

Chapter Three

Australia

Australia is the first of our case studies. In one way at least, Australia represents the beginning of our transnational pollution story—even if the phenomena we are exploring in this book are best viewed as a circular flow of political communications, goods and environmental harms in which all three countries in this study are caught. Each country is affected by the massive quantities of pollutants emitted daily into the world's atmosphere, and each struggles to control the harmful effects of these pollutants. Each also contributes to the production and circulation of pollution, and to the international politics and communications that inevitably follow. But this is where Australia provides a useful point for us to enter the flow, as not only is it one of the world's largest greenhouse gas emitters per capita, it makes a significant contribution to the overall production of greenhouse gasses and air pollution by being one of the world's biggest exporters of coal. As a major producer of greenhouse gases, the production and export of coal cannot be separated from climate change, and here Australia provides another point of focus. The Great Barrier Reef, probably Australia's most iconic place, faces serious threats from warming seas and extreme weather events, and has become a global symbol for the impact of continuing pollution and the climate change that results.

This chapter, therefore, analyses political discourses within media in an attempt to reveal Australia's understanding of its role in producing atmospheric pollution, and in taking or attributing responsibility for its impacts. It also considers global reactions and responses to the crisis facing the Great Barrier Reef. We begin by outlining Australia's historic reliance on and future hopes for coal, and then we consider the role of Australia's neighbours and trading partners within major coal developments in Australia, including Japanese and Chinese corporate investment and as major markets. After addressing the role of coal in generating harmful atmospheric pollution, our focus turns to the Great Barrier Reef, which has faced direct impact from the coal industry through proposed dredging to expand coal export facilities and

indirect impacts from climate change through warming seas and extreme weather events. We draw on qualitative and quantitative computer-assisted textual analysis to identify and analyse media discourses of risk, responsibility and blame. Who is causing the crisis, who is affected, who is responsible and who responds?

The Producer and the Affected

The Past

Colonised by the British in the late 18th Century in part as a solution to its overflowing city gaols and the prison hulks lining the Thames, Australia is a product of the industrial revolution. Just as it was doing at ‘home’, coal was to play an important role in the new settlement. Coal is Australia’s oldest export trade, and has consistently been one of its biggest. Even Captain James Cook, the British explorer whose journeys in the 1770s provided the impetus and charts required for white settlement in 1788, had learned his trade on the vessels carrying coal between northern England and London (Minerals Council of Australia n.d.), apprenticed to the Walker family, members of which would later move to the new colony themselves to capitalise on the emerging coal industry. The presence of coal was recorded soon after settlement, at the mouth of a river initially named Coal River, but later renamed the Hunter. Australia’s first industrial town, Newcastle, is at the centre of the region—its English namesake was at the time Europe’s fastest growing city, a growth created by coal (Hood 2009: 17) – and the Australian Newcastle still retains the biggest coal export facility in the world (Minerals Council of Australia n.d.).

Although early Australian coal mines tended to be short-lived—markets were driven by domestic heating requirements and the whaling industry, and demand was insufficient and too sporadic to sustain activity—the industry was firmly established by the 1840s when a combination of steamships, free settlers and industrial machinery drove growth. No place better illustrates Australia’s difficult transition from penal colony to modern industrial nation than the historic coal mines at Saltwater River on the Tasman Peninsula in the southern island state of Tasmania. Hidden in the bush of the remote World Heritage-listed site are rusted remnants of steam-driven mining machinery that (inefficiently) pumped water from the underground pits in which

British and Irish convicts who had reoffended post-transportation were forced to work (Australian Government n.d.).

Coal emerged as the driver of Australian growth. It powered saw mills and flour mills, as well as the steam ships that brought settlers and goods. With Newcastle and the Hunter Valley housing one of the largest coal fields in the world, the colony (now state) of New South Wales dominated Australia's coal production for the first century and a half of white settlement. In the Hunter region alone, 6.5 million tons of coal were mined in 1908, valued then at 2.6 million sterling (Australian Bureau of Statistics 2012). Further north, coal mining began in Queensland shortly after the white settlement of Moreton Bay (near what is now the state capital of Brisbane) and has been continuing ever since. In 1908, Queensland's coal production stood at almost 700,000 tons, and estimates of coal deposits across the vast state suggested that "practically no limit can be set to its possibilities of extension" (Australian Bureau of Statistics 2012).

According to Ian Dunlop, a former fossil fuel executive and now advocate for climate change action:

This was the core power generation system that the country developed on... If we hadn't had coal, Australia would not be anywhere near what it is today. So it's been absolutely fundamental to the development of the country, particularly in the early years. Had we not had coal, both from a domestic power generation and steel manufacturing perspective and also from an export perspective increasingly since World War II, we would have nowhere near the amount of wealth generation Australia has enjoyed over recent decades (in Quince 2015).

Export of Australian coal began within decades of the establishment of the first mines. An American schooner carried 250 tons of coal to Rio de Janeiro as early as 1824. The initial poor quality left Asian markets unenthusiastic. With the introduction of steam ships, however, Australian coal was transported to a number of refuelling locations in the Asia-Pacific region, including Singapore, Colombo and Suva, and by 1861, the *Sydney Morning Herald* reported: "We have already despatched our coals to

China, Batavia, India, California, and South America... But this is a mere fragment of the probable demand, as the mining interest becomes stable and reliable” (Diamond 2009: 31). In 1865, approximately one-quarter or 64,000 tons of coal produced in Newcastle was exported.

The export trade was well established by 1910, strongly supported by government. As an *Australian Year Book* of the period notes: “At present coal mining in Queensland is in a very satisfactory position, the increasing volume of trade being chiefly due to the action of the Government in granting concessions to vessels coaling at local ports” (Australian Bureau of Statistics 2012). Industrial disputes over pay, safety, working conditions and job security impacted the Australian industry heavily in the following decades, but government intervention via the establishment of the Joint Coal Board and then a conciliation labour tribunal allowed rapid expansion post World War II. In the decades following the war, the industry was able to deliver enough coal to support Japan’s rise as the global leader in steel production (Quince 2015). Queensland and New South Wales coal drove the expansion, and Australia’s economic reliance on trade with its Asian neighbours and their growth became firmly established. Japan and Australia signed their first trade agreement in 1957 (Diamond 2009: 42).

According to Dunlop, Australia was exporting 1.9 million tonnes of coal by 1960, with 96 per cent of these exports for Japan’s steel industry (Quince 2015). By 1986, with Queensland production now overtaking New South Wales (Asafu-Adjaye 2009: 46), Australia was exporting 95.7 million tonnes of black coal, of which half was used in steel production and half in generating power (Quince 2015). Mining methods also shifted through this period from underground pits to lower cost and more efficient open-cut mines, in which the ‘overburden’ was first removed, providing easier access to the coal deposit. Says Dunlop:

It started to become apparent that the economics of doing that in the '50s and '60s were actually considerably better at scale than underground mining. So whilst you saw underground mining expand in places like the Illawarra in supplying Japan, you then also saw new techniques brought into the Queensland coalfields, particularly in the Bowen Basin, with these open-cut techniques, with very big drain lines, very large-scale trucks—all the pictures

you see these days (in Quince 2015).

Developing massive deposits for export was expensive, beyond the capacity of the Australia industry alone, and as such companies sought international investments. In 1959, for example, Australian family company Thiess Bros discovered reserves in Queensland of hard metallurgical (coking coal used in steel production, as opposed to thermal coal used for energy generation), and partnered with Japanese trading company Mitsui and American firm Peabody to develop the deposit, forming Thiess Peabody Mitsui. This company would dominate coal production for the next decade (Hood 2009: 6). While Japanese investment in Australian coal mining continued through the 1960s, it was formalised in the 1970 MITI (Japanese Ministry of International Trade and Industry) ‘development-for-import’ policy (Colley 1997: 1017). Resource security through direct investment in large-scale foreign ventures dispersed across many regions was at the heart of the policy, reflecting Japanese business and government anxiety about the country’s vulnerability to resource shortages. As a MITI white paper of 1981-82, noted:

Mineral resources are the lifeblood which sustains the life of the people and their industrial activity. Japan depends almost entirely on imports for its mineral resource requirements. What is more, deposits of mineral resources are concentrated in a few areas of the world... Owing to this peculiar set of circumstances, the availability of mineral resources could pose a short term sporadic threat or a protracted industrial menace to the economic security of Japan (in Colley 1997: 1017).

