GREAT AUSTRALIAN BIGHT RESEARCH PROGRAM

RESEARCH REPORT SERIES

Theme 6: Socio-economic analysis

THEME REPORT

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GABRP Research Report Series Number 36

October 2017

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Pascoe, S., Beer, A., Thredgold, C., Young, M. and Whetton, S. (2017). Theme 6: Socio-economic analysis. Theme Report. Great Australian Bight Research Program, GABRP Research Report Series Number 36, 24pp.

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GREAT AUSTRALIAN BIGHT RESEARCH PROGRAM

The Great Australian Bight Research Program is a collaboration between BP, CSIRO, the South Australian Research and Development Institute (SARDI, the University of Adelaide, and Flinders University. The Program aims to provide a whole-of-system understanding of the environmental, economic and social values of the region; providing an information source for all to use.

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ACKNOWLEDGEMENTS

This theme was funded by the Great Australian Bight Research Program, a collaboration between BP, CSIRO, SARDI, the University of Adelaide and Flinders University. The Program aims to provide a whole-of-system understanding of the environmental, economic and social values of the region; providing an information source for all to use. The authors would like to thank Gavin Begg and Ben Baghurst, (SARDI Aquatic Sciences); Rod Lukatelich (BP) and David Smith (CSIRO) for their useful comments on earlier versions of the report.

1. EXECUTIVE SUMMARY

The development of an oil industry in the Great Australian Bight (GAB) provides a number of opportunities as well as challenges. Potentially, the development may affect local communities, regional economies and the environment. To identify any changes from such a development, a record of baseline conditions is required. While such a baseline can be derived retrospectively, this may require disentangling the effects of other influences on social and economic developments in the region. Developing such a baseline before the development takes place, therefore, enables changes due to the development to be better understood, factoring in changes due to other external drivers also.

The aim of this theme was to develop a comprehensive baseline for the social and economic environment for the region most likely to be impacted by the development of an oil industry in the GAB. These studies focused on the Eyre Peninsula and the West Coast regions as this was the area most likely to be impacted. A further baseline study of fisheries and aquaculture across the GAB as a whole was also undertaken, as there was concern that the fishing industry could be adversely affected in the unlikely event of environmental damage caused by the development.

The social baseline study identified that the region is characterised by a small and sparsely distributed population, highly dependent on primary industries (agriculture, fishing/aquaculture and mining) for the most part. Opportunities outside these sectors are limited, and there is general net outward migration of younger residents to the larger centres. The study also identified that there is a strong attachment to place in the region, with the current pristine coastal and marine environment a key factor underlying this attachment. The region also has a substantial Indigenous population with strong cultural ties to the region and environment. Attitudes to the development in the region were largely positive, with expectations of alternative employment opportunities generated directly (by the oil industry) and indirectly through increased population in the region. Concerns about potential environmental damage, however, were also raised by a number of residents.

The results of the economic baseline study largely confirmed those of the social survey, namely that primary industries were the dominant sectors in terms of gross regional product and employment. Unemployment in the region was generally lower than the state average, although this was partially an artefact of the outward migration from the region for those seeking employment. The study also highlighted that there was a broader skills shortage in the region, and that potential direct employment opportunities from an oil and gas development would result in an influx of workers. Infrastructure in the region is also relatively poor, and improvements in infrastructure as a result of any development would be of benefit to the existing sectors. The economic study also developed an economic model of the region that could be used for future assessments of any development impacts against the baseline conditions.

The fisheries baseline study found that much of the value from wild-caught fisheries was derived from the South Australian state managed fisheries, with much of this deriving from the eastern part of the GAB. In contrast, most of the aquaculture production was derived from the western GAB. Profitability of the key fisheries varied considerably, although the high valued species managed by individual transferable quotas (tuna, lobster, crab and abalone) were generally more profitable than the fisheries managed through other controls. Qualitative modelling of the potential effects of a hypothetical oil spill in the region indicated that the aquaculture sectors were most at risk, mainly due to their proximity to the potential development but also due to their inability to relocate activities.

2. INTRODUCTION

The determination of environmental or ecological baselines is a fundamental and long-established component of damage assessment, and is a requirement in many jurisdictions prior to the development of industries with the potential to damage the resource base (e.g. Huguenin *et al.* 1996; UK Onshore Oil and Gas 2015). The Deepwater Horizon spill demonstrated that, in addition to ecological impacts, social and economic impacts may also be substantial (Smith *et al.* 2011; Hale *et al.* 2015; Deepwater Horizon Natural Resource Damage Assessment Trustees 2016; Morgan *et al.* 2016). To estimate economic, social and ecological injuries – and define appropriate restoration projects and compensation – it is necessary to understand the condition of natural resources and dependent communities prior to a spill (Kennedy and Cheong 2013).

Although in many cases it is possible to reconstruct a baseline *ex post* (Lotze *et al.* 2006), such a process is non-trivial, and adds additional uncertainty to any impact assessment. An appropriate baseline provides not only a point of reference against which any future impacts can be assessed, but may identify critical points in any socio-ecological system which can be taken into consideration during the planning process, with the result of reducing or mitigating any potential future harm.

