

# Rio Tinto

A close-up photograph of a young plant seedling with two bright green leaves and a thin stem, growing out of a cracked, reddish-brown seed. The seed is partially buried in dark, rich soil. The background is blurred, showing more soil and some green foliage.

Rio Tinto and  
biodiversity

Achieving results on the ground

# About Rio Tinto

**Rio Tinto is a leading global mining group, combining Rio Tinto plc, a public company listed on the London Stock Exchange, and Rio Tinto Limited, which is listed on the Australian Securities Exchange.**

**We are involved in every stage of the mining business. Products include aluminium, copper, iron ore, coal and uranium. Activities span the world but are concentrated in Australia and North America.**

**Wherever we operate, the health and safety of our employees, and a contribution to sustainable development are key values. We work closely with host countries and communities, respecting their laws and customs and ensuring a fair share of benefits and opportunities.**

## **Rio Tinto and sustainable development**

Mining is a long term, capital intensive business, with assets often situated in remote locations. The extended timescale means that if Rio Tinto is to deliver financial returns to shareholders, host governments and local communities, we need economic, environmental and social stability. Rio Tinto is committed to sustainable development not just because it is the responsible and ethical approach to managing the earth's natural resources, but also because it makes sound business sense.

Our business success is built on access to land, people and capital. Rio Tinto believes we can help to ensure access by building a strong and deserved reputation through our care for the environment, our social policies and our contribution to economic prosperity. The concept of sustainable development is integrated into all aspects of Rio Tinto's business through our corporate and operational policies, standards, strategies, programmes and performance indicators.



**Since launching our Biodiversity strategy four years ago, Rio Tinto has been on a steep learning curve. This booklet shares our approach to the management and conservation of biodiversity, our achievements to date, what we have learnt and what we plan to do next.**

Rio Tinto recognises that biodiversity and ecosystem service degradation are issues of global significance that will have long reaching, negative effects for society if not addressed promptly and effectively.

These issues present new challenges to the mining industry. Often in the past, the industry's approach to environmental management was focused on what happened within the mine's boundaries. Today, a well managed mining business needs to understand a much broader context. This includes the current and potential use of the land we manage, its biodiversity and social values, its connection with other habitats, and community expectations as to how the land is developed and managed.

Four years ago, Rio Tinto made a public commitment to biodiversity conservation and a goal of having a "net positive impact" on biodiversity. Put simply, we aim to ensure that biodiversity and its conservation ultimately benefit from our presence in a region. We knew then and still realise today that this is an ambitious goal – one that attracts high levels of interest and scrutiny from many stakeholders. But this commitment also provides long term business value, by enabling us to better understand the issues and their local, regional and social context – so that we can design and implement effective and sustainable projects to manage biodiversity better.

We have invested the past four years in engaging further with the conservation and science community, building our capacity internally, increasing our understanding of the issues and developing, implementing and revising a number of programmes. Achieving measurable results is now our biggest challenge, and I'm pleased to say we are beginning to make progress – as this booklet illustrates.

Our goal for the next four years is to build on what we have learnt, continue to harness the return on our investment with stronger biodiversity programmes and outcomes, and to re-examine the way in which natural capital is valued in our decision making.

I acknowledge we have a way to go, but by collaborating with others both internally and externally, I'm confident we can continue our learning, improve our performance and contribute to global biodiversity conservation.

A handwritten signature in black ink, appearing to read 'Tom Albanese'.

Tom Albanese, chief executive, Rio Tinto

**“Biodiversity” is a complex term, which means different things to different people. To Rio Tinto, biodiversity refers to the variety of life on earth, the different animals, plants and micro-organisms, their genes and the ecosystems of which they are a part. Impacts on biodiversity make mining and processing projects potentially sensitive for regulators, local communities, investors, non government organisations (NGOs) and employees. Rio Tinto's long term business success depends on our ability to understand and manage these issues.**

Rio Tinto's goal is to have a “net positive impact” (NPI) on biodiversity. This means minimising the impacts of our business and contributing to biodiversity conservation to ensure a region ultimately benefits as a result of our presence. Our biodiversity strategy was launched in 2004 at the IUCN World Congress in Bangkok.

The biodiversity strategy and NPI goal is a voluntary commitment Rio Tinto has made in response to both changing societal expectations and our understanding of business value.

To achieve NPI, we first seek to understand the biodiversity elements of the regions where we operate, as well as the intrinsic and societal “values” placed upon those elements. We then prioritise our actions, focusing on the biodiversity elements that have the highest conservation significance (described later in this booklet).

The issues for each project or operation vary greatly, as do the opportunities for minimising negative impacts and creating positive outcomes. We are focused on prioritising action at the projects and operations facing the highest risks.

This booklet provides information about Rio Tinto's biodiversity strategy, our approach and progress in its implementation and the tools and processes we have developed to help achieve our NPI goal. The booklet replaces our 2004 biodiversity policy and guidance documents *Rio Tinto's Biodiversity Strategy: Sustaining a Natural Balance*.



Joshua trees are members of the lily family and are only found in the Mojave Desert. Rio Tinto Minerals - Boron Operations has been in operation in the Mojave Desert of California since 1926.





## Biodiversity – a strategic issue for Rio Tinto

As human related biodiversity loss continues to increase, concern around mining's impacts on biodiversity will continue to grow. Rio Tinto owns and manages more than 110 operations (refer to inside back cover for map of our operations) around the world, located in six geographical regions across seven different climate zones.

Traditionally environmental issues such as impacts on biodiversity have been seen as a risk to a mining company's licence to operate. However, since the release of the biodiversity strategy in 2004, we are learning that biodiversity can present opportunities to build business value – opportunities to build better relationships with our stakeholders, understand emerging ecosystem services markets and achieve our sustainable development goals.

## Rio Tinto's biodiversity strategy

Rio Tinto's environmental management is governed by an internal policy and standards framework. When the Group first adopted our statement of business practice in 1998, *The way we work*, we formally recognised the need to take account of environmental factors in gaining access to land and managing our operations, particularly in areas of high conservation value. In 2003, Rio Tinto's policy on land access was strengthened, recognising the importance of biodiversity outside protected areas.

Rio Tinto's biodiversity strategy supports our projects and operations in their goal of achieving NPI. The key elements of the strategy include Rio Tinto's position statement and guiding principles on biodiversity.

### Our position statement on biodiversity

Rio Tinto recognises that conservation and responsible management of biodiversity are important business and societal issues. Our goal is to have a net positive impact on biodiversity.

We are committed to the integration of biodiversity conservation considerations into environmental and social decision making in the search for sustainable development outcomes. We recognise that this might mean that we do not proceed in some cases.