While oil was initially the focus of the policy, coal’s wide distribution across a diverse range of regions—regions that, unlike with oil, were without major conflicts—made it an attractive target. Despite Australia’s ongoing anxiety about foreign ownership, by 1992-3 40 per cent of Australian coal production was owned by foreign-based companies, with Japan’s stake of 13.1 per cent making it the source of more investment than any other single nation (Colley 1997: 1014). Security of supply—not profits—was the principal stated motivation. Japanese companies did not seek vertical integration within the Australian industry—that is, control and ownership across the full supply chain—and, as such, were able to minimise political

risk while providing the concessional financing required for the industry in Australia to rapidly expand through the latter part of the 20th century. Control remained with local companies, although the Japanese trading houses—despite their minority share of ownership—were able to exert considerable influence through their provision of cheap finances and access to markets (Colley 1997: 1018).

With Japan as its major trading partner and substantial investor, Australia dominated international coal trade until the 1990s, when Indonesia—and for a short period, China—developed thermal coal export industries (Quince 2015). In 2015, Indonesia was the world's largest coal exporter, although its deposits were forecast to run out within thirty years. If predictions are correct, Australia will again become 'coal king' as it rapidly overtakes Indonesia, whose lower-quality coal has already fallen out of favour with China. According to Australia's peak mining industry body, Australia will again be the world's biggest exporter of coal by 2017 (Minerals Council of Australia 2015: 7). China has joined Japan as a major investor in the Australian industry, with overall foreign investment now estimated at 80 per cent of the industry (Quince 2015).

The Future

Despite slowing markets, the coal industry remains one of Australia's most lucrative—second only to iron ore in terms of export earnings. Australia holds 9.2 per cent of the world's coal deposits, and almost 80 per cent of the coal dug from these deposits is shipped to its major buyers: Japan, which bought 120 million tonnes of the total 527 million tonnes extracted in 2014, then China, South Korea and India. According to the Minerals Council of Australia (2015), in the five years from 2010, coal accounted on average for more than 15 per cent of Australia's total exports, with export earnings at \$38.6 billion equal to or exceeding Australia's total agricultural exports. It estimates that the coal industry employs more than 40,000 Australians and another 135,000 indirectly.

The Australian government and mining industry publicly present a rosy picture for the future of coal exports. They predict an increase of 65 million tonnes in the decade to 2025, citing fifty-three proposed new developments for coal mines. They suggest that

export value will grow at a rate of 4.8 per cent annually until 2020. While 2015 was a tough year for Australia's exports of coal for steel production and thermal coal, the Department of Industry and Science predicts various free trade agreements—particularly the one with China that removes the three per cent tariff on imports—will see the market rebound and continue to grow for a decade at least. The fact that China's coal-fired infrastructure is relatively new and has a predicted lifespan of 40-60 years is often cited as the reason behind this optimism. "China will be the coal giant for many years in the future", according to the International Energy Agency's World Energy Outlook (2014).

While there is continuing debate about whether China's coal consumption has already peaked (International Energy Outlook 2015) or will peak and plateau in the 2020s as the Australian industry predicts, the Minerals Council suggests demand from India will be such that Australian export earnings will continue to grow. Even if India meets its ambitious renewable energy targets, the Council appears confident that India's coal-fired capacity will have grown by 70 per cent by 2030. There is also increasing demand from Australia's close neighbours in Southeast Asia—the ten members of the Association of Southeast Asian Nations (ASEAN), which are turning to coal to drive their economic development over gas and oil (Minerals Council of Australia 2015). Malaysia is now one of the largest importers of coal in Asia, buying from Australia, Indonesia and South Africa (Quince 2015). Meanwhile, Japan was in 2015 the only member of the G7 looking to significantly increase coal fired power generation, with 48 new projects in the pipeline. Overall, the world is predicted to use one billion more tonnes of coal a year in 2019 than it currently uses and there is more investment in coal in the pipeline than for any other form of energy production.

Despite high profile and targeted divestment and no-lending campaigns, banks in 2015 backed these growth predictions and continued to lend to the Australian coal and other fossil fuel industries. According to figures released by financial activists Market Forces, the top three lenders to Australian fossil fuels in 2015 were all Japanese financial groups—Sumitomo-Mitsui (AUD2.87 billion), Mizuho (AUD2.76 billion) and Mitsubishi UFJ (AUD2.29 billion)—investing largely in gas but also maintaining Japan's historic interest in lending to the coal industry (Slezak 2016). Australian banks—the Commonwealth and ANZ—loaned the next largest amounts (AUD1.75

billion and AUD1.42 billion respectively), followed by another Japanese lender, the Bank of Tokyo Mitsubishi (AUD1.39 billion). Among the loans from Australian banks were eight with a combined value of AUD 4 billion for coal projects signed in 2015 (Slezak 2016).

The Australian industry shows few signs of willingly walking away from coal. Central to the industry's vision for the future are nine new mines in the massive Galilee Basin deposit in Queensland, 400kms inland from Australia's northern east coast. If commissioned, the Carmichael mine, owned by Indian-based company, the Adani Group, would produce 60 million tonnes of high-quality thermal coal a year (Adani 2014), a "high-calorific value coal" that promises to deliver "more energy with less coal, and fewer emissions" (Adani 2015). According to the company, 10,000 direct and indirect jobs would be delivered by its mine and associated rail and port projects. Taxes and royalties to the state of Queensland would amount to \$22 billion (Adani 2015). Also in the Galilee Basin, MacMines Austasia, now solely owned by the Meijin energy group, one of China's largest producers of coal and a major supplier of coal products to the United States, South Korea and Japan (through Mitsubishi), has sought approval to produce 38 million tonnes of coal a year from its China Stone Coal Project. The proponents have claimed that the project, with an expected mine life of fifty years, would create 3900 jobs during the two-year construction phase and 3400 positions once operational. Royalties would amount to AUD5.9 billion over the mine's lifespan (Validakis 2015).

The Pollutant

Coal is the source of two high-profile forms of atmospheric pollution—particles and greenhouse gasses. In relation to the first, China has announced that it will burn less coal in order to control particle pollution (see Chapter Five), with public opinion surveys in China rating air pollution as the country's second biggest problem, behind corrupt officials. Although China still burns almost 4 billion tonnes of coal a year, estimates show a steady decline in coal consumption that is mostly affecting importers, including Australia (Grigg 2015). In the first eight months of 2015 alone, coal imports to China fell 31 per cent. Australia experienced a drop in thermal coal

exports of 0.7 per cent in 2015, while exports of coking coal (used in steel production) rose modestly.

Particle pollution caused by coal has emerged as a political issue domestically in Australia. A 2013-14 inventory of toxic substances found that coal was the leading source of particle pollution, with a doubling in coarse-particle pollution—PM10—from coal mining in the previous five years. According to voluntary reporting, emissions of the more dangerous fine-particle pollution—PM2.5—from the coal industry had increased by 52 per cent in the same period, compared to a general increase across all industries of 14 per cent (Cox and O'Brien 2015). The coal industry was responsible for 430,000 tonnes of coarse particle pollution in 2013-14, or 47 per cent of the national total. Coal combustion also emits sulphur dioxide, nitrogen oxides, and mercury as well as other heavy metals (Union of Concerned Scientists n.d.). A much quoted fact and public relations problem for the coal industry is that more people die in Australia from air pollution than in car accidents (Cox and O'Brien 2015).

Coal is the major contributor of greenhouse gases, and it is estimated that coal from the Carmichael mine proposed for Queensland will produce more emissions in a single year than New York (Taylor 2015). In terms of greenhouse gases, mining of coal directly releases methane, which the US Environmental Protection Agency suggests has a global warming potential 23 times higher than carbon dioxide. It estimates that coal mine methane contributes 8-10 per cent of human-made methane emissions worldwide. Electricity generation, of which 70 per cent relies on coal, contributes about 40 per cent of overall CO₂ emissions in Australia (Parliament of Australia 2010). While initiatives to lessen coal use and to introduce lower polluting and more efficient technologies are underway in Europe and the US, increasing coal combustion in India and Southeast Asia is predicted to occur using inefficient subcritical technologies (International Energy Agency 2015). How this co-exists with the 2015 COP21 agreement in Paris calling for the global increase in temperatures to be limited to 'well below' 2 degrees Celsius remains to be seen.

Despite incorporating 'clean air' measures such as 'carbon capture and storage' and 'high-efficiency super or ultra-supercritical plants' to address environmental

concerns, the Australian coal industry's predictions of growth seem wildly optimistic in the face of the air pollution crisis facing China and global agreements on limiting emissions. Prices for coal are low. According to the IEA's mid term report, prices of imported coal in Europe fell below USD50 a tonne in December 2015—levels not seen in a decade. The IEA predicted that persistent oversupply and shrinking imports in China and elsewhere meant that coal prices would remain under pressure until 2020. Coal might still form the basis for a significant proportion of global energy production, yet its reputation has never been lower, with increasing pressure on governments, banks and corporations to divest from the industry and to shift to cleaner sources of power. The future of coal, it would seem, sits somewhere between the total industry collapse hoped for by climate change and other environmental activists, and the rosy picture of continuing prosperity and even growth painted by the coal industry.