The need to develop a comprehensive baseline for the Great Australian Bight (GAB) has recently emerged. In January 2011, BP was awarded four exploration permits about 300 km south-west of Ceduna and committed to a work program that includes drilling four exploration wells. In 2011, Bight Petroleum was also awarded two leases west of Kangaroo Island and south of the Eyre Peninsula. In 2013, Statoil acquired a 30% share in BPs exploration program; Chevron was awarded two permits east of the BP/Statoil leases; and Santos/Murphy was awarded a lease further west. While BP and Chevron have subsequently decided not to proceed with drilling, other oil-related developments may still take place in the region.

The GAB is a region of high conservation significance and supports a wide range of human activities. Coastal waters are significant for the region's Indigenous communities and support iconic recreational fisheries. Valuable Commonwealth (e.g. southern bluefin tuna) and State (e.g. southern rock lobster, abalone, and sardine) fisheries operate in coastal waters and over the continental shelf and slope. Aquaculture leases are spread along the coast. Large marine parks have been established and the region supports important ecotourism ventures that take advantage of the current pristine environment. The region is also heavily dependent on agriculture and other forms of coastal tourism, both of which may be affected through changes in local community structures.

The proposed development is likely to change the structure of at least some regional communities, either through the introduction of new opportunities or, in a worse case, through damage caused by accidents. Establishing a baseline is necessary to identify these changes, which will also help inform future developments in the region. Regional economic modelling can be undertaken to make preliminary assessments as to where these impacts may occur (and an estimate of magnitude). How these changes may be perceived by the communities (positively or negatively), however, is currently unknown. The proposed development will also have impacts within the marine environment itself, but which impacts are of major concern to local residents is unknown, and the effects on the different fisheries is also unclear.

The aim of this research theme was to provide such a baseline and also undertake analyses to reduce some of these uncertainties. The theme consists of three projects. The first project (Project 6.1) was aimed at documenting the current socio-economic status of the regional communities as well as identifying current concerns about the development of an oil industry in the region, focusing particularly on the Eyre Peninsula and the West Coast regions. This includes developing community

profiles (especially coastal communities) and their level of economic diversification with emphasis on identifying communities' reliance on particular industries such as fishing and tourism, and understanding their resilience and adaptation capacities; and how communities are structured socially, incorporating information regarding Indigenous communities, labour force, education, religion, political persuasion, and more "generic" top line information on sentiment toward relevant issues.

The second project (Project 6.2) was aimed at providing a regional economic baseline for the region, identifying the range and relative importance of the different industries to employment, income and the processes currently driving development of this region. The project also developed a series of regional economic models that can be used for subsequent analysis of impacts.

The third project (Project 6.3) focused particularly on the fisheries and aquaculture industries in the GAB. As well as determining the current economic status (e.g. gross value of production (GVP), profitability and contributions to the regional economy) of the different fisheries and aquaculture businesses in the region, the project also undertook a qualitative assessment of the potential impacts on different fisheries of the development of an oil and gas industry in the GAB, including the impact of a hypothetical oil spill in the unlikely event that one should occur.

A summary of each of these projects is provided in the following sections. Overall, the theme contributes to a whole-of-system understanding of the environmental, economic and social values of the region through providing a baseline against which potential changes can be assessed, but also identifying key social and economic drivers, attitudes and potentially critical sectors in the social and economic structure of the region.

3. PROJECTS

As noted above, the theme involved three projects aimed at establishing a series of benchmarks in the area. The first project (6.1) focused on the social profile of the region, including the views, aspirations and concerns of the existing residents; the second project (6.2) was focused on the economic profile of the region, describing the key industries in the area; while the third project (6.3) focused on the fishing industry in the GAB. These projects and their key findings are described in more detail below.

3.1 Project 6.1: Social profile of the Eyre Peninsula and West Coast region

3.1.1 Objectives

This project was established with the three main objectives:

1. To provide a description of the region's social structure and the processes currently driving change;
2. To identify community perceptions with respect to the potential impact of oil and gas activities on the region, including the potential for onshore developments; and,
3. To develop an understanding of the region's capabilities and capacity to take advantage of future developments.

3.1.2 Key results and discussion

The development of oil or gas resources in the GAB has the potential to change the structure of at least some regional communities on the West Coast and throughout the Eyre Peninsula. The Eyre Peninsula and the West Coast are a relatively under-developed part of South Australia, with the region having a relatively small population scattered over a large area.

Change has been evident in many of these communities over the last three decades, and these transitions have included a decline in conventional agriculture, the rise of aquaculture, the development of a strong export focus to the fishing sector, and the emergence of mining, both in the recent past and in prospect.

Community attitudes and perceptions of the potential impacts of the development of an oil industry in the region – both positive and negative – were elicited through a series of one-on-one interviews with key stakeholders (business leaders, community planners, etc.) as well as focus groups including local residents. A social impact assessment was also undertaken to consolidate the findings under a formalised framework.

Population characteristics

The Eyre Peninsula and the West Coast (EPWC) region (Figure 1) as a whole had a population of around 56,300 in 2012, roughly two thirds of which were located in the local government areas (LGAs) of Whyalla and Port Lincoln on the Spenser Gulf. Population growth in the region is less than the State average, with three of the LGA experiencing population declines during the period 2001 to 2011. The small population is believed to lack the critical mass needed to meet the needs of growing industries, and strategies that deliver population growth considered important for the region.