We want to be biodiversity leaders within the mining industry, for the competitive advantage and reputational benefit this provides. Our performance on biodiversity conservation and management issues will create benefits for our business.

We are committed to:

- The identification of biodiversity values impacted by our activities.
- The prevention, minimisation, and mitigation of biodiversity risks throughout the business cycle.
- Responsible stewardship of the land we manage.
- The identification and pursuit of biodiversity conservation opportunities.
- The involvement of communities and other constituencies in our management of biodiversity issues.

### Guiding principles to support our position

- Our goal is to have a net positive impact on biodiversity by minimising the negative impacts of our activities and by making appropriate contributions to conservation in the regions in which we operate.
- We are committed to the conservation of threatened and endemic species and high priority conservation areas, and support local, national and global conservation initiatives.
- We will seek equity and the reconciliation of differing perspectives and ideals in biodiversity decisions and actions.
- We will enhance biodiversity outcomes through consultation, constructive relationships, and partnerships with key stakeholders.
- We will integrate the identification, evaluation, and management of biodiversity issues into the planning, decision making, and reporting processes throughout the business cycle.
- We will apply appropriate expertise and resources to biodiversity issues, building internal and external capacity where necessary.
- Subject to appropriate consent, we promote the collection, analysis, and dissemination of biodiversity information and knowledge.



## Engaging with others

For Rio Tinto's biodiversity strategy to be successful, we need to have good working relationships with those who are impacted by or have an interest in the decisions of our business. Indigenous land owners, affected communities, governments, regulators, international, regional and local NGOs, investors, the science and finance communities and our managers and employees all have interests and concerns to which we must respond, and understand. Engagement helps us better understand issues and priorities, and develop programmes and actions that the parties involved agree will provide value.

Through the establishment of formal partnerships with leading global and regional conservation NGOs, we built a collaborative process that initially shaped the policy elements of the biodiversity strategy and NPI goal. These relationships have continued to flourish since 2004 and have played a significant role in the refinement of our understanding around NPI and the development of the methodologies and tools we are using in the implementation of the strategy at our sites.

Rio Tinto's biodiversity partners include: BirdLife International, Conservation International, Earthwatch Institute, Fauna & Flora International and Royal Botanic Gardens, Kew.

Stuart Ankin (left), senior tour guide with Arnhem Land Ecotourism, Northern Territory Australia, shares his local knowledge with Guy Dutson from Birds Australia (the Australian partner of Birdlife International).



## Achieving our goal

Biodiversity is a very complex issue to both understand and manage in the context of mining, refining and smelting. Since 2004, the concept of Rio Tinto achieving a net positive impact (NPI) on biodiversity has been the subject of much debate – both internally and externally.

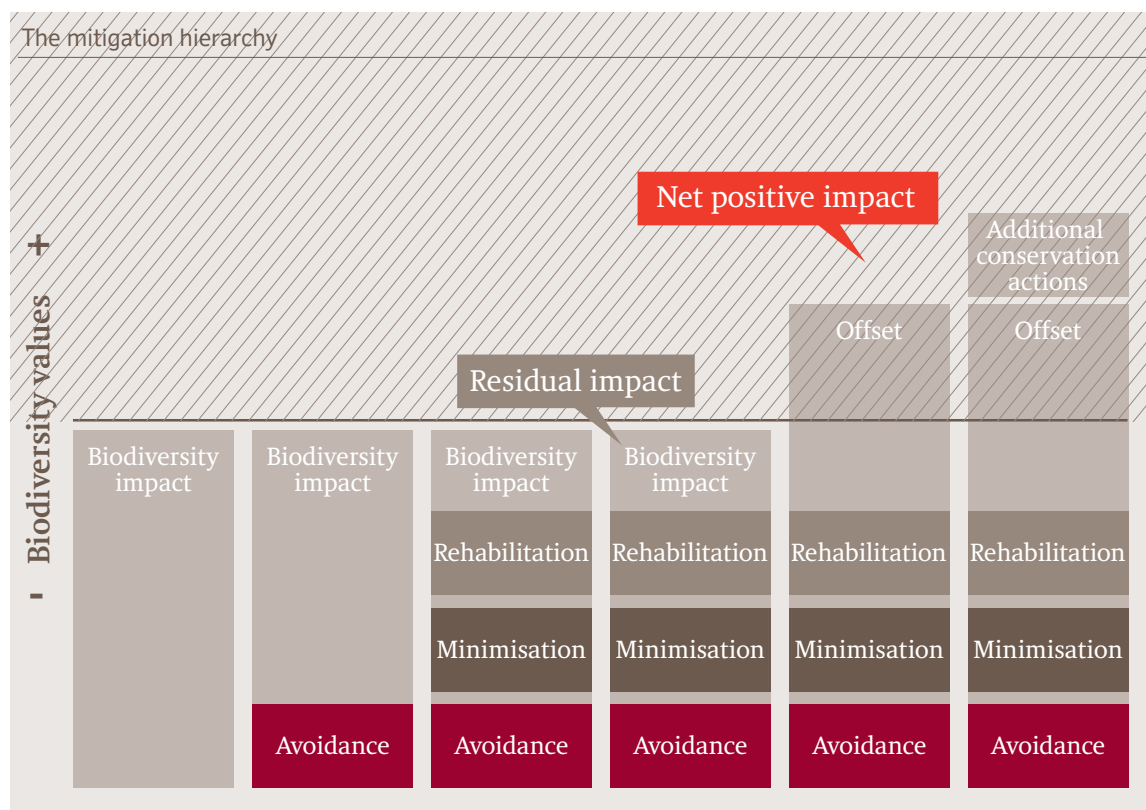
For the past four years, we have worked with the help of others, including our conservation organisation partners, to refine our understanding of the concepts that in turn govern the ongoing development of our strategy – concepts such as biodiversity “values” and “offsets”. This refinement will continue, as the pilot work at our projects and operations delivers new learning and improved understanding of complex issues.

### Rio Tinto and NPI

Rio Tinto believes that to achieve NPI we first need to reduce our impacts on biodiversity values through avoidance, minimisation and rehabilitation. Collectively we describe these actions as “the mitigation hierarchy”.

We then aim to achieve a positive impact with the use of biodiversity offsets and additional conservation actions. The cumulative effect of the mitigation hierarchy, biodiversity offsets and additional conservation actions is illustrated below.

We are continually working to refine our understanding and implementation of the mitigation hierarchy, biodiversity offsets and additional conservation actions.





## Our definitions

### Avoidance

Rio Tinto defines “avoidance” as activities that either change or stop mining and refining actions before they take place, preventing their expected impacts on biodiversity. Avoidance involves a decision to change the expected or normal course of action.