The Reef

Nowhere better illustrates the uncertainty and risk embedded within the coal debate than the Great Barrier Reef. Down the railway tracks from the massive coal deposits of inland Queensland, the Reef is a vital producer of income and livelihoods for Australia—although economically it pales next to coal in terms of its overall contribution to the Australian economy. Described as one of the natural wonders of the world—‘a global nature superstar’—the Reef is Australia's premier tourist destination, attracting more than AUD5.7 billion to the Australian economy in 2012 and creating employment of almost 69,000 full-time equivalent workers (Deloitte Access Economics 2013). Stretching for 2500 km along the Queensland coast, the Great Barrier Reef is the world's largest coral reef ecosystem, and was listed by the World Heritage Committee in 1981 for its range of outstanding values, including being “probably the richest area in terms of faunal diversity in the world” (UNESCO n.d.). Its scientific credentials are exceptional with a list of marine creatures that includes 600 types of soft and hard corals, more than 100 species of jellyfish, 3000 varieties of molluscs, 500 species of worms, 1625 types of fish, 133 varieties of sharks and rays, and more than 30 species of whales and dolphins (Foxwell-Norton and Lester 2016). The Great Barrier Reef Marine Park covers 344,400 km² and

contains 3000 coral reefs, 600 continental islands, 300 coral cays and 150 inshore mangrove islands.

Culturally, the Reef is part of Australia's national identity, with Australians defining themselves as coastal dwellers "living on the edge" (Drew 1994). It is a site of historical and contemporary Indigenous cultural heritage, retaining significance to Australia's Aboriginal people, especially those 45 traditional owner groups whose traditional lands border the Reef (GBRMPA), and it is the location of a brutal colonial history, invasion and frontier encounters, also part of the Australian identity (McCalman 2013). The Reef supports numerous regional towns, communities and businesses reliant on tourism and fishing and thus the continued status of the Reef as a holiday destination. The impact of tourism-related activities, from outer reef snorkelling and diving visits to sunscreen use, is monitored for its potential threat to the Reef's health.

However, it is the impacts of pesticide and soil run off from coastal strip agriculture, coral bleaching, and changes to sea temperature and CO₂ levels associated with climate change that put the Reef at most risk. Its management authority, the Great Barrier Reef Marine Park Authority (GBRMPA), warns of the impact of extreme weather events. The Reef has long coped with cyclones and floods, but recent extreme weather events like those that occurred in 2010-11 have caused unusual levels of damage. Tropical cyclones can cause extensive damage to individual corals and to the structure of the Reef. According to the Authority, approximately 34 per cent of all coral mortality between 1995 and 2009 was caused by storm damage. Cyclones such as the Category 5 Yasi that hit in 2011 can have impacts that affect large areas for decades, if not centuries (GBRMPA n.d.). Flood waters running into the shallow reef lagoon can also form, according to the Authority, reduced-salinity plumes laden with nutrients, sediments and agricultural chemicals such as fertilizers and pesticides, which stress and kill some of the Reef's animals and plants, while encouraging productivity in others. Either way, the Reef's ecosystem is disrupted. At best, the Great Barrier Reef is now described by its management authority as an 'Icon under Pressure' (Lloyd 13 August 2014).

Various Australian governments' eagerness to 'cut green tape' came very close in 2015 to confirming a new status for the Reef with UNESCO's World Heritage Committee—'in danger'. Of particular concern was the proposal that coal from the mines in the Galilee Basin would be transported to massively expanded shipping facilities at Abbot Point, on the central Queensland coast, where large-scale dredging would allow ships transporting the coal to make their way through the Reef. How and to where the three million cubic metres of dredge spoil would be removed—the initial proposal to dispose of spoils within marine park boundaries was replaced by a proposal to dump on nearby wetlands valued by local indigenous communities—has caused continuing controversy. The new state government, while quickly reassuring investors of its commitment to the coal industry, has since proposed a second land-based site.

While this conflict over the Reef is less surprising when viewed within the context of Australia's 'extreme' environmental politics this century, outlined in Chapter Two, it also illustrates the complexity of interactions that occur within environmental politics and communications—interactions between industry and government, media and political sources, science and activism. These are the 'switching points' of Manuel Castells' still emergent 'network society' (2004, 2009), where connectivity and power flow and clash to produce real outcomes for landscapes and the people who inhabit them.

Attributing responsibility for the Reef

In this section, we examine mediated events that have occurred in relation to the Great Barrier Reef within the context of these transnational environmental, industrial and political pressures. Our focus is to identify and analyse discourses of responsibility; where and how they appear and, when possible, with what aims and to what effect. As we noted in Chapter One, recent empirical research and theorizing (see for example Olausson 2009; Robertson 2010; Jamieson 2010; Cerutti 2010; Szerszynski 2010) has identified the attribution of responsibility as a key moment within a public sphere's discursive struggle over environmental harm, and the negotiation and distribution of justice more generally (Sen 2009: 337). Here, the struggle to contain spectacle is keenly fought and visible, and it is therefore vital that these critical moments within

discourse are revealed. In attempting to do this, we apply two methods to consider media reporting of the issues facing the Great Barrier Reef—firstly, a qualitative analysis of media texts and their broader political contexts, outlined below, before applying a computer-assisted technique for text analysis. We end by highlighting our findings and with methodological reflections.

Qualitative Analysis of Responsibility Attribution

Our approach focusses on claims-makers, changing media practices and technologies, and decision-makers, analytically connecting media content with the social conditions and material culture of its production, use and flow (Appadurai 2008 [1990]) and identifying ‘modes of symbiosis’ (Morley 2009) between different media platforms. Following and analysing political messages and events as they move through media texts, phrases are identified in which ‘responsibility’ is attributed in relation to the Great Barrier Reef, alongside the political and media spheres in which the attribution is located. This analysis is cross-referenced and supplemented with interviews in Australia and Japan with environmental campaigners, government and industry representatives (including corporate and social responsibility officers, diplomats and corporate communications specialists), and journalists and other media producers.

Both the spectacular nature of the Great Barrier Reef and the stresses it is under frame media texts that attribute responsibility across various institutional, political and geographic arenas. Writing in August 2014 in the UK edition of the *Guardian* newspaper, for example, high-profile Australian scientist and environmental campaigner, Tim Flannery, attempts to assign rights and responsibility to distant publics:

If the Carmichael coal mine is a global story, and the Great Barrier Reef a global asset, then the issue should not be left to Australia alone to decide. The citizens of the world deserve a say on whether their children should have the opportunity to see the wonder that is the reef. Opportunities to do this abound. Petitioning national governments to put climate change on the agenda of the G20 summit, to be held in Australia in November this year, is one. Pushing governments to play a constructive role at the 2015 climate negotiations in

Paris is another, as is letting the Australian government know directly that everybody has a stake in the reef, and that it needs to act to secure its future. The Great Barrier Reef does not have to die in a greenhouse disaster like the one that devastated the world's oceans 55 million years ago. But if we don't act decisively, and soon, to stem our greenhouse gas emissions, it will.

(Flannery 2014)

Flannery draws attention to the global and transnational elements of the case, defines the means for influencing international decision-making bodies, and by invoking the concept of an 'everybody', 'citizens of the world' and a global 'we', suggests the existence of a legitimate and potentially efficacious transnational public sphere (Fraser 2014). He is also assigning responsibility to a global 'we': "if we don't act incisively, and soon...".

Greenpeace clearly spoke to the 'distant' when it warned that "any dumping of dredge spoil on the World Heritage-listed reef will be an 'international embarrassment' and akin to 'dumping rubbish in the Grand Canyon'" (Petersen 2 February 2014). It further invoked the spectacular when it produced an advertisement that accused the Australian Government of killing Nemo—in a blender no less. As reported by the *Daily Mail*:

The super-cuteness of Nemo, the beloved clownfish made famous in Pixar's delightful film *Finding Nemo*, is being used to highlight what Greenpeace says is a potential environmental disaster on Australia's Great Barrier Reef. Greenpeace Australia Pacific has released a controversial advertisement which features a clownfish stuck swimming in a blender as part of its campaign to stop what it claims is a 'monstrous new mine' in Queensland, which will require a shipping terminal in the World Heritage listed Great Barrier Reef. The 30 second video, which was uploaded on YouTube on Tuesday, has since gained more than 29,000 likes. (Lee 2014)

Such appeals manifest across a range of local, national and international forums. Legal and governance structures are key spheres for drawing attention to the spectacular while publicly attributing responsibility, particularly given the well-

established relationship between these institutional arenas and journalistic reporting practices. By January 2015, court cases against Adani and its Carmichael mine were underway in Australia. One was brought by the local Queensland Mackay Conservation Group, which claimed the impact of greenhouse gas emissions on the Reef had not adequately been ‘taken into account’ when the mine was approved (Chang 2015). In some reporting of this case, however, ‘consequence’ was expressed in terms of impact on the coal industry, and ‘responsibility’ placed on the conservation group for disrupting the industry and the federal government in approving the mine. A second case was brought by the Conservation Action Trust, an Indian environmental group, which was reported as being the first such challenge in Australia mounted by overseas activists. According to the *Guardian*:

Debi Goenka, an executive trustee of the CAT, said: ‘The coal from Carmichael, when burnt in India, threatens the health and livelihoods of poor, rural people in India. These people can’t afford the electricity that will be generated – all they’ll get will be damage to their health and the air, water, land and natural resource base on which their survival depends.’ (Milman 9 October 2014)

Adani Mining’s head Jeyakumar Janakaraj reportedly responded by claiming that activists were using lies in their anti-mining campaigns: “I don’t think they can sleep at night because they are using falsehoods” (McCarthy 2014). He drew on established corporate and social responsibility-type discourses of responsibility to restrict activist claims when he said: “We are doing what is right. We are responsible, we are changing the lives are millions” (McCarthy 2014).