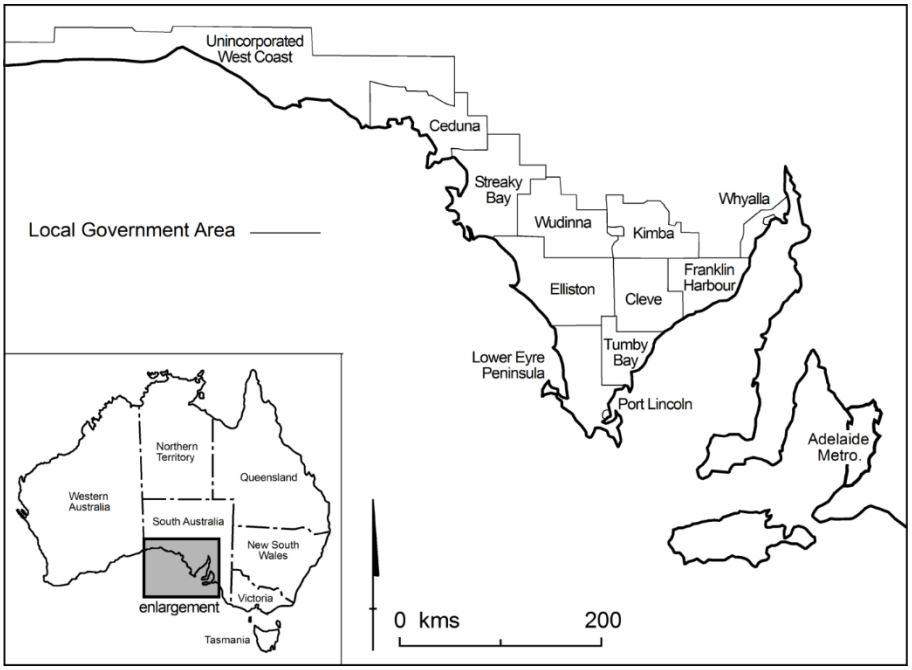

Figure 1. Map of the Eyre Peninsula and west coast (EPWC) region study area

Around six per cent of the population are of Indigenous heritage. The Nauo (south western Eyre), Barngarla (eastern Eyre), Wirangu (north western Eyre), and Mirning (far western Eyre) are the original Aboriginal Nations present and maintain traditional ties to Country in the study area.

With the exception of Whyalla, unemployment in many of the smaller parts of the EPWC is relatively low, but this reflects a net emigration from these areas to other parts of the region, with many younger (ex) residents looking towards Adelaide for employment opportunities. The remaining workforce is relatively old, with 44 per cent over the age of 45 years. In contrast, incomes in the region are generally higher than those of Adelaide, a result of the earlier mining boom and development of aquaculture businesses in the region.

The region has a strong, export-focussed economy, largely reliant on the production of primary products – grains, seafood, livestock, etc. From interviews held with key stakeholders, there is a belief that the skills in the labour force – that is, the quality of human capital – is a limiting factor for the further development of the region. Respondents noted that the seasonal nature of much employment meant that many individuals needed training across industries and sectors. Agriculture is still the main industry, but is employing fewer people, and this affects small communities.

Quality of life and the environment

Many focus group respondents noted that the EPWC offered a high quality of life and a near-pristine environment. A very high percentage of respondents made use of the natural assets of the region and took value out of the environment in some way. Virtually all respondents had visited beaches and 85 per cent had made use of national parks or conservation parks. Just under 50 per cent had visited a marine park or reef and just over 40 per cent had visited a botanical park or public garden.

The strong value placed on environmental quality spilled over in a number of focus groups into avowed opposition to any development that was seen to be a threat, either onshore or offshore in the GAB. For Aboriginal respondents, the environment was an important material resource, spiritually significant and a central part of their heritage.

Sense of belonging and attachment

A clear majority of participants felt a strong connection to the EPWC region, and reported a high degree of satisfaction with their life there. There was a very strong sense of place attachment, and a well-developed appreciation of the community that people live in. There was a high level of trust for neighbours, and an awareness of the frequent contact between individuals and households. High levels of support activity were also reported by the participants, underpinning the perceptions of high levels of social capital across the region.

Perceptions on impacts of the development

Most respondents felt any development would result in gains for infrastructure provision (Figure 2), a modestly favourable impact on their local communities, and positive impacts on the economy of the EPWC. Few respondents believed development would have a negative impact on their community, but did foresee population growth as a result of this development. This implies an acceptance of population growth as a desirable outcome, and also reinforces the findings of the focus groups where many respondents noted the impacts of population loss with some considerable concern.

Concerns and fears of negative consequences related to the environment. Respondents believed that development in the GAB would affect natural features and landscapes, and that development would potentially have an impact on tourism and commercial fishers.

