commenced operations in late 2004. The Centre will promote better collaboration and a higher profile for world-class science in coastal NSW.

Primary Industries Innovation Centre

Also in the reporting period, the Minister launched the Primary Industries Innovation Centre which brings together the University of New England and NSW DPI's Tamworth Centre of Excellence for Northern Farming Systems, Armidale Beef Industry Centre and Glen Innes Centre for Perennial Grazing. The Centre is targeting new opportunities for primary industries and associated downstream processing activities to create wealth in northern NSW.

Legislation on gene technology

The Gene Technology (GM Crop Moratorium) Bill was amended to improve and clarify the functions of the NSW Agricultural Advisory Council on Gene Technology and to clarify the Minister for Primary Industries' authority over the handling of cultivated GM food plants.

Cooperative research centres

In July 2005, NSW DPI will become a partner in six new cooperative research centres funded by the Australian Government. The six centres are:

- Australasian Invasive Animals
- Beef Genetics Technologies
- Cotton Catchment Communities
- Internationally Competitive Pork Industry
- National Plant Biosecurity
- Sustainable Forest Landscapes.

Over their seven-year life, we will invest in excess of \$71 million in science staff and related resources with the Australian Government providing \$159 million in grant funding.

Major projects

FutureDairy

A \$10.5 million national research and development project, FutureDairy is a partnership involving NSW DPI, Dairy Australia, Victorian DPI and the universities of Sydney and Melbourne. The project, which will revolutionise the Australian dairy industry, concerns new fodder and feeding systems and new automated milking systems. FutureDairy research forms one component of our new dairy research strategy for NSW.

Testing for exotic diseases

The virology laboratory at EMAI is increasing its capacity to do 'same day' screening of diseases such as avian influenza and Newcastle disease with the commissioning of new equipment to support large-scale rapid sample processing and testing. Equipment includes a new robotic workstation and a rapid real-time PCR cyler that will allow screening of samples for DNA and RNA. The equipment and associated test systems give the laboratory the potential to screen more than 1000 samples per day.

Artificial breeding of grey nurse sharks

In early June 2005, the Minister announced a program to artificially breed the endangered grey nurse shark. The prestigious scientific journal *Nature* covered the story.

A scientist specialising in shark reproductive biology will oversee the research. Additional expert input will come from Sea World on the Gold Coast, Oceanworld Manly and other Australian and overseas researchers.

Pre-slaughter control of pathogens

A project involving NSW DPI, CSIRO, Food Science Australia, Livestock Industries, Brisbane and the Queensland Department of Primary Industries investigated the biology of Shiga toxin-producing *E. coli* (STEC) – a recently emerged foodborne pathogen – and potential on-farm intervention to decrease the excretion of the organisms by cattle.

Key findings demonstrate distinct STEC types in sheep compared to cattle, a conclusion that will assist medical epidemiologists in human disease investigations and allow insight into the ecology of STEC in ruminants. The project also identified that both probiotic bacteria and a virus (phage) inhibit growth of the pathogens. A diet with more roughage was additionally shown to reduce *E. coli* numbers in cattle faeces and change the distribution of virulence factors in the bacteria.

The importance of this research is highlighted by the number of conference presentations on the project and articles published in peer-reviewed scientific journals.

New diagnostic tests for pig respiratory disease

The Elizabeth Macarthur Agricultural Institute finalised an important study examining new diagnostic tests for two major respiratory diseases of pigs, pleuropneumonia and *mycoplasmosis*. The project, supported by Australian Pork Limited, provided valuable information on new diagnostic tests, particularly the introduction of a new serovar-independent ELISA test for porcine pleuropneumonia. Use of the tests will lead to more effective disease control by the pig industry.

NATA accredits olive oil sensory panel

NSW DPI's Organoleptic Panel, which assesses the sensory qualities of olive oil, received NATA accreditation in 2004-05. Based in the DAS Olive Oil Testing Unit at Wagga Wagga, the panel is the only one accredited in Australia.

The Testing Unit is trained to International Olive Oil Council (IOOC) standards and is already receiving samples from the IOOC for analysis.