The struggle over the spectacular shifted into the political arena in November 2014 when US President Barack Obama made an official visit to Australia. In a speech at the University of Queensland, Obama told the audience the “incredible natural glory of the Great Barrier Reef is threatened.” He located responsibility for the Reef with the nation state, and responsibility for climate change on nation states collectively. While calling for a ‘leapfrogging’ of coal in developing countries, he also specifically queried the management of the Reef and claimed the right of his daughters and their children to see the Reef in fifty years time. Australia’s mismanagement meant they

too were among the affected, he inferred. Both the Queensland and Federal governments responded angrily. Claiming there ‘was an issue’ with the President’s speech, the Australian foreign minister, Julie Bishop, said: “We are demonstrating world’s-best practice in working with the World Heritage Committee to ensure that the Great Barrier Reef is preserved for generations to come... I think President Obama might have overlooked that aspect of our commitment” (Shanahan 2014).

Secondary appeals to consumers to alter their buying habits provide another sphere for the struggle to contain the spectacular and responsibility. ‘Fight for the Reef’ is a campaign jointly established by World Wildlife Fund (WWF)-Australia and the Australian Marine Conservation Society (fightforthereef.org.au). In April 2014, it achieved substantial publicity by winning the support of iconic US-founded ice cream company Ben & Jerry’s, now owned by global retail giant Unilever. Under a campaign banner of ‘Reef Scoop Tour’, the company encouraged customers to ‘Scoop Ice Cream, Not the Reef’.

We'll be travelling across our fair land, scooping out free ice cream and raising awareness of how the Reef is at serious risk from intensive dredging, mega ports and shipping highways, and encouraging Australians to join us. (Ben and Jerry’s, n.d.; see also Unilever n.d.)

Like Tim Flannery, WWF-Australia’s Chief Executive Officer, Dermot O’Gorman, invoked the notion of global shared concerns and responsibility when he described Ben and Jerry’s involvement as reflecting the concern of people around the world about how the reef is being managed. Ben & Jerry’s’ tour is a timely reminder that the world expects the Queensland and Australian governments to lift their game’ (*Brisbane Times* 2014).

In response, the Queensland Government suggested Australians boycott Ben & Jerry’s ice cream and referred the company to the Australia Competition and Consumer Commission. As in earlier examples of government and corporate responses, the Government’s reaction prioritised notions of ‘truth’ and ‘fairness’ as more important manifestations of ‘responsible’ behaviour. This, for example, was the response from the Queensland environment minister:

Ben & Jerry's can campaign on whatever issue they like but as a company they have an obligation to tell Australians the whole truth and nothing but the truth... Australia has strict laws to protect consumers against misleading and deceptive behaviour. These mistruths could cost jobs and development in regional Queensland. It's irresponsible behaviour from a company that should know better (Vogler 2014).

Similarly, the Brisbane's *Courier Mail* stated:

Ben and Jerry's ice cream has been hauled over the coals by the Queensland Government for supporting WWF's 'propaganda' to save the Reef campaign. Environment Minister Andrew Powell wants Australians to boycott the American company, saying it has damaged the reputation of the Reef and jeopardised jobs and tourism dollars. 'Another company has signed up to the campaign of lies and deceit that's been propagated by WWF,' Mr Powell said. 'The only people taking a scoop out of the reef is Ben and Jerry's and Unilever. If you understand the facts, you'd want to be boycotting Ben and Jerry's'. (Agius 2014)

The irony of the government's suggestion of a boycott of Ben and Jerry's was not lost on Queensland researchers Kerrie Foxwell-Norton and Marcus Lane (2014), who pointed out that meanwhile the federal Australian government had proposed legislative change to Section 45DD of the Australian Consumer and Competition Act removing exemptions for environmental and consumer campaigns so activists could no longer implement secondary boycotts as a protest strategy. As Foxwell-Norton and Lane write: "Perhaps the Queensland Government missed the memo" (2014).

The principal site for the discursive battle over the Reef has been UNESCO's World Heritage Committee, and specifically meetings in Doha in June 2014 and Bonn in June 2015. While the Australian and Tasmanian governments 'accepted the umpire's decision' in relation to the 'humiliating' rejection by the World Heritage Committee of their attempt at Doha to delist 74,000 hectares of Tasmanian forests (ABC News 24 June 2014), it was reported that Australia's department of foreign affairs had

established a dedicated taskforce to ensure that the Reef was not listed as ‘in danger’ by the UN (Milman 12 December 2014) when it next met in Bonn. Officials and ministers were dispatched around the world to lobby key countries over the issue, and international journalists and key decision makers were invited to Australia to visit the Reef themselves. Australian ministers also raised the issue with member countries of UNESCO’s World Heritage Committee on an opportunistic basis (Milman 12 December 2014). For the *Australian* newspaper, lobbying of the World Heritage Committee indicated the existence of ‘deep international hostilities’ over protection of the Reef. Under the heading ‘Reef rift exposed as campaign goes global,’ it reported:

The federal government has banned dumping in Great Barrier Reef Marine Park waters and the Queensland government has promised to extend the ban to the remaining World Heritage boundaries that lie within state jurisdiction. The federal government is unlikely to be able to appease green groups, however. The government and resource groups say the true motive of the global campaign to protect the reef is to end coalmining, an issue that also lies at the heart of the UN’s response to climate change. Greenpeace listed three concerns with the plan considered a key document in the UNESCO deliberations: it says it still allows coalmining, is silent on climate change and fails to address cumulative effects on the reef. (Lloyd 23 March 2015)

Nevertheless, the attempts to avoid responsibility for the Reef’s deterioration appeared unlikely to succeed if these reported comments from a member of the Portuguese delegation can be taken as representative:

The major cause for the reef degradation is not only a consequence of extreme weather conditions and climate change as Australian Government documents seem to imply, but also due to human causes and interference... We are concerned that not only Canberra is handing over environmental approval powers to the Queensland State Government on a matter of such high national and international relevance, but also other measures that have been taken that can deteriorate the health of the reef even more. (ABC News 18 June 2014)

After the change of state government in Queensland in early 2015, it was reported that

‘tough new regulations’ to tackle the amount of pollution flowing onto the Great Barrier Reef would be considered, with the state’s first ever ‘reef minister’ vowing to strengthen protections to avoid the ecosystem being listed as ‘in danger’ by the UN (Milman 18 February 2015). Meanwhile, the new Government’s decision to again move the dredge spoils dumping site was described by journalists as a ‘symbolic change’ and an indication of continued support for the development of the massive coal deposit. Premier Anastacia Palaszczuk was reported as saying her government “sends a clear message: we can protect the Great Barrier Reef, and we can foster economic development and create jobs” (Lloyd 12 March 2015). The new government, however, was still attempting to shift responsibility, with journalists reporting that a government department was examining claims that Adani’s ‘chequered environmental and legal history’ was grounds to revoke its status as a ‘suitable operator’ for Australia’s largest coalmine. The department was reported to be considering an Environmental Justice Australia report that questioned how Adani Mining continued to pass its ‘character check’ in Queensland given the alleged role of related companies in “serious legal violations and extensive environmental harm in India” (Robertson 25 February 2015).

Semantic Analysis of Responsibility Attribution

In the following, we present and analyse the results of our application of automatic semantic analytical tools to media reporting of environmental issues facing the Great Barrier Reef. Semantic analysis is a particular type of natural language annotation—apart from part-of-speech tagging, syntactic parsing and other types of language-specific morphological analysis tools—which allows researchers to identify repetitions and associations within and across large sets of media texts. The key component of semantic analysis is a comprehensive semantic terminology containing a large variety of lexical groups, categories and classes—hierarchically structured and automatically mapped onto the raw media materials—to assist with textual and discourse analysis. Belonging to the family of natural language processing tools, semantic analysis has been widely adopted in the study of specialised genres and discourses such as product reviews and commercial promotion materials. While other natural language processing techniques can assist with the analysis of ‘objective information’ of texts like grammatical and syntactic structures, semantic analysis is considered useful in the extraction of patterns that underlie ‘subjective information’

such as attitudes and perspectives towards specific products, events, and social phenomena.