For example: a haulage road may be redesigned during project development or expansion to avoid the clearance of habitat with high conservation significance, resulting in longer haul distances.

### Minimisation

“Minimisation” reduces the severity of impacts on biodiversity that result from mining and processing actions already under way. These actions reduce the likelihood or magnitude of biodiversity impacts, but cannot completely prevent them. It can sometimes be difficult to demarcate between avoidance and minimisation because some actions have aspects of both.

For example: the confined deposition of benign tailings material to create beaches on which wetlands can be established.

### Rehabilitation<sup>1</sup>

“Rehabilitation” involves the preparation of safe and stable landforms on sites that have been disturbed by our activities, followed by re-vegetation with the aim of establishing a specific habitat type. Restoration is the term used when the original habitat type is recreated. To qualify in NPI calculations, the site should be restored to a state where its biodiversity values equal those of the original disturbed habitat, or better.

For example: the restoration of littoral forest habitat on recreated dune systems, following ilmenite sand mining. Another example could be a site being rehabilitated to an area rich in biodiversity, with inclusion of wetlands etc, whereas restoring it to its original state may have meant replacing farmland or other habitats of low conservation significance.

### Offsets

Biodiversity “offsets” are conservation actions designed to compensate for the unavoidable impacts on biodiversity caused by mining and refining. Offsets should never be employed in the place of appropriate on-site avoidance and minimisation measures, but rather seek to address any residual gap<sup>2</sup>. Offsets take the form of either “averted disturbance” of habitat (the offset must demonstrate that the disturbance was inevitable without our intervention) or restoration of degraded habitat.

For example: preventing unsustainable forest use through community based conservation, establishing a protected conservation reserve, restoring native grassland by removing competition from exotic grasses and on this land, establishing a conservation covenant.

### Additional conservation actions (ACAs)

“Additional conservation actions” include a broad range of activities which are intended to benefit biodiversity, where the effects or outcomes can be difficult to quantify. While the biodiversity outcomes of these actions are difficult to measure, these kinds of intangible assets will always form an essential part of Rio Tinto’s contribution to biodiversity conservation.

For example: helping to build capacity in conservation organisations to enable better biodiversity conservation outcomes on projects they are involved with. This might include supporting their participation in environmental management and development programmes.



<sup>1</sup> Rehabilitation and restoration are two terms that have sometimes been erroneously used interchangeably. In the context of Rio Tinto’s biodiversity strategy, restoration refers to actions taken on degraded habitat, either disturbed by our activities or by others, that restores its biodiversity value.

<sup>2</sup> Adapted from ten Kate K, Bishop J, Bayon R (2004). Biodiversity offsets: views, experience and the business case. Insight Investment and IUCN.

# Achieving results on the ground

Opportunities for reducing negative impacts on biodiversity and creating positive outcomes differ significantly from one operation to another.

A number of Rio Tinto's operations are located in some of the most biodiversity-rich regions of the world, while others are located in regions of low biodiversity value.

**Since launching our biodiversity strategy in 2004, we have undergone a continuous learning process – both in defining and understanding the principles and concepts of responsible conservation management, and in developing, testing and refining the tools and processes that we need to do so.**

### Tools for the job

A series of methodologies and tools have been developed to help our operations identify, plan for and manage biodiversity programmes based on the needs of the business and the biodiversity values of the regions in which they operate. Tools include:

- A Groupwide biodiversity values assessment protocol.
- A biodiversity action planning tool.
- An offset design tool.

### Prioritising global action for Rio Tinto

Assessing Rio Tinto's interaction with biodiversity and the size of our biodiversity footprint is an important first step in the successful implementation of our biodiversity strategy and progress towards achieving a net positive impact (NPI) on biodiversity.

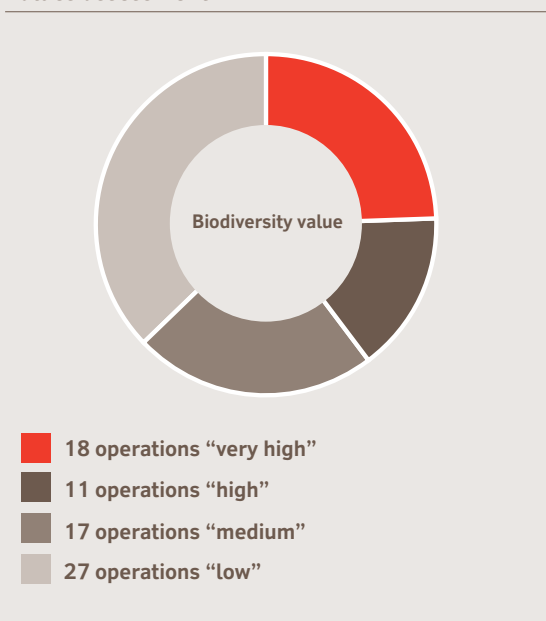
One of the ways we do this is through evaluating data collected in Rio Tinto's annual internal social and environmental survey. The survey is used to evaluate performance across the Group on a range of issues, from biodiversity and water management, safety and occupational health through to greenhouse gas emissions and product stewardship. Our reporting framework supports the Global Reporting Initiative and is influenced by internal and external feedback, as well as various compliance issues resulting from legal and regulatory requirements and voluntary agreements.

Another way we assess our interaction is through the Groupwide biodiversity values assessment protocol. The protocol was developed in 2007 to assess the biodiversity values of Rio Tinto's land holdings and surrounding areas to help prioritise action. The protocol assesses operations' biodiversity values based on:

- Land in proximity to biodiversity-rich habitats.
- Species of conservation significance.
- Additional site-specific biodiversity values and/or threats.
- The external conservation context.

Operations were ranked as having either “very high”, “high”, “medium” or “low” biodiversity values. Results from the assessment of 73 of our operations can be seen below<sup>3</sup>. Grouping operations on this basis enables resources and action planning assistance to be given to our highest priority operations.

Results from Rio Tinto's Groupwide biodiversity values assessment



<sup>3</sup> This data was collected before the completion of the Rio Tinto acquisition and integration of the Alcan group operations and therefore does not record the landholding data for the former Alcan sites that are now part of the Rio Tinto Group. For more information about Rio Tinto's biodiversity impact, see *Rio Tinto and biodiversity – Group biodiversity profile*.



## Achieving results on the ground

### Creating Wyoming's first conservation easement on mining land

Rio Tinto Energy America (RTEA) operates a number of coal mines in the Intermountain West of the US, including the Jacobs Ranch Mine. Rehabilitating disturbed lands is very important to RTEA in its efforts to mitigate the effects of mining. After mining is complete, layers of soil and topsoil are replaced and contoured to match the pre-existing landscape, seeded with native plants and then monitored and maintained until plant growth returns to pre-mining land use levels.

