

Giant steps:

**industry and conservation
make history through Gorgon**

The Gorgon project—the largest natural gas development ever approved in Western Australia—is well under way. Managing the project's impact on island and marine environments, as well as the conservation programs being funded through the project's agreed environmental offsets, is no small undertaking either.

**by Fran Stanley, Keith Morris,
Tom Holmes and Joanna Moore**



September 2009 marked an historic landmark for Western Australia. It was the month that the proposal to produce and export natural gas extracted from the massive Greater Gorgon area off the State's north-west, using nearby Barrow Island as a base, got the go-ahead. This came from both the Australian and State governments and from the project's financiers, Joint Venture participants Chevron Australia and Australian subsidiaries of Shell and Exxon Mobil. Since then, Tokyo Gas, Osaka Gas and Chubu Electric Power have joined as participants in the project. Gorgon will be the biggest industrial development in Australia's history, and one of the largest such ventures in the world.

But industry is not the only superlative here. Barrow Island, which will host the onshore facilities to process, store and load the product, is Western Australia's second biggest island, and is recognised as one of the most important areas for native fauna conservation in Australia. Its geographic isolation has resulted in it being an important refuge for many species that have either declined in number or become extinct on the mainland. In addition, Australia's largest onshore oil field has been operated by Chevron



Australia on Barrow Island for more than 40 years, producing more than 300 million barrels of oil since 1967.

Barrow Island was declared a nature reserve in 1908. In 1910, the reserve's status was changed to class 'A' in recognition of its significance for the conservation of a range of animal species. Any development proposals have to take these highly significant conservation values into account. The Gorgon proponents and the State Government have negotiated a program of environmental offsets to be funded by the Joint Venture, to ensure the project will contribute to improving Western Australia's biodiversity conservation values as well as its financial ledger. The offsets will take the form of a range of conservation programs to be led by the Department of Environment and Conservation (DEC).

The project

The Gorgon project will build and operate three 'gas trains' on Barrow Island—processing equipment to condense, compress and liquefy the natural gas—to produce 15 million tonnes each year of liquefied natural gas (LNG) for export to Japan, China, Korea and India. The project also involves building a marine wharf and jetty, with a large associated dredging program and a domestic gas plant. Construction for the project is now under way and will continue for the next three to five years. It is anticipated the plant will process natural gas for decades to come.

Island refuge

Barrow Island Nature Reserve is home to 23 threatened and four priority animal species. The smaller surrounding islands—Double, Middle, Pasco and Boodie—are also nature reserves. Adjacent to the island are Barrow Island Marine Park and Barrow Island Marine Management Area, which support a range of marine habitats and species including coral reefs, mangroves, algal and seagrass habitats, dugongs, whales and other cetaceans, marine turtles, fish and invertebrates. The islands are vested with the Conservation Commission of Western Australia, and the marine reserves with the Marine Parks and Reserves Authority. All are managed by DEC.

Environmental offsets

DEC is managing the Gorgon project's impact on island and marine conservation. This involves monitoring the effectiveness of quarantine systems on both Barrow Island and the mainland, and having a management and monitoring presence on Barrow

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Main DEC field staff monitoring near Barrow Island.

Photo - Tom Holmes/DEC

Inset A golden bandicoot captured on Barrow Island for translocation.

Left Lorna Glen is one of three sites chosen as a new home for species translocated from Barrow Island.

Photos - Judy Dunlop/DEC





Above DEC staff carry cage traps with animals for release on Hermite Island.
Photo – Ann Biasol/DEC

Right Brushtail possums trapped on Barrow Island have been translocated to Cape Range National Park.
Photo – Bill Muir/DEC



Island to ensure the protection of island and marine environments. DEC staff will be permanently based on Barrow Island to undertake these roles. In addition, as part of the environmental approvals for the Gorgon project, the Gorgon Joint Venture is also assisting with the funding of a number of new conservation programs.

These programs will extend knowledge and protection of threatened marine turtle species on the Northwest Shelf, provide information about key marine ecosystems and the potential impacts of human pressures (including dredging programs), and translocate mammals and birds to areas where these native fauna populations have been lost through introduced animals, weeds and changed land management practices. An important aspect to the programs on and around Barrow Island is the development of an ecological knowledge base, which will provide a baseline for monitoring during the development. There is also a contingency fund in place to support eradication if non-indigenous species become established on Barrow Island because of the project.

Mammals airlifted

One of the first offset programs to get under way has been the translocation of four mammal species from Barrow Island to three other locations. Before the Gorgon Joint Venture started clearing land on Barrow Island to build the gas treatment plant in early 2010, DEC trapped about 600 animals and airlifted them off the island to start new populations elsewhere. During February 2010, 325 golden bandicoots (*Isodon auratus barrowensis*), 65 boodies (*Bettongia lesueur* spp.), 111 spectacled hare-wallabies (*Lagorchestes conspicillatus conspicillatus*) and 104 brushtail possums (*Trichosurus vulpecula*) were captured on Barrow Island and flown to their new homes. This represented only a small portion of the total populations of these animals on Barrow Island.