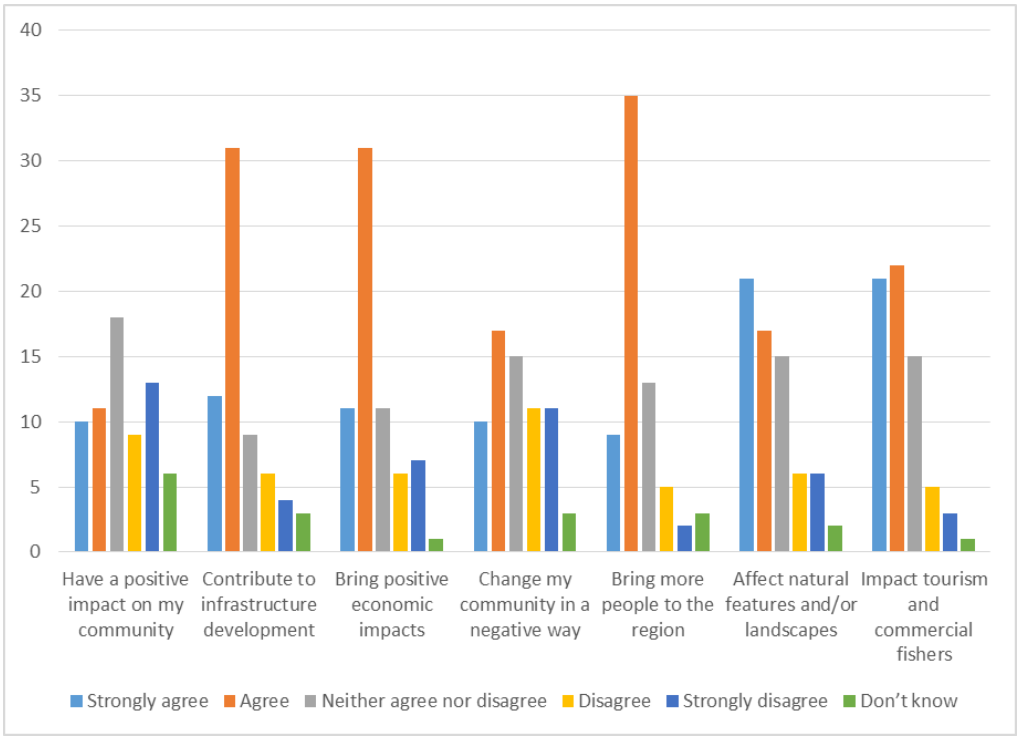

Figure 2. Perceptions of impacts of offshore exploration and drilling, and possible subsequent onshore development

Social impact assessment (SIA)

Social Impact Assessment (SIA) is a technique developed by a number of disciplines in the social sciences that is focussed on anticipating change and measuring – or assessing – the likely impacts before they arise (Becker 2001)). SIA aims to understand the consequences of a proposed change or development before they arise, helping decision makers in the public and private sectors make better-informed decisions about whether to proceed, and which options to pursue. SIA differs from

other forms of evaluation – such as environmental impact assessments or resource assessments, in that it focusses on the ways in which people live their lives, it considers cultural issues and affords a central role to the community and the institutions that support it. SIA is often considered to be an essential tool in delivering sustainable development as it encourages better social and environmental management. It also promotes better planning processes for major developments, being embedded in the early planning stage of proposals.

There is no single approach to undertaking an SIA, which may include a combination of an analysis of past trends, scenario development and assessment, and expert consultation, to name a few. Correspondingly, a variety of approaches were used in this study, largely drawing from documented information (e.g. research literature, Census data, and other secondary sources), and information collected during the field work (interviews and focus groups). The broad approach untaken follows that proposed by the Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (1995). This process includes identifying baseline conditions, scoping the range of impacts and predicting the likely effects of a development and the response to these impacts[1].

The baseline conditions are discussed above. The goal of the scoping phase of SIA is to understand the full range of probable social impacts associated with a development, with both the impacts forecast by the proponent and by the local community needing to be assessed. A requirement of the SIA framework is that scoping needs to pay attention to the views of affected individuals and communities. This requirement was met in the project through the extensive consultation with, and involvement of, local community members and stakeholders in the impact assessment.

The scoping stage of the SIA identified a range of key issues, following the procedure established by the Interorganizational Committee (1994):

- *Probability of event occurring:* There is a possibility that exploration wells will be drilled in the GAB and, while BP announced in October 2016 that it will not proceed to drilling, Chevron indicated its intention in November 2016 to drill up to four exploration wells;
- *Number of people including Aboriginal populations that will be affected:* In reality, very few people will be affected in the exploration phase, with drilling crews sourced from outside the region and supplied out of Adelaide. Any disruption to iconic species will have both economic impacts and call into question the 'clean, green' image of the Eyre Peninsula and the Bight. Aboriginal people in particular are likely to be greatly affected by adverse events, and this applies to both those still connected to their traditional country, as well as those moved as a consequence of colonisation and other processes;
- *Duration of impacts:* Exploration is likely to have short term impacts on the population.
- *Value of benefits and costs to impacted groups:* The development of exploration wells is likely to generate few benefits – and few costs – for local communities. There may be some short term advantages that accrue to the Eyre Peninsula region – such as infrastructure or facility upgrades – but these will not reshape the future of the region;
- *Extent that the impact is reversible or can be mitigated:* Any impacts associated with the exploration phase are likely to be reversible or can be mitigated – short of a catastrophic incident (which is unlikely). The recovery of the populations of some iconic species in recent years and decades suggests there is a degree of resilience, and the exploration phase will be relatively short lived;

[1] The full process involves 10 stages, including post-development monitoring and assessments. Not all stages could be addressed in the project, and only these four stages are reported in the synthesis report.