At Jacobs Creek, an extensive and productive wildlife habitat was created on a mosaic of rehabilitated and undisturbed lands. The mine donated the 295 hectares of rehabilitated land plus an additional 100 hectares to the Rocky Mountain Elk Foundation and agreed to the creation of The Rochelle Hills Conservation Easement.

This land is the first easement – a parcel of land with an agreed purpose – on reclaimed mine lands in Wyoming, and the first Rocky Mountain Elk Foundation easement on rehabilitated lands anywhere in the US. The land contains high quality grazing land, four reservoirs that serve as water sources for wildlife, and a diversity of topography and habitat types that includes over four hectares of woodland. The easement now provides valuable habitat for the Rochelle Hills elk herd, made up of more than 400 animals.

The Rochelle Hills elk herd is made up of more than 400 animals.





### Creating exclusion zones to provide protection

Rio Tinto Iron Ore's Mesa A and Mesa K projects are located in the Pilbara region of Western Australia and are part of a series of mesa formations created tens of thousands of years ago by an ancient river channel. The discovery of troglifauna – microscopic cave-dwelling, air-breathing invertebrates – within the cavities of the iron ore formation presented significant environmental challenges for the projects.

Sampling led to the discovery of troglifauna within other mesa formations in the region, however, DNA work revealed each troglifauna species was unique to each individual mesa formation. For the Mesa A and Mesa K projects, this meant any potential impact on the troglifauna from mining activities could not be offset by preservation of other mesa formations.

To ensure compliance with Western Australia's legislation, regulators and Rio Tinto standards, changes were made to the mine plans to ensure that the troglifauna species considered at risk were protected in designated conservation areas. These conservation areas (known as the Mining Exclusion Zones or MEZ) were removed from the proposed mine plan and designed to connect with additional habitat outside the proposed mining area. A minimum buffer of 50 metres has also been designed around poorly represented species. Rio Tinto believes the final MEZ designs at Mesa A and K provide protection for all known troglifauna taxa and habitat types.

Home to many of Rio Tinto Iron Ore's operations, the Pilbara region of Western Australia is well known for its biodiversity-rich landscape.





# Achieving results on the ground

To achieve our NPI goal, our operations need to understand clearly the biodiversity features of the areas in which they operate and the values placed on those features. An operation must be able to:

- Identify the important biological values on and off site at the species, habitat and ecosystem service level.
- Understand what impacts mining activities and infrastructure have on these features.
- Develop a plan to mitigate the impact (considering avoidance, minimisation, rehabilitation, offsets and additional conservation actions).

The biodiversity action planning (BAP) tool has been developed to help operations complete all of these steps in a standardised way, enabling conservation approaches to be compatible with operations' management systems.

Guidance for the BAP was developed in partnership with Fauna & Flora International (FFI) through trials at four Rio Tinto sites with different needs, complexity and resources: Rössing, Namibia; Palabora, South Africa; QIT Madagascar Minerals (QMM), Madagascar; and, Corumbá, Brazil. By trialling BAP in a number of environments, from a Namibian desert to a Brazilian wetland, both Rio Tinto and FFI are confident this tool can accommodate the diversity of Rio Tinto's operational environments with the rigour expected from the conservation community.

The BAP process has seven stages, as illustrated on page 13.

Dune rehabilitation at Richards Bay Minerals in South Africa. Wind breaks, facing the prevailing winds, are erected to protect the emerging seedlings from damage.





## Stage 1: Review Groupwide values assessment

### Key outputs

- Review results of values assessment
- Business case for site BAP developed

## Stage 2: Develop the biodiversity baseline

### Key outputs

- Key stakeholders identified
- Data compiled from existing sources, eg surveys
- Gaps in available data identified
- Work plan produced to gather additional data and work commissioned
- Information gathered
- Biodiversity context and baseline section of the BAP produced

## Stage 3: Risk assessment

### Key outputs

- Biodiversity features identified for site and surrounding area, and prioritised
- Identification of potential impacts of operation and wider drivers of environmental change
- Determination of direct and indirect effects of impacts on features of interest
- Initial risk assessment completed
- Verify with stakeholders and review plan

## Stage 4: Set objectives, targets and actions for the site

### Key outputs

- Objectives and actions defined using the mitigation hierarchy
- Actions identified will include costs, timetables and methods. Indicators are selected to help in monitoring progress, and warning of remedial action
- Integrate into environmental management systems and business planning processes

## Stage 5: Implementation

### Key outputs

- Identify appropriate implementation mechanisms for the BAP
- Review other mine management objectives to ensure no conflicts exist, and if conflicts do exist, resolve them
- Agree and allocate resources and responsibilities for each area or feature
- There is an understanding that the BAP is a "live process" that will be updated regularly

## Stage 6: Management, monitoring and evaluation

### Key outputs

- Indicators used to monitor performance and outcomes
- Objectives, actions and risks are reviewed based on monitoring results

## Stage 7: Reporting

### Key outputs

- Identify opportunities for reporting and implement

## Achieving results on the ground

### Taking a regional approach to biodiversity management

Rio Tinto Coal Australia (RTCA) operates three coal mines in the Bowen Basin region of Central Queensland, Australia, with a fourth currently under development. While the business already has a good understanding of its landholding's biodiversity features, it recently developed a new regional biodiversity action plan (BAP) as part of the implementation of Rio Tinto's biodiversity strategy.

Adopting a regional approach to managing biodiversity risks and opportunities enables RTCA to both manage site-specific issues as well as implement programmes that could deliver conservation outcomes across the Bowen Basin. For example, these could include enhancing regional populations and corridor and habitat connectivity, which includes species or habitats found across several RTCA sites – such as brigalow (*Acacia harpophylla*), bluegrass communities and koalas (*Phascolarctos cinereus*).

As part of the BAP process, RTCA focused on gaining an understanding of the flora and fauna communities and species known (or suspected) to be present on and adjacent to its four sites. Each species or community was summarised by its legislative status and then assessed on its vulnerability and irreplaceability.

By taking a risk assessment approach, the species or communities with the highest biodiversity risk for RTCA have been identified and appropriate actions prioritised.

RTCA's BAP will be rolled-out across all four Bowen Basin operations. Proposed actions include site-specific enhancement and restoration activities, academic research to improve understanding of species lifecycle requirements, and activities that seek to enhance regional conservation outcomes.

Rio Tinto Coal Australia's Blair Athol Mine in central Queensland.





### Building local knowledge and skills

Through its global partnership, Rio Tinto and Earthwatch Institute work together to build knowledge and skills among the conservation community and to support scientific research in Africa. Since 1999, the partnership has supported more than 200 African scientists, conservationists, reserve managers, students and government employees from more than 16 countries to participate in Earthwatch Institute projects.