This program saw spectacled hare-wallabies and golden bandicoots travelling to Hermite Island, in the Montebello Islands group, to establish

new populations as part of the Montebello Renewal project (see 'Montebello Renewal', *LANDSCOPE*, Summer 1996–97). Prior to the introduction of feral cats (*Felis catus*) and black rats (*Rattus rattus*), probably by pearlshells or from shipwrecks in the early 1900s, the wallabies and bandicoots occurred naturally on Hermite Island. The feral cat and black rat became well established on the island, decimating the native animal populations. Intense efforts by DEC and volunteers in the 1990s led to the successful eradication of feral cats and black rats. This means the island can now once again become a refuge for the threatened species (see 'Moving mala', *LANDSCOPE*, Autumn 1999).

Fauna reconstruction

Golden bandicoots were also relocated to the former pastoral station Lorna Glen, 150 kilometres north-east of Wiluna, together with boodies, also

known as burrowing bettongs. Boodies and golden bandicoots once lived on Lorna Glen and across the arid region, but disappeared following European settlement. The reintroductions are part of Operation Rangelands Restoration, which is aimed at re-establishing ecosystem health and wildlife diversity to almost 600,000 hectares of rangelands in the north-eastern Goldfields by 2020.

Since 2001, DEC and the Wiluna Aboriginal community have carried out a range of activities to remove livestock and other introduced animals from Lorna Glen, manage bushfires and build a boundary fence with neighbouring landholders. Baiting and trapping has reduced feral cat

numbers by about 75 per cent, and foxes are virtually non-existent at Lorna Glen. A 1,100-hectare predator-proof compound was also constructed in which reintroduced animals can acclimatise to their new surroundings and be totally protected from the few remaining feral cats. Once they have bred, their adapted offspring will be released outside the fenced enclosure, into the wild.

Previous mammal reintroductions into unfenced areas in Australia's arid interior have not been successful, mainly because of an inability to control feral cats that prey on small-to-medium-sized native mammals. But recent advances in feral cat control techniques mean the conservation of Australia's

most threatened native animals and the restoration of the arid zone can successfully begin (see 'Controlling introduced predators in the rangelands: the conclusion' on page 17). During the next 10 years, re-establishment of 11 native animal species at Lorna Glen is planned, making it one of the world's largest wildlife reconstruction programs (see 'Into the wild: restoring rangelands fauna', *LANDSCOPE*, Winter 2009).

Brushtail possums have been transported from Barrow Island to Cape Range National Park near Exmouth. Fox control is under way here for rock wallaby conservation, and this is the start of another fauna reconstruction project in the arid zone, where most mammal declines have occurred. Interestingly, these possums are much smaller than their mainland relatives and have shorter tails, possibly because they are mainly ground-dwellers—there are very few trees on Barrow Island!



Left DEC research scientist Adrian Wayne releases a spectacled hare-wallaby on Hermite Island.

Photo - Sophie Arnall/DEC

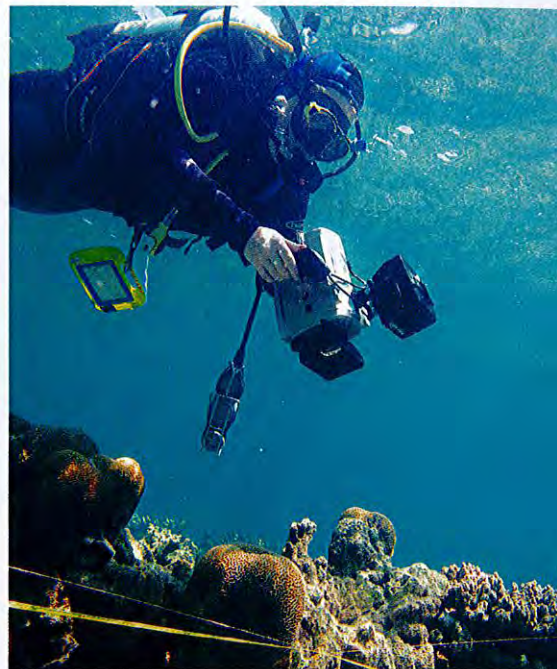
Below left A healthy translocated boodie at Lorna Glen.

Photo - Judy Dunlop/DEC

Below Radio tracking boodies to their warrens at Lorna Glen.

Photo - Joanna Moore/DEC





Above left Flatback turtle.
Photo – Jiri Lochman

Above Field staff conducting benthic video transects near Barrow Island.
Photo – Kevin Crane/DEC

The Threatened and Priority Species Translocation and Reintroduction Program will continue for the next decade. In the next part of this project, it is planned to translocate two bird species, the Barrow Island black and white fairy wren and the spinifex bird, to the Montebello Islands. Newly established populations will be monitored to check whether they are thriving in their new homes.

Turbid waters

Another offset program already under way is the Dredging Audit and Surveillance Program. This marine monitoring program aims to assess the potential impacts of marine construction, dredging and spoil disposal activities on the marine biodiversity of the adjacent Montebello and Barrow islands marine parks and reserves.