Given that the primary purpose of semantic analytical systems is to extract information from large-scale data bases regarding specific discourse features of environmental media and news reporting, they focus on general and abstract terms that reflect judgemental, evaluative and emotional language expressing. These include:

- Evaluation (good and bad, true and false, accuracy and appropriateness; authenticity)
- Importance (noticeability and markedness)
- States and processes (contentment; trepidation; apprehension and confidence)
- Personal traits (sensibleness and absurdity; strength and weakness)
- Relationship (obligation and necessity; competition and rivalry; power, authority and influence; permission and authorisation; help and hindrance)
- Psychological actions, states and processes (reasoning modes; belief and scepticism; knowledge, perception and retrospection; level of expectation; mental practices, procedures, resources and techniques; conceptual objects like ideas and concepts; level of interest, energy and boredom; desire and aspiration; effort and resolution; and intelligence and ability).

The semantic analysis tool we have used in this study of media reporting on the Great Barrier Reef and to ask how responsibility is attributed within these texts was developed by the Centre for Computer Corpus Research on Language of the University of Lancaster, UK. It is known as the UCREL Semantic Analysis System (USAS) (<http://ucrel.lancs.ac.uk/usas/>). The development of the version of the Lancaster semantic analysis tool deployed here relies on McArthur's *Longman Lexicon of Contemporary English* (McArthur 1992). USAS has a multi-tier structure which covers twenty-one major discourse fields and domains labelled alphabetically. Within each field, subdivisions are provided based on the semantic properties of terms and expressions classified in each major domain.

In corpus discourse analysis, semantic properties refer to the inherent semantic correlation between different words and expressions. For example, the current version of the Lancaster semantic annotator highlights fifteen types of words and expressions which can be grouped into different categories of specific discourse functions. Words such as ‘appropriate, disagree, inappropriate, suit, relevant, unsuitable’ which indicate the (lack of) appropriateness, suitability and aptness are marked by the code A1.2 The identification of such words can be done by retrieving such words from the database automatically. Such a ‘search and retrieve’ process is known as corpus semantic analysis.

<TABLE 3.1 HERE>

Automatic corpus annotation tools like USAS claim to be instrumental in processing quantitative databases to extract useful textual information, and suggest that the statistical processing and modelling of media data are a prerequisite to conceptualising and developing theoretical constructs for empirical media studies. We have two aims in using this tool: one, to provide insights into our specific texts, especially the framing and editorial strategies devised for environmental media reporting purposes; and two, to consider the methodological continuity and disjuncture we identify between our two approaches.

As we argued in the book’s opening chapter, the mining and extraction of subjective textual information—that is, language that is judgemental, evaluative and emotional—is useful in assessing the relationship between news media and public opinion and mobilisation. News language, apart from witnessing and reporting events of perceived social importance, is charged with ideologies, political interests, cultural predilections, personal motivations, values and attitudes (Fairclough 2013). It assumes the social role of informing and fostering a sense of responsibility among publics on social issues like climate change and environmental protection (Dryzek 2013). An effective way to fulfil this role is to develop an affective news language style with the potential to promote attitude change and engage the general public in taking action to protect the natural environment. This specific case study on Australia

explores potential advantages furnished by our methodological approach, with a view to developing useful empirical lines of research for environmental media reporting in distinct cultural systems.

To match the qualitative analysis based on recent environmental news reporting on the Great Barrier Reef, the news database compiled contains articles published in Australia between 2011 and 2015 which share the ‘Great Barrier Reef’ and ‘pollution’ as the two key words in the textual content. It was discovered using the Environmental Health News database, a United States-based foundation- and reader-funded news service that both produces news and distributes news published in searchable data bases from around the world (environmentalhealthnews.org). While not claiming total coverage nor to be free of editorial selection processes, this database was chosen for its extensive coverage of international environmental issues and comprehensive distribution network.

Following our keyword searches, the total size of our database was slightly over 500,000 words. The distribution of the news sources studied is shown in Figure 3.1, and include APN News Service, Australia ABC News, Australian Associated Press, *Australian Financial Review*, *Brisbane Courier-Mail*, *Brisbane Times*, *Business Spectator*, *Gladstone Observer*, *Melbourne Age*, *National Times*, Science Network Western Australia, Sydney’s *Daily Telegraph*, *Sydney Morning Herald*, *The Conversation* and *West Australian*.

<FIGURE 3.1 HERE>

As the size of data sets grows—an increasingly salient trend in many disciplines, including media studies—the computer-assisted approach to data analysis is deemed to play an instrumental role in advancing our understanding of new social and cultural events and phenomena in the media. The use of USAS identified a set of important text-internal features of the Australian media reporting on the conservation and debates over industrial development in areas close to the Reef since 2010. These features, underscored by a number of specific word groups, point to three key

dimensions of the reporting on the Reef: (1) Membership, (2) Interest and Involvement and (3) Cognition.

<FIGURE 3.2 HERE>

From these figures we are able to identify and extract some underlying patterns in the Australian media reporting on the Reef at a cross-state level. A number of interesting textual patterns and features of the Australian media were examined. Overall, there are three peaks in Figure 3.2 suggesting the focus of the reporting on the Great Barrier Reef in Australia over the five-year period under investigation:

High-Frequency Words (Membership and Interest and Involvement)

- **X7** (Levels of desire and aspiration (words such as ‘scheduled, target, ambitious, willingness, plan’)
- **S7.1** (Influence of administration/government (represented by words such as ‘controlling, leading, convene’ etc.)
- **S8** (Levels of help/hindrance (words such as ‘barrier, obstacle, opposition, cooperation, support, assist’)

The semantic category Membership includes five interrelated sub-lexical classes: (1) level of association and affiliation; (2) level of obligation or necessity; (3) influence of administration or government; (4) level of permission, consent and authorisation; and (5) level of help or hindrance to specific plans and/or actions.

The semantic category Interest and Involvement is divided into six pertinent lexical classes: (1) levels of attention; (2) levels of interest; (3) (lack of) decision; (4) levels of desire and aspiration; (5) efforts and resolution and lastly (6) judgement over the success or failure of specific actions.

The highlight of word groups from **Membership** and **Interest and Involvement** indicate that the Australian reporting on the environmental status of the Great Barrier Reef has its unique focus and features, i.e. a clear and strong emphasis on multi-sectoral interaction, effective partnership building and adequate policy intervention to tackle social and research problems at a large scale such as the

environmental impact of development on the Great Barrier Reef.

With regards to the prevalence of words from the semantic category of ***Interest and Involvement***, i.e. ***X7*** (desire and aspiration), the corpus finding seems to show strong pressure within media discourse urging action: our close reading suggests that it is government and industrial sectors being urged to make practical and well-targeted plans and take concrete actions to combat existing and any potential risks to the reefs. For example:

The Greens said the breakdown, that could cause ‘significant environmental damage,’ was another reason for the federal government to press pause ***on plans to*** (X7) increase shipping massively for fossil fuel exports throughout the Great Barrier Reef. (*Sydney Morning Herald* 20 May 2012)

The stoush appears to raise doubts about ***planned reforms*** (X7) aimed at streamlining environmental approval of projects by shifting more responsibility to state governments. (*National Times* 6 June 2012)

In the semantic analysis of the data set, the annotation category ***Membership*** is used to measure the levels and modes of collaboration between actors or stakeholders involved in the events or activities reported by the media. Under the ***Membership*** category, there are five sub-categories of words which depict various aspects of partnership building and interaction among different societal sectors:

- Firstly, S5: the sub-category of words indicating varying levels of association and affiliation. Typical words and expressions under the sub-category of association are ‘regroup, joint, bilateral, bond, community, together’.
- Secondly, S6: the sub-category of words describing the levels of obligation and necessity in tackling industrial pollution or other kinds of risks and threats posed by development activities near the Reef. Typical words and expressions under the subcategory of responsibility are ‘essential, mandatory, commitment, should, responsibilities and binding.’

- Thirdly, S7.1: the sub-category of words indicating the levels of power, authority and influence of administration and governments in tackling perceived risks to the Reef. Typical words and expression under this category are ‘controlling, leading, convene and powerhouse.’
- Another sub-annotation category which sustains the corpus analysis membership building is S7.4, which illustrates levels of permission, consent and authorisation of relevant industrial development proposals, activities and policies. These include words such as ‘ban, allow, approve, disapprove, ratify, permit,’ etc.
- Lastly, words such as ‘obstacle, opposition, cooperation, promote, support, back, assist’ are collectively grouped under the sub-category of S8. This is associated with the varying levels of help, support or hindrance from different societal sectors to the preservation of natural heritage sites such as the GBR.