- *Likelihood of causing subsequent impacts:* There are unlikely to be any knock on impacts associated with exploration;
- *Relevance to present and future policy decisions:* Risk is an important part of the policy environment. Any adverse impacts are likely to erode political and community support for development, and the recognition of risk is likely to fuel further controversy;
- *Uncertainty over possible effects:* There is a high degree of uncertainty over the likely impacts. Exploration in the GAB is a small scale activity and in many respects a well-established technology. However opponents argue that local conditions, especially wave heights in winter and spring generate a challenge for our current technology; and
- *Controversy:* The proposed development is controversial, even in the exploration phase. In part this controversy is a product of well-developed and organised opposition from a number of community groups. There is evidence that this opposition – often externally organised – has had an impact in the Eyre Peninsula and West Coast regions. Some of this opposition is opposed to fossil fuels generally, not just the development discussed here.

The overall impact of the exploration drilling phase on the region is small scale, time limited and distant from the landmass of the EPWC. The SIA concluded that, in all likelihood:

- There will be the continuation of modest economic growth in the region, boosted to a very slight degree by activities associated with the drilling of exploration wells, although overall regional income will be largely unchanged. Population change will also remain on its current trajectory. The overall trend for economic activity and infrastructure development in the region will also be largely unchanged;
- Seafood and related industries may face some disruption, especially if there is a change in the movement of Southern Bluefin Tuna (SBT) or an adverse influence on the sardine fishery;
- There may be some impact on tourism in the region, which may be significant if the migration of whales or the movement of other iconic species is affected.

Predicting responses to a major development can be exceptionally challenging, but recent Australian experience and primary data collection in the region suggests:

- Key leaders in the region – including local Members of Parliament and many local government leaders – are broadly supportive of the proposal. The views of local political leaders are unclear, and while key government agencies support the development, their influence on wider opinion is likely to be limited. Other groups, including a number of industry groups are not, and may actively oppose development. The proposal is likely to have few strong local advocates within the community, partly because the localised benefits for the region are difficult to identify;
- Exploration in the GAB is likely to face on-going and strenuous opposition from environmental groups. This opposition is likely to include legal action by a variety of groups, including Aboriginal communities, environmental groups and potentially some representatives of the fisheries industry;
- Indigenous communities are likely to protest development on cultural, as well as environmental, grounds;

Conclusions

This socioeconomic profile provides a snapshot of the social, cultural, economic and political conditions of individuals, groups, communities and organisations living in the EPWC region. Importantly, we find that the EPWC region has a relatively small population scattered over a broad area. Despite its sparse population it is comprised of complex communities including:

- Significant Indigenous populations, some of whom continue to live on traditional Country and maintain many cultural practices (including language and for some a semi-nomadic lifestyle), while others have a more contemporary lifestyle;
- Populations of persons born overseas and their children and grandchildren living in communities that identify strongly with their place of origin;
- Dryland farming communities;
- Fishing and aquaculture communities; and,
- An increasing population of retirees.

Residents in the region have a strong attachment to the area, with the environment playing a large role in this attachment. Concerns were raised by many residents interviewed about the potential changes to the environment that may occur as a result of the development of an oil or gas industry in the GAB.

At the same time, many residents identified the lack of infrastructure as an impediment to the development of the region (necessary to maintain and/or increase populations). This included lack of water supply and treatment infrastructure, export infrastructure (e.g. wharves) and power supply. The lack of an adequately skilled labour force was also seen as an impediment; largely arising from the seasonal nature of much of the employment in the region. Many participants in the focus groups expressed their concern that young people in the region had few opportunities available to them. This included the capacity to engage in further education and find employment.

Being able to meet the aspirations of Aboriginal Australians on the Eyre Peninsula was an acknowledged priority. The region has a much higher Aboriginal population than many other regions and economic growth and employment is needed to lift their health and living standards. They are trying different education models in primary schools, but students fall behind in high school, and that leads to lower attendance. Literacy and numeracy are also a problem. School funding varies with the numbers attending.

The SIA framework was helpful in drawing conclusions about the state of the EPWC region, and the views of residents on possible development in the GAB. Many in the general community are open to the possibility of development, although opposition to development is already well organised and will become more acute over time. The level of risk to iconic species, the environment generally and humans associated with seismic exploration, and (potentially) commercial production is a major concern across the community. However, there is a tendency for communities to overestimate the risks associated with such a proposal, and underestimate the prospects for mitigation. This is likely to be the case for the GAB, but in the absence of reliable information, communities struggle to develop better informed assessments.

3.2 Project 6.2: Economic Profile of Eyre and Western Region

3.2.1 Objectives

This project was established with the three main objectives:

1. Develop a baseline understanding and description of the Eyre Peninsula and West Coast (EPWC) economy and the processes currently driving development of this region;
2. Build a capacity to identify the potential impact of BP's activities on the region with a focus on the contribution that BP could make to social and economic development;
3. Develop an understanding of the region's socio-economic capabilities and capacity, which can support future work to ensure that potential benefits to the region are maximised.

3.2.2 Key results and discussion

The study sets out a range of economic and social indicators under the themes of demography, economy, employment, education and health. Information for the study is largely drawn from Australian Bureau of Statistics (ABS) data both from the Census and other collections; previous studies conducted by the South Australian Centre for Economic Studies (SACES); Regional Development Australia studies; data collated in other research studies; and consultations with selected stakeholders in local government and industry. Current infrastructure and required new investment is described for roads, rail, ports, airports and power supply.

The data are also used for the development of a regional economic model that can be used to assess the potential impacts of major developments in the region, such as those proposed for the GAB.

Demography

As noted in Project 6.1, the population in the region is relatively small, representing only around 3.5% of the total South Australian population. The population is largely concentrated in two provincial cities – Whyalla and Port Lincoln – with the remaining third of the population spread over a number of small coastal towns.