The program will also enable DEC to provide independent, informed and timely environmental management advice to assist in the management of dredging activities and is complementary to industry marine compliance monitoring programs. DEC established 23 permanent monitoring sites in 2006, resurveyed and established additional sites in 2009 and surveyed these sites again in April 2010. These surveys provided data on the condition of benthic and fish communities of the

Montebello and Barrow islands marine parks and reserves before dredging started in earnest. The monitoring program will continue to monitor key marine communities during and beyond the timeframe of the dredging operations.

The 2009 survey consisted of two week-long field expeditions, involving 10 scientific and technical staff from DEC's Marine Science Program, Environmental Management Branch, Pilbara regional office and The University of Western Australia's Oceans Institute. Not only were the trips significant for the spatial scale over which surveys were conducted, but they also forged invaluable collaborations between the groups involved.

In total, 26 sites were intensively surveyed throughout the eastern Montebello and Barrow islands area, encompassing a wide range of locations and habitats. Although results are still being analysed, preliminary evidence indicates that both coral and reef fish communities throughout the islands are generally in excellent condition, highlighting the area's regional marine biodiversity significance within WA.

Information collected from these trips forms the baseline for DEC's monitoring of marine communities potentially affected by industrial activities in the Montebello and Barrow islands marine parks and reserves.

Dredging on the eastern side of Barrow Island has now begun and is scheduled to continue for the next two years. The current monitoring program will continue during the next three years. Further field surveys will be conducted at regular intervals during this period and will be used in tandem with information collected by the private sector to monitor developmental impacts on the local ecosystem. This program will be integrated into the State-wide marine parks and reserves and threatened marine fauna monitoring programs currently being developed and implemented by DEC's Marine Science Program.

Marine turtles

The largest of the offset programs is the Northwest Shelf Flatback Turtle Conservation Program. One aspect of this program is the survey, monitoring and research into flatback turtle populations on the Northwest Shelf. Additionally, the project aims to minimise interference to key feeding



Left Oil storage tanks on the east coast of Barrow Island. This beach is one of the main flatback turtle nesting sites.
Photo - Fran Stanley/DEC

Below Lorna Glen project officer Judy Dunlop with a golden bandicoot, one of several species being reintroduced to parts of its former range in the rangelands.
Photo - Brent Johnson/DEC



and breeding locations. There are also plans for education and communication programs to support marine turtle protection. This long-term program will be developed during 2010, and will begin to be implemented in 2011.

Offset funding is also available for an intervention program which depends on the outcome of the flatback turtle conservation program on Barrow Island. If necessary, this intervention program will work to improve recruitment to this turtle population, through such measures as the establishment of a hatchery.

Net conservation benefits

The second set of conservation programs to be funded by the Gorgon Joint Venture are those that deliver 'net conservation benefits'. These are defined as demonstrable and sustainable additions to, or improvements in, biodiversity conservation values in WA.

Net conservation benefits for the Gorgon project also include the requirement to target, where possible, the biodiversity conservation values affected or occurring in similar bioregions to Barrow Island.

Under the agreed biogeographical regionalisation for Australia, Barrow Island falls within the Cape Range subregion of the Carnarvon bioregion. The adjacent Gascoyne and Pilbara bioregions are considered to be similar to the Carnarvon bioregion. The \$60 million being provided to fund net conservation benefits over about 30 years will enable at least two major projects to be undertaken, which could include the restoration of native fauna, habitat improvement and forging new partnerships with Aboriginal people and industry.

With many projects already well under way, and plans for some large and exciting ones still to come, managing the environmental offset and net conservation benefit projects for the Gorgon project is a mammoth undertaking. It is hoped the projects will help to maintain the biodiversity values of Barrow Island and its status as an island that has remained free of many of the processes that have threatened the Australian mainland. Additionally, they will enable some truly significant conservation projects to be undertaken elsewhere in the State.

Fran Stanley is the Department of Environment and Conservation (DEC) Gorgon project coordinator, based in Perth. She can be contacted on (08) 6467 5455 or by email (fran.stanley@dec.wa.gov.au).

Keith Morris is a senior principal research scientist supervising the fauna translocation and reintroductions as part of the Gorgon project offset programs and can be contacted at DEC's Wildlife Research Centre, Woodvale on (08) 9405 5159 or by email (keith.morris@dec.wa.gov.au).

Tom Holmes is a research scientist with DEC's Marine Science Program based at Kensington. He can be contacted on (08) 9219 9769 or by email (thomas.holmes@dec.wa.gov.au).

Joanna Moore is a DEC publications officer and *LANDSCOPE* editor. She can be contacted on (08) 9389 4003 or by email (joanna.moore@dec.wa.gov.au).

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Publishing credits

Executive Editor Madeleine Clews.

Editors Joanna Moore, Rhianna King.

Scientific/technical advice

Kevin Thiele, Paul Jones, Keith Morris.

Design and production Natalie Jolakoski, Peter Nicholas, Gooitzen van der Meer.

Illustration Gooitzen van der Meer.

Cartography Promaco Geodraft.

Marketing Estelle de San Miguel.

Phone (08) 9334 0296 Fax (08) 9334 0432.

Subscription enquiries

Phone (08) 9334 0481 or (08) 9334 0437.

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