A close observation of the textual patterns in the annotated corpus data points shed light on some interesting features of the reporting of the conservation of the Reef in Australian newspapers. There are three coding categories which are high-frequency word groups in the Reef reporting: S5, S7.1 and S8. Within the semantic analysis category of *Membership*, High-frequency words indicate prioritised aspects of partnership or membership development around tackling environmental threats to the Reef. The co-occurrence of high-frequency word groups of *S7.1* and *S8* seems to suggest that effective policy making and political intervention has provided the focus of much of the media debate on responsibility attribution around perceived risks and harms and actual damages caused to the Great Barrier Reef. For example:

.... there are three key factors that will determine if reefs can adapt: reducing of local stressors such as over-fishing, pollution and habitat destruction; expanding current management (S7.1) strategies such as marine protection zones, ecosystem-based management (S7.1) and water quality issues; and slowing climate change by aggressive reduction of CO2 emissions. (ABC News 22 July 2011)

That's why Labor wants to convene (S7.1) a high-level strategic group, including the primary industries community, to see the best way to reduce pollution run-off into the reef. We need our agricultural industry. Labor is proud to support our agricultural industry, but we also need to save the Great Barrier Reef. (ABC News January 14, 2015)

The World Wildlife Fund (WWF) says it is likely the World Heritage Committee will give Australia another year to strengthen its policies to protect (S8) the Great Barrier Reef off Queensland. (ABC, 17 Jun 2013)

The state government is to fund more than 30 research and support (S8) projects to help farmers from Mackay to Cooktown cut chemical run-off and soil erosion flowing into the ocean and killing coral. (EcoNews, November 21, 2011)

These frequency-based textual features suggest that the issue of the Reef is embedded in an especially salient political discourse, highlighting the importance of the influence exerted by the government and authorities (S7.1) in fostering social collaboration and joint efforts (S5) to effectively tackle the hindrance and difficulties (S8) faced by the conservation and sustainable development and use of the Reef.

Lastly, as the corpus analysis shows, a unique feature of the Australian media reporting on the Great Barrier Reef is that the overall emphasis across this specific time period is given to words (*Cognition X2.4*) indicating the importance attached to investigation and examination (represented by words such as 'monitor', 'research') as opposed to words indicating levels of belief and scepticism or understanding and comprehension. A useful exploratory tool is the perspective of Cognition (a specific category of the semantic analysis) that is further divided into dimensions of belief and scepticism, understanding and comprehension; experience and awareness; expectation and lastly, (lack of) the use of scientific and investigative methods. Here are some examples:

...In a review article published in today's Science, Pandolfi (Professor John Pandolfi, of the University of Queensland's School of Biological Sciences) says latest research shows climate change remains the greatest threat to the world's reefs. (ABC News 22 July 2011)

...Discussing the health of the reef, the Environment Minister Tony Burke, yesterday said the number of ships working in the Great Barrier Reef will be closely monitored to ensure the health of the marine eco-system. (The Sydney Morning Herald, by Nicky Phillips, March 7 2012)

The research findings give hope that, even though warming of the oceans is already occurring, coral that has previously withstood anomalously warm water events may do so again. (10 April 2012 in ECOS)

Conclusion

There are two main methodological considerations that provide the basis of the use of semantic analysis in our study of the Australian media reporting of the ecological impact of environmental changes associated with economic development and policy making. Firstly, as different from population health (see chapters on Japan and China), the impact of pollution on natural resources such as the Great Barrier Reef cannot be easily established or measured by mortality and morbidity. The subject of our case study represents a complex and politically controversial topic which provides the focus of heated and evolving debates in Australia and internationally. The nature of the subject we investigate, the Great Barrier Reef at risk and the roles and responsibilities of global industries, NGOs and decision-making bodies, thus requires an exploratory and descriptive approach to the analysis of Australian environmental media discourse. With its extensive (in terms of degree, level and scale) lexical categories, semantic analysis has proved a useful tool, which enables us to systematically explore the diversity and subtlety of the reporting and framing of the Great Barrier Reef under the continuing global pressure of coal development.

Secondly, as discussed earlier in this chapter, the looming environmental crisis which threatens the Great Barrier Reef points to the lack of effective and consistent policy

making over the issue. Multi-sector cooperation and partnership development on environment protection provides a much-needed yet largely under-explored social and research issue in Australia. Insights into the relation between multi-sectoral collaboration and policy making help fill a critical gap in the current study of environmental issues. This consideration has motivated us to use semantic analysis in our case study to explore the level of alignment or divergence among societal sectors, stakeholders and interest groups in Australia with regard to the perception and attribution of responsibilities associated with the increasing pollution and irreversible harms caused to the Great Barrier Reef. This research aim was achieved in the corpus analysis by examining the patterns of the distribution of words belonging to two semantic analysis categories, i.e. *Membership* and *Interest and Involvement*.

On 1 July 2015, UNESCO's World Heritage Committee ruled against listing the Great Barrier Reef as 'in danger.' The decision followed lobbying and last-minute actions and promises made by the Australian and Queensland governments to ban dredging spoil dumping and cut pollution runoff by 80 per cent within a decade. Australia's environment minister was quoted as saying that the country had 'clearly heard the concerns of the world heritage committee' and implemented all its recommendations (Robertson 2 July 2015). The *Guardian* reported:

The environment minister, who led a vigorous diplomatic lobbying effort to avoid an adverse listing following concerns raised by UNESCO last year, said some green groups had campaigned with "spectacular lack of success" for the reef to be listed in danger.

Greenpeace told delegates in Bonn that Australia's continued support for new coal mines in Queensland meant that there would be "more dredging, thousands more coal ships through the reef and a dangerous amount of new coal being burnt."

Conservation groups have attempted to bring international attention to the difficulties faced by the reef. Greenpeace funded advertisements on London's Underground network telling commuters that this is their "last chance to visit" the reef. (Robertson 2 July 2015)

According to news reports, the World Heritage Committee's decision was strongly

influenced by very recent actions to curb the number of ports and to ban marine dumping of dredge spoil, but ‘the elephant in the room’ was still the Galilee coal basin, and the inevitable damage it would cause to the world heritage area. Australia’s plan to protect the Reef was also largely silent on climate change, “even though the Commonwealth’s own Great Barrier Reef report card has identified climate change as the single largest threat to the reef” (Milman 2 July 2015).

Here, we see many of the important themes drawn out by our analyses at play. Both the qualitative and quantitative analysis revealed critical words in the news discourse especially those charged with strong semantic meanings in establishing the patterns and modes of responsibility attribution around the environmental degradation of the Great Barrier Reef over recent years. For example, words exuded in the qualitative analysis include ‘symbolic change,’ ‘suitable operator,’ ‘serious violations,’ ‘extensive harm,’ ‘deep international hostilities,’ ‘in danger,’ ‘humiliating rejection,’ ‘truth,’ ‘fairness,’ ‘responsible behaviour,’ ‘pretty healthy,’ ‘overlooked our commitment,’ ‘consequence,’ ‘monstrous new mine,’ and ‘international embarrassment.’ The quantitative analysis that retrieved key words or, in statistical terms, high-frequency word groups, complemented the news discourse analysis. For instance, both approaches found that the scale of the impact of the changing environment including development and climate change on the Great Barrier Reef requires systematic research and effective policy and management intervention strategies. This is reflected in the high-frequency words in the news corpus indicating influence of administration/government (S7.1); levels of help and hindrance (S8), and Investigation and Examination (X2.4). This is supported by the qualitative analysis of recent news articles extracted from the database. The implications of these findings will be discussed in the book’s concluding chapter.

In a wider methodological context, there is systematic alignment between the corpus approach we used in this chapter with the quantitative corpus analysis that will be introduced in the two chapters on Japan. That is, the annotation category of *Membership* in USAS is methodologically connected with the coding schemes developed for the study of Japanese media reporting on air pollution and environmental innovation. For example, the five sub-categories under *Membership* represent five important types of actions taken by multiple societal sectors,

stakeholders and groups of interest in the development of the Australian discourse around the protection and conservation of emblematic national resources.