Under the guidance of a lead scientist, participants contribute to field research while increasing their scientific understanding and learning new techniques. Some projects include skills training, such as the use of Geographic Information Systems (GIS), or focus on specific issues, for example the role of the community in conserving Madagascar's ruffed lemurs.

A range of projects have been supported, from identifying and cataloguing South Africa's invertebrate species, to exploring Kenyan mangrove forest restoration methods and benefits for ecosystems and communities. In terms of helping Rio Tinto to reach its goal of having a net positive impact on biodiversity, capacity building is an additional conservation action (see page 07). Research findings may also be incorporated into mitigation and offset planning.

Early career African and Asian scientists research mangrove forest restoration in Gazi Bay, Kenya, as part of Earthwatch's Capacity Building programme.





When implementing the biodiversity strategy and NPI goal, we focus our actions on aspects of biodiversity that have an importance or “value” that adds to their significance. This concept was used to good effect in our Groupwide biodiversity values assessment, and it is key in the effective management of biodiversity at an operation or project.

We developed our separate "site biodiversity values assessment" to identify and prioritise the key biodiversity values of relevance to an operation. This site assessment is generally, but not always, undertaken as part of an existing operation’s broader BAP process or a new project’s environmental impact assessment.

The assessment, held in consultation with stakeholders, considers the different levels of biodiversity – species, habitats and ecological processes – and then considers if these are important in their own right (having "intrinsic values", such as rare species), or if they are important in a utilitarian sense (having "service values", such as fuel wood and medicinal plants, or processes like water purification). Careful completion of the assessment is critical to ensure all significant biodiversity features are identified, as they underpin the subsequent biodiversity management at the site.

In general the prioritisation process gives higher priority to species, habitats and ecosystem services that are either important to local communities and/or have regional, national or global conservation significance.

The biodiversity values matrix <sup>4</sup>			
	Species	Habitats/Communities	Ecosystem processes
Intrinsic values	Irreplaceability and vulnerability of species	Irreplaceability and vulnerability. Also exemplary habitats	Ecosystem health and functioning. Evolutionary diversification
Service values	Food, fibre, fuel, genetic resources, totem/cultural species	Hunting, gathering and fishing habitats. Culturally valued landscapes eg sacred groves	Air quality, climate regulation water purification

<sup>4</sup> For an example of the application of this matrix, see the case study on page 20.

## Offset design and implementation

The use of offsets to compensate for biodiversity loss is increasingly being practised widely and required by legislation in a number of countries where Rio Tinto operates. We believe that, at certain operations, the development of an integrated package of offsets, as well as additional conservation actions, can help us to achieve our NPI goal, while meeting legal requirements and maximising conservation gains. As with all other aspects of our biodiversity strategy, we continue to grow and refine our understanding of offsets.

Since 2004 we have piloted offset methodologies at some of our sites, including QMM in Madagascar and Corumbá in Brazil. In addition, we have been involved in external biodiversity offset initiatives, such as the Business and Biodiversity Offset Programme. As a result of the pilots and external consultation, we have developed an offset design methodology based on seven key steps (see below).

### Seven steps in offset design

1

Conduct key biodiversity values  
risk assessment

2

Calculate amount of biodiversity loss  
(the residual impact)

3

Select possible offset sites using  
biological criteria

4

Select realistic offset sites using  
socio-political and economic criteria

5

Design conservation interventions to  
create sufficient biodiversity gains

6

Obtain approval/negotiate with  
regulator or authority

7

Enter offset implementation process

### Offsets can take the form of:

- Averted disturbance – involves identifying an area of land of the same or better biodiversity value and reducing and/or eliminating existing external impacts or risks. For example: reducing or stopping deforestation activity.
- Restoration – takes place from scratch, where cleared or degraded land is planted and restored, or management practices of existing habitat are changed to restore its biodiversity status.

While we recognise the importance of “like-for-like” offsets, from a conservation, regulatory and accounting point of view, we believe that in certain situations, they may be unrealistic, inappropriate or do not result in optimal outcomes.

As the concept of offsets continues to evolve, we recognise that “out-of-kind” offsets may result in greater conservation benefits. For example: offsetting common habitat that is in local abundance, such as Australian spinifex grassland, with a habitat that is of higher conservation significance, such as lowland Mulga woodlands.

Conversely we recognise that “worse-for-like” offsets (where the biodiversity value of the offset site is lower than the impact site) do not compensate for the residual impact of our operations.

## Achieving results on the ground

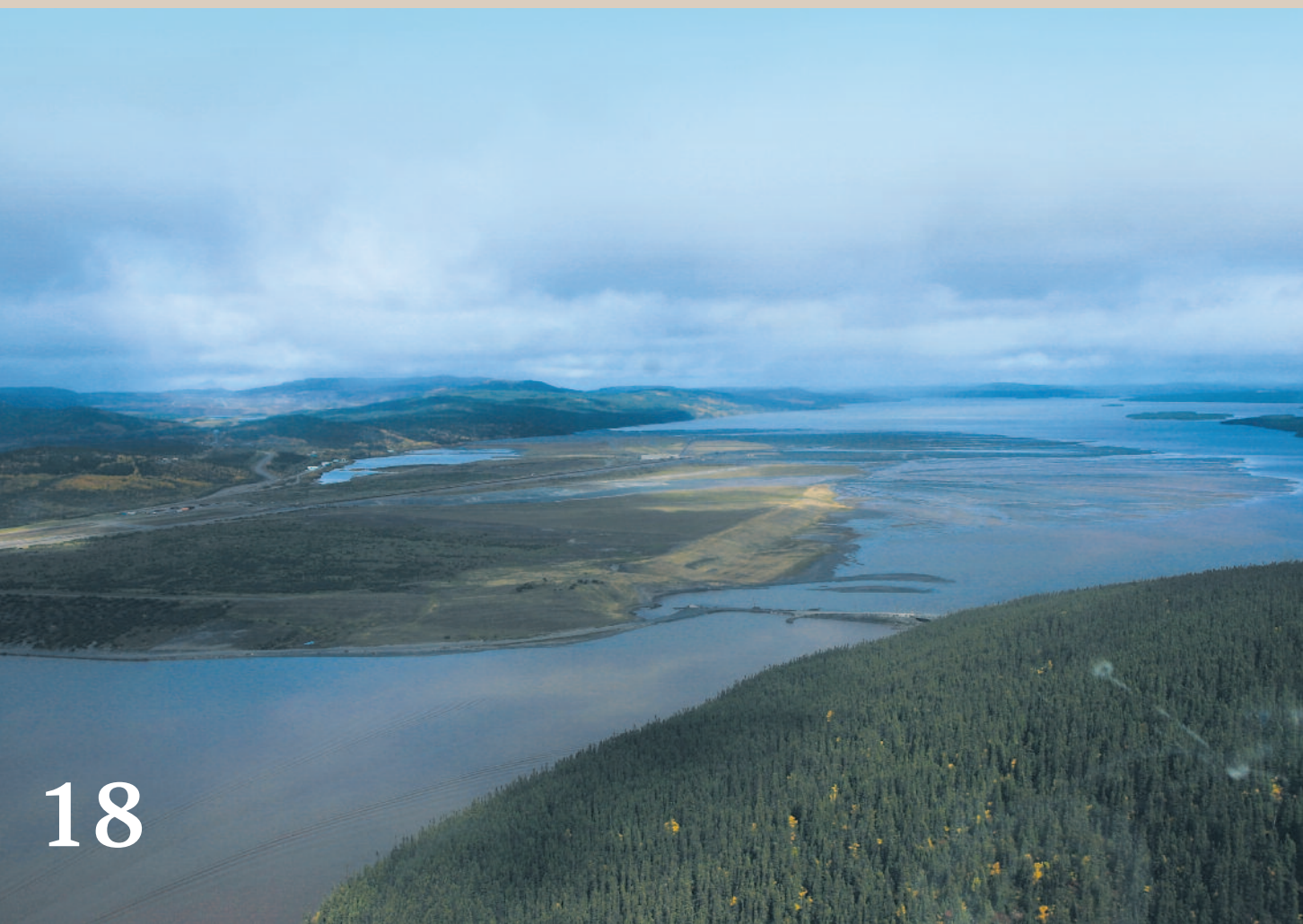
### Minimising impact and creating new habitats for Wabush Lake