Stonefruit pest and disease management

The stonefruit industry will soon have a national integrated pest and disease management strategy following the completion of a 250-page manual. As the lead agency for the project, NSW DPI collaborated with Horticulture Australia to organise a series of 18 meetings in all of Australia's major stone fruit production regions that identified major pest and disease concerns. The manual, which takes into account grower feedback at the draft stage, will present growers with an overall strategy that will allow them to reduce pesticide use while keeping pest numbers below damaging levels. By doing so, they will be better able to meet consumer demand for minimal chemical intervention in food production.

The manual should be available by October 2005.

Sustainable forests

The need to demonstrate ecologically sustainable management has long been of concern to forest managers. The issue is complex, involving political, technical and statistical dimensions, but recent research published by NSW DPI fills in many of the knowledge gaps that have existed to date.

The research shows the need for species monitoring in a regional context.

Saline aquaculture

Our inland saline aquaculture research at Wakool, funded in partnership with Murray Irrigation Ltd (MIL), ACIAR and the Fisheries Research and Development Corporation, reported good progress in developing technology to culture rainbow trout, prawns, mulloway and other species in saline groundwater. This year, around one tonne of inland ocean trout grown at Wakool was sold together with trial shipments of inland ocean prawns. NSW DPI and MIL are collaborating on a business plan to guide commercial development of trout and prawns and ongoing research and development priorities for inland saline aquaculture.

Removing *Caulerpa taxifolia*

Our scientists released a report on work undertaken with the University of Wollongong to develop environmentally benign ways of removing the invasive and destructive *Caulerpa*

taxifolia weed from NSW estuaries. The report identifies osmotic shock as the most promising control measure – the coarse salt treatment killing plants within hours with little residual impact on the marine environment. The salting technique is now a major component of our NSW *Caulerpa taxifolia* Control Plan.

The Biosecurity, Compliance and Mine Safety section of this report covers control of *Caulerpa* through building public awareness.

Conferences

In 2004-05 NSW DPI hosted two major conferences, the 4th International Fisheries Observer Conference and the Australasian Aquaculture Conference, 'Profiting from Sustainability'. Both were held in Sydney.

Divisional performance				
	Units	2002-03	2003-04	2004-05
Outcomes:				
New crop/pasture varieties released	no.	6	6	5
State market share of varieties developed by the Department:				
wheat	%	30	31	35
canola	%	70	55	55
soybeans	%	75	85	85
chickpeas	%	90	60	65
lupins	%	55	60	65
lucerne	%	35	40	45
Formal alliances with universities and other research partners	no.	17	21	24
Outputs:				
Scientific and educational publications	no.	803	797	804
Intellectual property arrangements in place	no.	70	65	68
Samples processed by departmental laboratories	no.	351 104	409 637	420 000

CASE STUDY

Excellence in service delivery to stakeholders

*NSW DPI has been
recognised as a provider
of world-class science
and research*

DEPARTMENTAL SCIENTISTS TOP WORLD RANKINGS

Rankings by an international science indexing company show that NSW DPI is providing world-class science to promote the growth, sustainability and biosecurity of NSW primary industries.

Thomson ISI has ranked the Department's scientists in the top one per cent in the world in two fields – agricultural sciences, and plant and animal sciences.

Thomson ISI indexes 8700 internationally peer-reviewed journals and, according to Thompson ISI head of research Dr Nancy Beyer, the number of papers produced is a measure of productivity.

'The number of citations to those papers – the references in papers indicating earlier work upon which the authors have depended for their research – is a measure of the influence or impact of this research', Dr Beyer said.

'Thus, by counting publications and citations, we obtain a quantifiable picture of the productivity and impact of nations, institutions and individuals in specific areas of research.'

In April 2004, Thomson ISI recorded 492 papers from NSW Agriculture in the field of agricultural sciences. These papers were cited 1989 times, giving a citation per paper average of 4.04.

In the same month, 370 papers from NSW Agriculture were recorded in the field of plant and animal science. These were cited 1312 times, giving a citation per paper average of 3.55.

In both instances, the citation rate for papers authored or co-authored by our scientists was significantly higher than the Australian or world average. The Australian average in the field of agricultural sciences was 2.4. In the field of plant and animal science it was 3.0.

The ISI ranking, however, may not pick up research of regional or local interest because such work has limited international import. Given its regional focus, the impact of NSW DPI science is therefore likely to be even greater than that indicated by the ranking.