Our analysis of Australian environmental reporting has focused on the increasingly pressing problem of the deterioration and conservation of the Great Barrier Reef and its relationship to the country's historically embedded and still resonant connection to coal and reliance on global trade and tourism. In line with one of the main aims of this book, the case study is not meant to be an exhaustive investigation of news media reporting of threats to the Great Barrier Reef, but rather a contribution to knowledge and debate, and to methodological advances in empirical environmental media analysis. It demonstrates and illuminates how the deployment of automatic and exploratory data coding schemes such as USAS can assist with the extraction of useful patterns in quantitative media data sets, helping to further reveal the discourses identified qualitatively. It also shows us that the task we have set ourselves here is a potentially fruitful one; to access and distil large data sets and historically rich contexts in such a way that we and policy makers can recognise and expose the many subtle ways responsibility and blame can be distributed across complex communications, trade and political networks. We will elaborate on this further in the book's conclusion.

References

- ABC News (24 June 2014) 'UNESCO rejects Coalition's bid to delist Tasmanian World Heritage forest'. Accessed 14 August 2014 from <http://www.abc.net.au/news/2014-06-24/unesco-rejects-bid-to-delist-world-heritage-forest/5538946>
- ABC News (18 June 2014) 'UNESCO ruling: Decision on whether Great Barrier Reef as "in danger" deferred for a year'. Accessed 23 March 2015 from <http://www.abc.net.au/news/2014-06-18/unesco-defers-decision-on-great-barrier-reef-danger-status/5530828>
- Adani (2014) 'Carmichael Coal Mine and Rail Project'. Accessed 14 August 2015 from <http://www.adanimining.com/Australia-Carmichael-coal>,

- Adani (2015) 'Land Court of Queensland recommends approval of Adani's Carmichael mine'. Media Release 15 December. Accessed 9 February 2016 from <http://www.adaniaustralia.com/media/media-releases>
- Agius, Kym (28 April 2014) 'Queensland government urges boycott of Ben and Jerry's ice cream over WWF propaganda'. *The Courier Mail*. Accessed 23 March 2015 from <http://www.couriermail.com.au/travel/australia/queensland-government-urges-boycott-of-ben-jerrys-ice-cream-over-wwf-propaganda-on-great-barrier-reef/story-fnjv0r9-1226898567920>
- Appadurai, Arjun (2008) [1990] 'Disjuncture and Difference in the Global Cultural Economy', pp. 47-65 in J.X. Inda & R. Rosaldo (eds) *The Anthropology of Globalization: A Reader*, 2nd edition. Oxford: Blackwell.
- Asafu-Adjaye, John (2009) 'Coal and the Australian Economy'. pp. 46-57 in Knights, Peter and Hood, Michael (eds) *Coal and the Commonwealth: The Greatness of an Australian Resource*. Accessed 26 February 2016 from http://www.crcmining.com.au/wp-content/uploads/2013/05/Coal-and-the-Commonwealth_web.pdf,
- Australian Bureau of Statistics (2012) 'History of Coal Mining'. *Year Book Australia*. Accessed 26 February 2016 from <http://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/1301.0Feature%20Article1271910?opendocument&tabname=Summary&prodno=1301.0&issue=1910&num=&view=>,
- Australian Government (n.d.) 'National Heritage Places – Coal Mines Historic Site'. Available online at: <http://www.environment.gov.au/heritage/places/national/coal-mines>, Accessed 26 February 2016.
- Ben and Jerry's (n.d.). Scoop Ice Cream, Not the Reef. Accessed 14 August 2014 from <http://www.benandjerry.com.au/flavours/reef-scoop-tour>
- Brisbane Times (14 August 2014) 'Ben and Jerry's ice cream hurting reef: Qld Gov'. Accessed 14 August 2014 from <http://www.brisbanetimes.com.au/queensland/ben-and-jerrys-ice-cream-hurting-reef-qld-govt-20140429-37eg7.html#ixzz39ao4XvRH>
- Castells, Manuel (2004) *The Power of Identity*. 2nd ed. Oxford: Blackwell Publishers.

- Castells, Manuel (2009) *Communication Power*. Oxford: Oxford University Press.
- Cerutti, Furio (2010) 'Defining Risk , Motivating Responsibility and Rethinking Global Warming'. *Science and Engineering Ethics*, 16, 489-499.
- Chang, Charis (16 January 2015). 'The court case that could choke mining in Australia'. *News.com.au* Accessed 23 March 2015 from <http://www.news.com.au/technology/environment/the-court-case-that-could-choke-mining-in-australia/story-fnjwvztl-1227186867553>
- Colley, Peter (1997) 'Investment practices in Australian coal: The practice and profit of quasi-integration in the Australia-Japan coal trade'. *Energy Policy*, 25 (12) 1013-1025.
- Cox, Lisa and O'Brien, Natalie (2 April 2015). 'Coal the biggest contributor to toxic air pollution study'. *Sydney Morning Herald*. Accessed 26 February 2016 from <http://www.smh.com.au/federal-politics/political-news/coal-the-biggest-contributor-to-toxic-air-pollution-study-20150401-1mcwbt.html#ixzz40JFe1AGo>.
- Deloitte Access Economics (2013) *Economic contribution of the Great Barrier Reef*. Townsville: Great Barrier Reef Marine Park Authority.
- Diamond, Marion (2009) 'Coal in Australian History'. pp. 23-45 in Knights, Peter and Hood, Michael (eds.) *Coal and the Commonwealth: The Greatness of an Australian Resource*. Accessed 26 February 2016 from http://www.crcmining.com.au/wp-content/uploads/2013/05/Coal-and-the-Commonwealth_web.pdf.
- Drew, Philip (1994) *The Coast Dwellers: Australians living on the Edge*. Victoria: Penguin.
- Dryzek, John S. (2013) *The Politics of the Earth: Environmental Discourses*. 3rd Edition. Oxford: Oxford University Press.
- Fairclough, Norman (2013) *Critical discourse analysis: The critical study of language*. 2nd edition, Routledge, Abingdon, 608pp.
- Flannery, Tim (1 August 2014). The Great Barrier Reef and the Coal Mine that Could Kill It. *The Guardian*. Accessed 8 August 2014 from <http://www.theguardian.com/environment/2014/aug/01/-sp-great-barrier-reef-and-coal-mine-could-kill-it>
- Foxwell-Norton, Kerrie & Marcus Lane (2014) 'Ben and Jerry's reef campaign shows that green groups are vital for democracy'. *The Conversation* 6 May. Accessed

- 14 August 2014 from <http://theconversation.com/ben-and-jerrys-reef-campaign-shows-that-green-groups-are-vital-for-democracy-26310>
- Foxwell-Norton, Kerrie and Libby Lester (In press) 'Saving the Great Barrier Reef from Disaster: Media then and now'. *Media, Culture and Society*.
- Fraser, Nancy (2014) *Transnationalizing the Public Sphere*. Cambridge: Polity.
- Great Barrier Reef Marine Park Authority (GBRMPA) (n.d.) 'Impact of extreme weather on coral reefs'. Accessed 23 March 2015 from <http://www.gbrmpa.gov.au/managing-the-reef/threats-to-the-reef/extreme-weather/ecosystem-impacts/impact-on-coral-reefs>
- Grigg, Angus (2015) 'China's "war on pollution" will hit coal hard'. *Financial Review*, 25 September 2015. Accessed 26 February 2016 from <http://www.afr.com/news/policy/climate/chinas-war-on-pollution-will-hit-coal-hard-20150925-gjv1k1#ixzz40JNdDTKB>
- Hood, Michael (2009) 'Introduction'. Pp. 8-22 in Knights, Peter and Hood, Michael (eds.) *Coal and the Commonwealth: The Greatness of an Australian Resource*. Accessed 26 February 2016 from http://www.crcmining.com.au/wp-content/uploads/2013/05/Coal-and-the-Commonwealth_web.pdf
- International Energy Agency (2014) *World Energy Outlook 2014*. Accessed 26 February 2016 from <http://www.iea.org/newsroomandevents/pressreleases/2014/november/signs-of-stress-must-not-be-ignored-iea-warns-in-its-new-world-energy-outlook.html>
- International Energy Agency (2015) *Coal: Medium-Term Market Report 2015*. Accessed on 26 February 2016 from <http://www.iea.org/Textbase/npsum/MTCMR2015SUM.pdf>
- Jamieson, Dale (2010) 'Climate Change, Responsibility and Justice'. *Science and Engineering Ethics*, 16, 431-445.
- Lee, Sally (24 July 2014) 'They killed Nemo! New Greenpeace ad shows world's most beloved fish trapped in a BLENDER in grim environmental protest'. *Daily Mail*. Accessed 23 March 2015 <http://www.dailymail.co.uk/news/article-2703691/New-Greenpeace-ad-shows-Nemo-trapped-blender-protest.html>
- Lloyd, Graham (13 August 2014) 'Outlook for Reef Getting worse. *The Australian*. Accessed 8 August 2014 from <http://www.theaustralian.com.au/national->