The Iron Ore Company of Canada (IOC) operates a mine in Newfoundland, Canada, in an area of valuable native ecosystems, including an extensive system of lakes, wetlands and boreal forests. For 40 years, IOC discharged up to 23 million tonnes of finely grained rock tailing into Wabush Lake. Although in compliance with regulatory requirements (the tailing is inert and non-toxic) the tailing was having a significant effect on the physical and biological balance of the lake. So in response to concerns within Rio Tinto, from the local community and regulatory changes, IOC considered a number of options to minimise the tailing's impact on the lake and surrounding environment.

With community input, the decision was made to change the way tailing was discharged into the Wabush Lake. Through a creative use of the tailing – a mixture of rock and sand – new land forms and a wetland are being created across the disposal area and planted with a diverse variety of local vegetation. Low-lying areas form a mosaic of wetland basins, riparian zones and uplands, providing a variety of habitats for native wildlife.

Now, a new project is underway to restore Wabush Lake's colour and recover lost fish habitat. The overall project is rehabilitating 15 hectares of mining residue into a self-sustaining ecosystem.

The Iron Ore Company of Canada operates a mine in Newfoundland, Canada, in an area of valuable native ecosystems, including an extensive system of lakes, wetlands and boreal forests. A new project is now underway to rehabilitate 15 hectares of mining residue into a self-sustaining ecosystem for the local community.





**Developing a methodology to measure an operation's progress against NPI is the most complex and difficult issue we face. It is however a critical element of the biodiversity strategy.**

The first significant task was identifying an acceptable date from which progress towards NPI should be assessed. Many of our sites have been collecting biodiversity data for several years, but we needed to be able to set a Groupwide baseline. Following discussion with key internal and external stakeholders, biodiversity data will be collected from Rio Tinto operations throughout 2009 with the aim of setting a Group benchmark at the end of 2009. With the baseline established, this data will be used in the Group's target reporting process.

Biodiversity has no single currency. Today, climate change impacts are measured in terms of tonnes of CO<sub>2</sub> equivalents. Many scientists and organisations have attempted to develop a similar metric for biodiversity, using various aggregations, selections and weightings of different biodiversity components and values. However, no single methodology stands out as being appropriate in the Rio Tinto context.

**To be effective, a biodiversity metric needs to be:**

- Workable, meaningful and based on sound science.
- Within the technical capacity of operations.
- Able to be understood by stakeholders.
- Supportive of the NPI goal.
- Complementary to the BAP and other biodiversity strategy tools and methodologies.

To date, testing different NPI calculation methodologies has primarily been conducted at our QIT Madagascar Minerals (QMM) project. At this site the NPI concept has been defined in terms of a baseline date, the sphere of the project's influence, types of impacts, the types and number of biodiversity features and both intrinsic and service values. The case study on page 20 illustrates aspects of the development and testing of our work.



"Hydroseeding" to restore vegetation involves spraying a mixture of seeds, water, fertilisers and mulch onto newly relaid topsoil. Within a month growth will be fully germinated and flourishing.

## Measuring NPI at QIT Madagascar Minerals (QMM)

Standardisation of ways to measure loss and gain of biodiversity is essential. The NPI process at QIT Madagascar Minerals (QMM) has required the development of a set of currencies which are appropriate for each group of biodiversity values, be they threatened species, rare habitats or non-timber forest products.

A combination of the area in which a value was found and the quality of that area in supporting the value was found to be a universally appropriate currency for both intrinsic and service values. Different measurement methods and metrics were used, as appropriate, for each type of biodiversity feature, to provide data for the "Area x Quality" currency.

For example: the measurement of the quality of littoral forest required the development of a standardised forest condition metric, scaled from pristine to heavily degraded, based on habitat structure; the density of key reptile species is being determined by pitfall trapping or habitat type; and the quality of forest for various non-habitat timber forest products was measured using community assisted botanical transects.

In some of these latter cases the direct human-use natural products can be expressed as volumes or masses, such as "1,000kg charcoal". For convenience the Area x Quality currency is being referred to as "Quality Hectares".

Several worked examples of the current and projected Quality Hectares values for several NPI measures relevant to the QMM project are considered. For simplicity, at present, only losses through mining and gains through offset are considered, because of the current uncertainty over the size and nature of rehabilitation efforts for indigenous forest types and many species.

### The two biodiversity values considered are:

#### 1. Littoral forest

The St Luce forests and Mahabo are both offsets for impacts on littoral forest. These sites are extremely important for this habitat and most of its constituent species. In fact, NPI is not possible at QMM without these two sites appropriately managed as offsets. Here we map out its projected gain and loss over the next 25 years, which is the approximate expected mine life for the Mandena deposit.