Population growth in the area (0.47% per annum) is substantially lower than that of the State as a whole (1.05% per annum). This is largely a result of a net outward migration from the region, although the provincial cities also attract inward migration from other parts of the region. Other coastal areas with expanding aquaculture industries have also experienced a net inward migration (e.g. Streaky Bay). The age structure in the region is skewed towards older residents, as it is the younger residents who are most likely to leave in order to fine employment opportunities elsewhere.

In contrast, the Indigenous population in the region, which represents around 6% of the region's population, increased at around three times the State rate between 2006 and 2011, largely attributed to the younger age structure and fertility rate.

Economy and key industries

The EPWC accounts for approximately 3% of the State's total output, with a gross regional product of around $2.6 billion in 2012-13. Sixty per cent of the EPWC's total gross regional production (GRP) is produced in the two most populous councils of Port Lincoln ($768 million) and Whyalla ($823 million) (Figure 3).

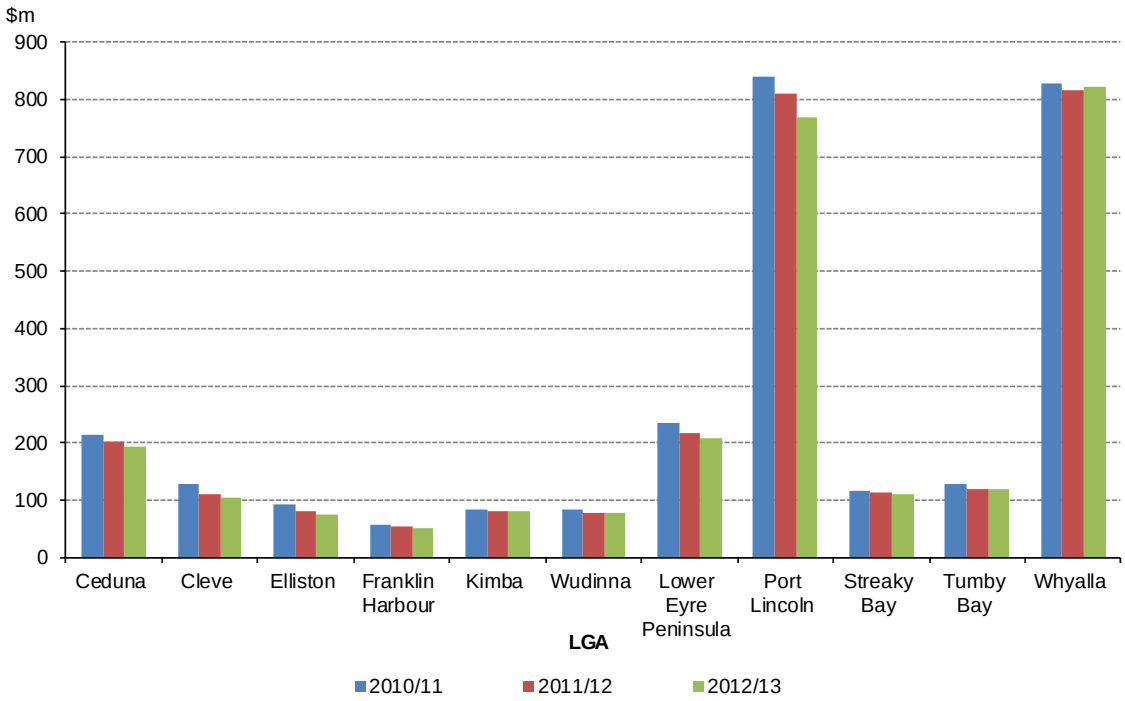

Figure 3. Gross Regional Product by Council − Eyre Peninsula and West Coast, 2010/11, 2011/12 and 2012/13

Agriculture is the main industry in the region in terms of value, with grain crops (and wheat in particular) being the most valuable component. In 2011-12, grains had a GVP of $406 million, representing 13% of the GRP. Cropping land in the Eyre Peninsula represents 36% of the total cropping land in South Australia. Grazing is also an important agricultural activity, with grazing land in the region representing 16% of the total grazing land in the State. The main grazing activity involves sheep for wool, with meat and cattle livestock being less significant (approximately 2% of South Australia's total), and pigs and poultry production accounting for less than 1% of South Australia's total. Other agricultural activities on the Eyre Peninsula include small scale nurseries involved in flower cultivation, fruit and nuts orchards/production e.g., olives, grapes for wine production and consumption, vegetables e.g., carrots, lettuces and tomatoes and hay and silage production especially cereal cut for hay.

Mining is the second largest industry in the region, contributing around 8% of the region's GRP in 2011-12, with a GVP of around $283 million and generating exports worth $333.6 million. Six of South Australia's 21 mines operating as at 2014 are located in the EPWC. While mining currently comprises a small share of economic activity in the region, the scale of the identified resources in the region means that significant potential for growth exists over the medium term depending on commodity prices and extraction costs. The Eyre Peninsula is rich in iron ore with high grade deposits of hematite and magnetite. Mineral exploration as of 2013 has identified up to one billion tonnes of proven iron ore resource with an estimated value of between $100 billion and $140 billion based on the prevailing prices in 2014.