- affairs/climate/great-barrier-reef-outlook-getting-worse/story-e6frg6xf-1227022279428?nk=0af3f2e1626417b4037c07c802bdd1d9
- Lloyd, Graham (23 March 2015) 'World Heritage Commission asked to Declare Reef in Danger'. *The Australian*. Accessed 23 March 2015 from <http://www.theaustralian.com.au/national-affairs/climate/world-heritage-commission-asked-to-declare-reef-in-danger/story-e6frg6xf-1227273641263>
- Lloyd, Graham (12 March 2015) Palaszcuk Government shows its faith in coal. *The Australian*. Accessed 23 March 2015 from <http://www.theaustralian.com.au/national-affairs/state-politics/palaszcuk-government-shows-its-faith-in-coal/story-e6frgczx-1227259092309?sv=8c1cd9273d9f08324fd3d7ed8881df1e>
- McCalman Iain (2013) *The Reef: A Passionate History from Cook to Climate Change*. Australia: Viking/Penguin Books.
- McCarthy, John (28 November 2014) 'Premier Campbell Newman goes on resources offensive, hitting back at criticism from broadcaster Alan Jones and US president Barack Obama'. *The Courier Mail*. Accessed 23 March 2015 from <http://www.couriermail.com.au/business/premier-campbell-newman-goes-on-resources-offensive-hitting-back-at-criticism-from-broadcaster-alan-jones-and-us-president-barack-obama/story-fnihsps3-1227138847545>
- Milman, Oliver (18 February 2015) Great Barrier Reef polluters face tougher action under Queensland's new government. *The Guardian*. Accessed 23 March 2015 from <http://www.theguardian.com/environment/2015/feb/18/great-barrier-reef-polluters-face-tougher-action-under-queenslands-new-government>
- Milman, Oliver (2 July 2015) 'Great Barrier Reef: Australia says Unesco decisions shows it is a 'world leader''. *The Guardian*. Accessed 4 March 2016 from <http://www.theguardian.com/environment/2015/jul/02/great-barrier-reef-australia-says-unesco-decision-shows-it-is-a-world-leader>
- Milman, Oliver (9 October 2014) 'Carmichael mine: Indian conservation group joins legal battle with Adani.' *The Guardian*. Accessed 23 March 2015 from <http://www.theguardian.com/environment/2014/oct/09/carmichael-mine-indian-conservation-group-joins-legal-battle-with-adani>
- Milman, Oliver (12 December 2014) 'Great Barrier Reef: Australia sends diplomats out to defend its actions. *The Guardian*. Accessed 23 March 2015 from <http://www.theguardian.com/environment/2014/dec/11/great-barrier-reef->

- australia-sends-diplomats-defend-actions-un-in-danger-list
- Minerals Council of Australia (n.d) 'Characteristics of the Australian Coal Industry'. Accessed 26 February 2016 from http://www.minerals.org.au/resources/coal/characteristics_of_the_australian_coal_industry
- Minerals Council of Australia (2015) 'Coal: Hard Facts'. 2nd Edition. Accessed 26 February 2016 from http://www.minerals.org.au/file_upload/files/publications/Coal_Hard_Facts_2nd_Edition_FINAL.pdf
- Morley, David (2009) 'For a Materialistic, Non-Media-Centric Media Studies', *Television & New Media* 10 (1): 114-16.
- Olausson, Ulrika (2009) 'Global warming-global responsibility: Media frames of collection action and scientific certainty'. *Public Understanding of Science*, 18: 421-436.
- Parliament of Australia (2010) 'How much Australia emits'. Accessed 26 February 2016 from http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/ClimateChange/whyClimate/human/howMuch
- Petersen, Freya (2 February 2014) 'Great Barrier Reef Marine Park Authority approves plan to dump Abbot Point spoil'. *ABC News*. Accessed 15 July 2016 from <http://www.abc.net.au/news/2014-01-31/abbot-point-spoil-dredging-approved/5227774>
- Quince, Annabelle (29 September 2015) 'What future for coal, a crucial part of Australian history?' *ABC Rearvision*. Accessed 26 February 2016 from <http://www.abc.net.au/radionational/programs/rearvision/what-future-for-coal-a-crucial-part-of-australian-history/6810886>
- Robertson, Alexa (2010) *Mediated cosmopolitanism: The world of television news*. Polity: Cambridge.
- Robertson, Joshua (25 February 2015) Adani's fitness to run Queensland mine examined over environmental concerns. *The Guardian*. Accessed 23 March 2015 from <http://www.theguardian.com/australia-news/2015/feb/25/adanis-fitness-to-run-queensland-mine-examined-over-environmental-concerns>
- Robertson, Joshua (2 July 2015) 'Unesco spares Great Barrier Reef "in danger" listing

- but issues warning'. *The Guardian*. Accessed 4 March 2016 from <http://www.theguardian.com/environment/2015/jul/01/great-barrier-reef-spared-unesco-in-danger-listing-un>
- Sen, Amartya (2009) *The Idea of Justice*. Harvard University Press.
- Shanahan, Dennis (21 November 2014) 'Julie Bishop "understands" fury at Barack Obama climate swipe'. *The Australian*. Accessed 23 March 2015 from <http://www.theaustralian.com.au/national-affairs/climate/julie-bishop-understands-fury-at-barack-obama-climate-swipe/story-e6frg6xf-1227130123949>
- Slezak, Michael (26 February 2016) 'Australia's biggest banks pump billions into fossil fuels despite climate pledges'. *The Guardian*. Accessed 26 February 2016 from <http://www.theguardian.com/environment/2016/feb/26/australias-biggest-banks-pump-billions-into-fossil-fuels-despite-climate-pledges>
- Szerszynski, Bronislaw (2010) 'Reading and Writing the Weather: Climate Technics and the Moment of Responsibility'. *Theory, Culture & Society*, 27(2-3): 9-30.
- Taylor, Lenore (12 November 2015) 'Coal from Carmichael mine "will create more annual emissions than New York"'. *The Guardian*. Accessed 26 February 2016 from <http://www.theguardian.com/environment/2015/nov/12/coal-from-carmichael-mine-will-create-more-annual-emissions-than-new-york>
- Unilever (n.d) 'Ben and Jerry's Joins Fight for the Reef'. Accessed 14 August 2014 from <http://www.unilever.com/brands-in-action/detail/ben-and-jerrys-joins-the-Fight-for-the-Reef/389282/>
- UNESCO (n.d.) Great Barrier Reef. Accessed 8 August 2014 from <http://whc.unesco.org/en/list/154>
- Union of Concerned Scientists (n.d.) 'Coal power: air pollution'. Accessed 26 February 2016 from http://www.ucsusa.org/clean_energy/coalvswind/c02c.html#.Vs_c5zYwj0c
- Validakis, Vicky (28 July 2015) 'New 6.7 billion coal mine proposed for the Galilee Basin'. *Australian Mining*. Accessed 26 February 2016 from [http://www.australianmining.com.au/news/new-\\$6-7-billion-coal-mine-proposed-for-the-galilee](http://www.australianmining.com.au/news/new-$6-7-billion-coal-mine-proposed-for-the-galilee)
- Vogler, Sarah (1 May 2014). LNP refers ice cream company Ben and Jerry's to ACCC over Barrier Reef campaign. *Courier Mail*. Accessed 14 August 2014 from <http://www.couriermail.com.au/business/lnp-refers-ice-cream-company->

ben-and-jerrys-to-accuse-over-barrier-reef-campaign/story-fnihsps3-1226901781884?nk=1e25e3f6f89d4ceb1647c2366385b9af

1. 'Rate of change key to reef survival', in ABC by Dani Cooper Friday, 22 July 2011
<http://www.abc.net.au/science/articles/2011/07/22/3273983.htm?site=science44&topic=latest>
2. QLD Labor makes election promise to slash pollution in the Barrier Reef, in ABC by Stephanie Smail, January 14, 2015
<http://www.abc.net.au/pm/content/2015/s4162324.htm>
3. More time tipped for Great Barrier Reef protection policies, WWF says, in ABC by Natalie Poyhonen, David Chen and Kirsty Nancarrow, 17 Jun 2013
<http://www.abc.net.au/news/2013-06-17/more-time-tipped-for-barrier-reef-protection-policies/4757720>
4. Bid to slash toxic run-off victory for Great Barrier Reef, in EcoNewsby David Twomey, November 21, 2011
<http://econews.com.au/9265/bid-to-slash-toxic-run-off-victory-for-great-barrier-reef/>
5. Great Barrier Reef is at a crossroads, says UN mission, in The Sydney Morning Herald, by Nicky Phillips, March 7 2012
<http://www.smh.com.au/environment/conservation/great-barrier-reef-is-at-a-crossroads-says-un-mission-20120306-1uit8.html>
6. Could corals survive a warmer, more acidic ocean? 10 April 2012 in ECOS
<http://www.ecomagazine.com/print/EC12250.htm>