#### 2. *Leptolaena pauciflora* - Quality Hectares

This locally endemic plant is known from the Mandena mine site and also occurs at the offset sites of St Luce and Mahabo. It will suffer some losses through mining over the next 25 years. Much of these are already avoided through the Mandena conservation zone (230ha) on the lease, a protected forest tract which is now a nationally recognised protected area. Residual losses are more than compensated for through its occurrence at two offset sites (St Luce and Mahabo). These NPI calculations are conservative and precautionary because restoration efforts will add greater gains in the future.

**Figure 01**

Projected "Quality Hectares" of littoral forest lost and gained over mine life

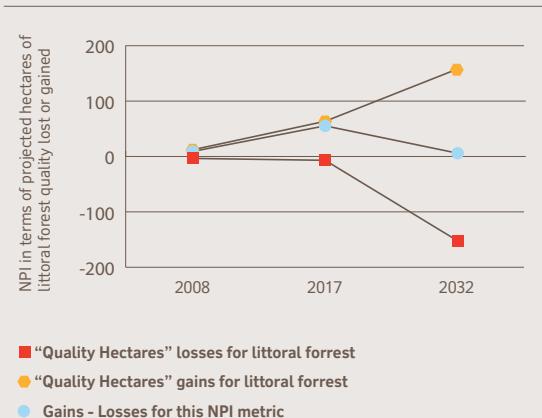


Figure 01. Quality Hectares of littoral forest gained and lost until 2032. By 2008, there have been few losses (red points) of littoral forest and some small gains (orange points: upper) which come through avoided deforestation at two offset sites (St Luce and Mahabo). By 2017, net impact (blue points) will be highly positive for littoral forest because avoided deforestation gains have continued (2008-2017) but mining will not clear much forest over this period due to the uneven distribution of forest fragments across the mine path. By 2032, at mine closure, after some mine clearance losses, littoral forest is predicted to be net positive on account of offsets alone. This is a precautionary conservative estimate that does not include habitat restoration efforts which are likely to add another 200 hectares of littoral forest to the gains.

**Figure 02**

Projected "Quality Hectares" of *Leptolaena pauciflora* lost and gained over mine life

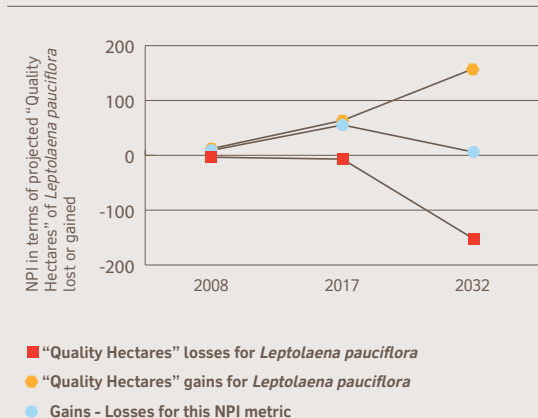


Figure 02. Losses, gains and net impact mapped through the mine life in terms of Quality Hectares for a locally endemic plant, *Leptolaena pauciflora*. The projected changes for this species are similar to the littoral forest habitat in which it is found – this demonstrates the value of using forest area and quality as surrogate for some biodiversity values such as this species. The blue points indicating net impact are conservative because they do not include gains likely to be made through restoration efforts; however even with the current precautionary approach NPI is possible for this and many other key species.

### **Rio Tinto's biodiversity strategy continues to be refined through internal and external engagement. All involved recognise the enormous challenge we have set for ourselves.**

Measuring biodiversity and the success of conservation programmes is a challenging task, with the conservation and science communities still working to determine an agreed framework. Achieving and demonstrating NPI for Rio Tinto is not an easy task but, by working with our operations and the conservation and science communities, we aim to develop dynamic methodologies and processes that can be improved over time. We believe these will not only demonstrate our commitment to the environment but also raise the bar for biodiversity conservation management within the mining sector and contribute to broader knowledge of the field.

Looking forward, we are committed to:

- Transitioning our pilot programmes to full implementation across our operations.

This will include:

- Further refining our tools and methodologies to work with existing operational management systems.
- Developing communication and awareness programmes targeting operations' management and specialists. This work will begin in late 2008 and continue into 2009.
- Furthering discussion and engagement around key concepts such as biodiversity offsets and measuring NPI.
- Exploring emerging markets, such as ecosystem services and how they can be used to meet our NPI goal.

Rio Tinto recognises that we do not have the remit, skills or resources to assume sole responsibility for the long term biodiversity protection and conservation of the areas where we work. We will therefore continue to work with communities, governments and conservation NGOs that also have a stake in the outcomes of programmes.

The next four years are critical to our progress in meeting our NPI goal, and we will communicate our successes and failures at the next IUCN World Congress.





## Exploration

The Exploration group is organised into five geographically based teams in North America, South America, Australasia, Asia and Africa/Europe and a sixth project generation team that searches the world for new opportunities and provides specialised geological, geophysical and commercial expertise to the regional teams. The Asia team was formed in 2006, reflecting a significant expansion in exploration effort in Russia, Mongolia and the Former Soviet Union.

## Technology and Innovation

Technology and Innovation, previously Operational and Technical Excellence, has bases in Australia, Canada, the UK and the US. Its role is to identify and promote best operational technology practice across the Group and to pursue step change innovation of strategic importance to orebodies of the future.

- Key**
- Mines and mining projects
  - Smelters, refineries and processing plants remote from mine

## Aluminium

Rio Tinto's Aluminium product group is the wholly owned, integrated aluminium subsidiary, Rio Tinto Alcan, which owns and manages operations predominately located in Canada and Australia, with other significant interests in the UK, France, New Zealand, Brazil, Guinea, China, Iceland, Ghana, Norway and the US. The group is currently organised into four business units – Bauxite & Alumina, Primary Metal, Engineered Products and Packaging. Rio Tinto announced in 2007 the intention to divest both the Engineered Products and Packaging business units. Sites relating to these businesses are not shown above.

- Aluminium**
- Operating sites**
- 1 Alma
  - 20 Alouette (40%)
  - 7 Alucam (Edea) (47%)
  - 2 Anglesey Aluminium (51%)
  - 1 Arvida
  - 9 Awaso
  - 1 Beauharnois
  - 1 Becancour (25%)
  - 3 Bell Bay
  - 4 Boyne Island (59%)
  - 5 CBG Sangaredi
  - 6 Dunkerque
  - 3 Gardanne
  - 10 Gove alumina refinery
  - 11 Gove bauxite mine
  - 1 Grande-Baie
  - 12 ISAL
  - 1 Jonquiere
  - 13 Kitimat

- 1 Laterriere
- 14 Lochaber
- 15 Lynemouth
- 17 Ningxia (50%)
- 16 Porto Trombetas (MRN)
- 4 Queensland Alumina Limited (80%)
- 18 Sao Luis (Alumar) (10%)
- 19 Sebree
- 1 Shawinigan
- 21 SORAL (50%)
- 22 St-Jean-de-Maurienne
- 23 Tiwai Point (79%)
- 24 Tomago (52%)
- 25 Weipa
- 4 Yarwun

## Copper

The Copper group comprises Kennecott Utah Copper and Kennecott Minerals in the US, and interests in the copper mines of Escondida in Chile, Grasberg in Indonesia, Northparkes in Australia, Palabora in South Africa. Projects under evaluation include the Resolution, Pebble and Eagle projects in the US, Oyu Tolgoi in Mongolia, La Granja in Peru and Sulawesi in Indonesia.