Fishing and aquaculture are also major industries in the region. The total value of aquaculture production in Eyre Peninsula was $222 million in 2012-13, 91% of the State's total, with the West Coast producing output valued at $10 million. Southern Bluefin Tuna accounted for the bulk of aquaculture output in the EPWC ($153 million), followed by oysters ($36 million) and other seafood ($25 million).

Tourism is also a significant industry in the EPWC. Tourists are drawn by natural attractions including, beaches, sea life, wildlife, marine parks and national parks. It is these natural assets which have been capitalised on to provide visitor experiences, i.e., sightseeing, wine tasting, dining, fishing, swimming, shark diving, boating, whale watching and other leisure tours. In 2012/13 the Eyre Peninsula attracted 683,000 visitors with expenditure of $255 million and of these the majority were domestic overnight and day visitors. There were 582 tourism businesses operating in the Eyre Peninsula in 2012/13, most employing businesses being either Micro (1-4 employees) or Small (5-19 employees) scale.

Infrastructure

The social profile identified that many individuals considered infrastructure as a current constraint to the further development of the region. The economic baseline study also identified particular issues with specific components of the transport infrastructure in the region.

The EPWC is serviced by the National Highway 1 Network, maintained by the State Government and comprised of the Eyre Highway, Lincoln Highway and Flinders Highway. Local governments are responsible for maintaining most local roads, totalling 12,742 km, of which 95 per cent are unsealed. Safety concerns about narrowness of some of the major roads given the presence of road trains were raised in the study, while the poor conditions of other roads to main tourist destinations were seen as possibly restricting the tourism potential of the region.

In terms of rail, an aging narrow gauge railway operates across the Eyre Peninsula independent of the national standard gauge network. Whyalla connects to the national standard gauge network via the steelworks but has no standard gauge line connections to the Eyre Peninsula. Upgrading the Eyre Peninsula railway to a standard gauge railway network, and establishing a standard gauge railway link to (at least) one of the Eyre Peninsula's commercial ports with cape class vessel capacity and the national standard gauge network were seen as priorities for the region.

Four commercial ports operate in the EPWC region. Two of these ports are privately owned and located at Whyalla. These are single use ports – one focused solely on iron ore and steel exports, and the other focused on natural gas and petroleum exports. The other two ports (Thevenard in Ceduna and the Port Lincoln port) are multiple use, exporting grain, other agricultural and fisheries products. The upgrade and expansion of the Thevenard port in the western part of the region to increase competitiveness and exports in the Western part of the Eyre Peninsula has been identified as a critical issue for the development of the region, as well as construction of purpose-built offloading facilities at Port Lincoln and Thevenard to improve efficiency in the loading and transport of seafood products.

The region is serviced by three regional passenger airports, one each in Ceduna, Whyalla and Port Lincoln. Other small local airports are located in Wudinna, Streaky Bay, Tumby Bay, Kimba, Cleve, Elliston, Cowell, Cummins, Lock and Minnipa, owned and operated by their respective local governments. Small airport infrastructure is limited, e.g., some runways are unsealed. Port Lincoln is the busiest of the three passenger airports. The primary reasons for travel to Port Lincoln by plane are business, holiday, or fly-in fly-out (FIFO) mine work, a segment which is likely to expand if new mines are approved and developed and minerals exploration continues. Ceduna has the lowest passenger traffic at the moment, although BP had planned to develop an aviation base at Ceduna Airport, investing $138 million in a new helipad, passenger terminal, hangars, and supporting office blocks to support initial exploration activities. Further mineral exploration and potential mine development by Iluka Resources 200 km northwest of the township of Ceduna is likely to require FIFO workers and tradespeople for site construction which would lead to further increased

passenger volumes through Ceduna Airport. Upgrades of both Whyalla and Ceduna Airports were identified as priority infrastructure improvements to accommodate the projected increases in passenger movements.

Power supply is also considered an issue, with most of the transmission network aging, and some parts of the region not connected to the State grid.

Employment

Agriculture and fishing are the major sources of employment in the region, representing roughly 14% of the total employment, with manufacturing also significant (12%), but restricted mostly to Whyalla. The region's reliance on several key industries for income, notably, agriculture, fisheries and aquaculture, tourism and mining, creates susceptibility to seasonal factors, fluctuations in overseas demand and international prices compared with other selected industries, e.g., services. This volatility can be seen in Figure 4. By comparison, the broader industry mix, service based economy and larger domestic market for the State as a whole provides a degree of insulation from external international factors, providing a higher degree of employment stability.

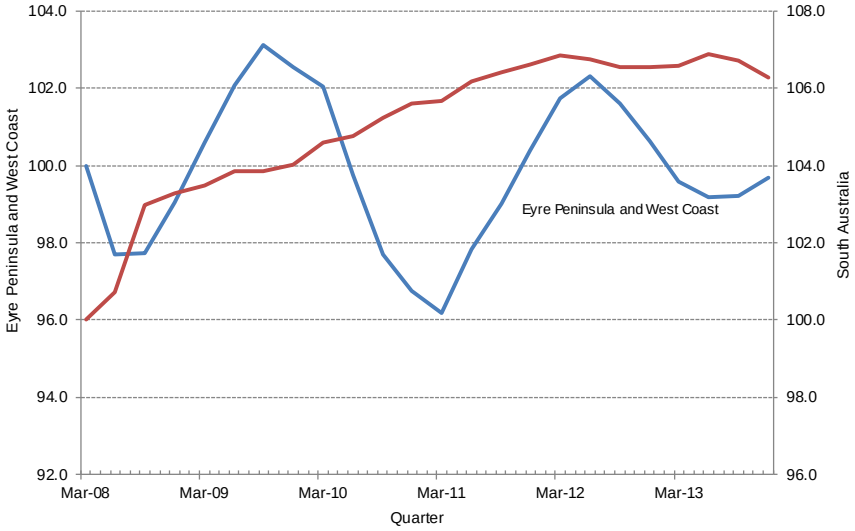

Figure 4. Aggregate Employment – Eyre Peninsula and West Coast, South Australia, Index (Base: March 2008 = 100))

Retail industries and services are also major employers. In particular, health care and social assistance contributes 12% to local employment, while retail trade contributes a further 11%.

