

day-to-day activities,” he says. “Claire and I took a plane ride over the whole rock art area to get a better perspective. We talked about it quite a lot. It is so beautiful and meaningful.” And ultimately tragic. Black learnt that Yaburara men, women and children were massacred on the shores of Burrup’s Flying Foam Passage in 1868, less than three years after Europeans reached the area.

On that visit his eyes kept returning to the flares rising from an industrial chimney, hissing out nitrogen oxides, compounds that form nitric acid when deposited in the environment. “I had a sense of incongruity. How could these two things coexist – industry at that level and cultural history? I left there wondering how we preserve what’s there.”

Black has always been a doer, a solver of problems. When he was awarded an Order of Australia in 2001, it was for multiple contributions to science, junior sport and bushfire safety. “I spent a lot of time in the local bushfire brigade in the Blue Mountains where I live. Walking out on patrols in the bush, I came across a lot of Aboriginal rock art, mostly petroglyphs or carvings or hand stencils in caves. So I was always interested. But this has taken over, and it’s changed my life.”

Murujuga’s rock art lies 3680km away from Black’s home outside Sydney. Trying to protect it has cost him \$135,000 in airfares so far and all his spare waking hours; it has tested the patience of his family and seen a dispassionate scientist embark on a crusade he never anticipated.

**No visitor to Murujuga leaves without noting** the vast, productive industrial estate nestled incongruously alongside the rock art. The silent figures etched in the rock have witnessed a cavalcade of industry appearing on their doorstep. Typical of resource-rich Western Australia, the arrival of diggers and bulldozers preceded any real knowledge of what else lay in the landscape. And Aboriginal voices went largely unheard until native title laws in 1993 gave people a voice.

The Burrup is the gateway to Australia’s biggest oil and gas operations – the gleaming sprawl of pipes and emission stacks from Woodside’s \$34 billion North West Shelf joint venture were later joined by its \$15 billion Pluto LNG Project. Down the road lies Dampier port, one of the busiest bulk-handling ports in the world.

When Woodside first moved in during the early 1980s, decorated boulders were removed like rubble to make way for progress. Nearly 2000 items of prehistoric art were transferred into a



Under threat:  
a petroglyph;  
scientist John Black

fenced, locked compound for “safe-keeping”; out of 720 Aboriginal sites identified on the proposed LNG site, 349 were destroyed. Around that time, in September 2003, the World Monument Fund added Burrup’s rock art to their global “black list” of 100 most threatened sites. It was the first Australian site to go on the list.

Heritage listing covers just under half of the 30km-long peninsula, but on the half available to industry more rock art was lost as companies moved in to make use of the region’s bountiful natural gas; an ammonia plant and a fertiliser and nitrate processing plant were built within hundreds of metres of rock art.

Last year, a leaked memo revealed that the new McGowan Labor government is considering approvals for more plants for urea and methanol production. Billions in state and national revenue, and thousands of jobs, depend on Burrup’s industrial might. So is coexistence with the rock art precinct a necessary evil?

Black wasn’t sure, but he wanted to know more. He got hold of CSIRO documents that, back in 2007, concluded that industry would have no impact on the rock art. As a scientist – a former senior CSIRO one at that – Black looked at the methodology. “What changed my life was reading those reports,” he says. He believes the

CSIRO reports were flawed, pointing out short-falls when we meet over a coffee during one of his many lobbying trips to Perth.

Black explains the problem. Each one of the one million images was created by incising lines or hammering dots into the dark, weathered rock patina, just deep enough to reveal the lighter clay-rich seam underneath. The patina is a kind of “desert varnish”; as Black explains it, specialised bacteria and fungi have evolved to survive in this extremely dry, harsh environment. The tiny organisms extract and concentrate manganese and iron compounds in dust to form a hard, protective sheath. But they only form under near neutral and alkaline conditions, and are prone to dissolve if acid levels rise. He argues that if new industry adds to that acid load, it could accelerate the rate at which the patina dissolves.

That possibility was confirmed in research conducted and published in 2005 showing acidity on the rock surfaces had increased since industrialisation of the Burrup. Ian MacLeod, former executive director of maritime heritage at the Western Australian Museum and a world expert on corrosion, had measured the pH levels on monitored rocks at Murujuga. Over time the levels had gone from near-neutral to as low as 4.2, meaning significantly acidic. “He had graphs showing mineral dissolution of the manganese and iron that make up that outer patina, and he showed that they were being dissolved,” says Black.

When he’s not talking gas emissions at Burrup, Black’s time is taken up with another kind of emission – methane from cows, an issue he’s been tackling since retiring from his job as assistant chief of CSIRO’s division of animal production. Why, I ask, should anyone heed his warnings in an unrelated field of industrial emissions? “My credibility as a scientist, for one,” he responds, bristling slightly. “I went through the ranks to the highest level, and I’m used to working on the science and the facts.”

He and MacLeod published a paper about the effect of industrial emissions on the rocks in *The Journal of Archaeological Science*. Their views are shared by others who have long warned against further industry incursions into the rock art precinct, including the Friends of Australian Rock Art (FARA) and the Centre for Rock Art Research at the University of Western Australia. The Centre’s director, archaeologist Jo McDonald, wrote the submission that argues for UNESCO World Heritage Listing of Murujuga. Late last year, the McGowan government stated it would work with the Murujuga Aboriginal Corporation