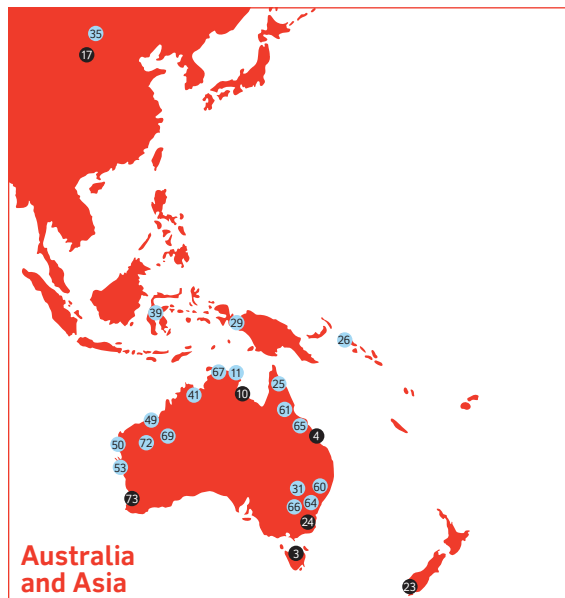
### Copper and gold

- Operating sites**
- 26 Bougainville (not operating) (54%)
  - 27 Cortez/Pipeline (40%)
  - 28 Escondida (30%)
  - 29 Grasberg joint venture (40%)
  - 30 Kennecott Utah Copper
  - 31 Northparkes (80%)
  - 32 Palabora (58%)
  - 33 Rawhide (51%)

- Projects**
- 34 La Granja
  - 35 Oyu Tolgoi (10%)
  - 36 Pebble (10%)
  - 37 Resolution (55%)

- Nickel**
- Projects**
- 38 Eagle
  - 39 Sulawesi

- Zinc, lead, silver**
- Operating sites**
- 40 Greens Creek (70%)



## Diamonds and Industrial Minerals

The Diamond and Industrial Minerals group comprises Rio Tinto's diamond interests in the Diavik mine in Canada, the Argyle mine in Australia, and the Murowa mine in Zimbabwe, served by diamond sales offices in Belgium and India. Rio Tinto's industrial minerals businesses comprise Rio Tinto Minerals, made up of borate and talc operations in the US, South America, Europe and Australia, and salt in Australia, as well as Rio Tinto Iron & Titanium interests in North America, South Africa and Madagascar.

### Diamonds

#### Operating sites

- 41 Argyle
- 42 Diavik (60%)
- 43 Murowa (78%)

### Borates

#### Operating sites

- 44 Boron
- 45 Coudekerque Plant
- 46 Tincalayu
- 47 Wilmington Plant

### Potash

#### Projects

- 48 Rio Colorado Potash

### Salt

#### Operating sites

- 49 Dampier (68%)
- 50 Lake MacLeod (68%)
- 49 Port Hedland (68%)

### Talc

#### Operating sites

(only major sites are shown)

- 51 Ludlow
- 52 Talc de Luzenac
- 53 Three Springs
- 54 Yellowstone

### Titanium dioxide feedstock

#### Operating sites

- 55 QIT-Fer et Titane Lac Allard
- 56 QIT-Fer et Titane Sorel Plant
- 57 Richards Bay Minerals (50%)

#### Projects

- 58 QIT Madagascar Minerals (80%)

## Energy

The Energy group is represented in coal by Rio Tinto Coal Australia and Coal & Allied in Australia and by Rio Tinto Energy America in the US. It also includes uranium interests in Energy Resources of Australia and the Rössing Uranium mine in Namibia.

## Iron Ore

The Iron Ore group's interests comprise Hamersley Iron and Robe River in Australia, Iron Ore Company of Canada, the Corumbá mine in Brazil and the Simandou, Guinea, and Orissa, India, projects. The group includes the Hls melt® direct iron making plant in Australia.

### Coal

#### Operating sites

- 59 Antelope
- 60 Bengalla (30%)
- 61 Blair Athol (71%)
- 62 Colowyo (20%)
- 59 Cordero Rojo
- 63 Decker (50%)
- 61 Hail Creek (82%)
- 64 Hunter Valley Operations (76%)
- 59 Jacobs Ranch
- 65 Kestrel (80%)
- 64 Mt Thorley Operations (61%)
- 63 Spring Creek
- 65 Warkworth (42%)

#### Projects

- 61 Clermont (50%)
- 60 Mt Pleasant (76%)

### Uranium

#### Operating sites

- 67 ERA (68%)
- 68 Rössing (69%)

#### Projects

- 69 Kintyre
- 70 Sweetwater

### Iron ore

#### Operating sites

- 71 Corumbá
- 72 Hamersley Iron mines:
  - Brockman
  - Channar (60%)
  - Eastern Range (54%)
  - Hope Downs (50% joint venture)
  - Marandoo
  - Mt Tom Price
  - Nammuldi
  - Paraburdoo
  - Yandicoogina
- 75 Hls melt® (60%)
- 74 Iron Ore Company of Canada (59%)
- 72 Robe River mines: (53%)
  - Pannawonica
  - West Angelas

#### Projects

- 75 IOC Pellet Plant (59%)
- 76 Orissa (51%)
- 77 Simandou (95%)

**Also in this series:**

*Rio Tinto and biodiversity – Biodiversity offset design*

*Rio Tinto and biodiversity – Group biodiversity profile*

**Case studies:**

- *The BirdLife International – Rio Tinto Partnership*
- *The Conservation International – Rio Tinto Partnership*
- *The Earthwatch Institute – Rio Tinto Partnership*
- *Fauna & Flora International – Rio Tinto Partnership*
- *Royal Botanic Gardens, Kew – Rio Tinto Partnership*
- *Protecting biodiversity at Great Salt Lake – On the ground at Kennecott Utah Copper*
- *Provide for today, protect for tomorrow – On the ground at Rio Tinto Energy America*
- *Managing biodiversity in Guinea – On the ground at Rio Tinto's Simandou project*

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