Growth industries experiencing highest employment growth and demand for skilled labour across the region between 2006 and 2011 were mining; electricity, gas, water and waste services; construction; and wholesale trade industries. In contrast, traditional industries experienced low employment growth and labour demand between 2006 and 2011, included manufacturing; and agriculture, forestry and fishing – the current major employer in the region. The reduction in growth of employment in this sector reflects low pay rates and subsequent difficulty attracting workers when better paid alternatives are available. Some types of farming businesses are moving to more capital intensive production resulting in a decreased demand for farm workers.

Indigenous employment is concentrated in public service industries, notably Health Care and Social Assistance (25%), Education and Training (10%) and Public Administration and Safety (7%). Mining companies cooperate and support Indigenous communities providing Indigenous education and training programs which upon successful completion provide participants with a certificate

qualification and permanent position within the mine. Mining's share of employment for Indigenous persons of 8.0% as at the 2011 Census (up from 3.3% in 2006) increased in line with new employment opportunities in recently opened mines (i.e., over the past 5 years) across the region.

Unemployment in the region has generally been lower than the State average, although high rates of unemployment (8%-10%) have persisted in Ceduna. Indigenous groups in the region have higher rates of unemployment and lower labour force participation compared with non-Indigenous groups. Income support dependence is high in these groups, and education outcomes are below the State average, while skills training and development is also low. As a result, Indigenous labour is generally at a disadvantage in the region.

Education

Adults resident in the region are much less likely to have qualifications beyond high school than the South Australian average, with 51% holding having no post-school qualification, compared with 46% of all South Australian adults. School completion rates in the region are also less than the State average, with a higher proportion of students leaving school before completing their Year 12 certificate. Further, only 9% of working age adults in the region hold a bachelor's degree or higher, half the rate for the state as a whole (18%). In contrast, the region has a higher proportion of adults with vocational (TAFE) qualifications than the State on average, reflecting the dominance of primary industries in the region.

Health

Lifestyle and socio-economic factors determine variation in general health and wellbeing across councils in the region. Indicators of poor health status for Ceduna (an area with the highest unemployment rate) – low birth weight, prevalence of smoking during pregnancy and rates of premature death − are all well above state and regional averages. Nearly all areas in the region have a higher incidence of premature death than the state average, some areas (Ceduna, Whyalla and Elliston) substantially so.

Availability of health practitioners is also generally lower than the State average, although this varies substantially between council areas.

Across Australia Indigenous persons have lower life expectancy and poorer overall health and wellbeing compared to non-Indigenous persons due to social, economic, and locational factors. Improvements in Indigenous health (in the EPWC and Australia wide) and employment outcomes are linked - persons in good health being more likely to be employed (or participating in the labour market) which promotes/improves Indigenous community involvement and engagement. The previously mentioned training programs provided by several mining companies are expected to improve employment outcomes, and indirectly improve health outcomes as a result. Further benefits are achievable by investments in improving quality/access of Indigenous health services to complement Indigenous employment training programs through cooperation with governments and mining companies.

Development of a regional economic model

The other main output of Project 6.2 is the development of a tailored economic modelling capacity for the region, built within the VU-TERM model. This creates the capability to objectively assess the impacts of a range of potential scenarios including the distribution of impacts between sub-regions and between industries. There are several potential uses of the regional modelling capacity, including:

a. Using scenarios developed in consultation with stakeholders, estimation and assessment of possible future impacts
b. Objectively documenting the contribution that BP has made to the region
c. Using the model to predict the consequences of different development options.

As with the socio-economic baseline, the economic model should be updated as the region's economic structure evolves over time.

3.3 Project 6.3: GAB Fisheries Benchmark Study

3.3.1 Objectives

The project had three main objectives:

1. Establish a benchmark of the current economic conditions of the fisheries (including aquaculture) in the GAB and contribution to local and State economies, and current social indicators of satisfaction where available;
2. Provide a qualitative assessment of the potential impacts of the development of the oil industry in the GAB on the fisheries sectors; and
3. Review approaches for undertaking social and economic impact assessment of the effects of any oil spills on the fisheries in the region. This will also take into consideration fisher and fisheries management responses to the oil spill, which can also affect the outcome under such an event.

3.3.2 Key results and discussion

Economic importance of the fisheries and aquaculture sectors in the GAB

A wide range of commercial fisheries and marine based aquaculture industries operate in the coastal and Commonwealth managed waters of the GAB. In South Australia, total GVP from fisheries and aquaculture was estimated to be around $400 million in 2013-14, split roughly 50:50 between wild caught and aquaculture production (Figure 5). Total direct employment in the wild caught sector was 1,150 in 2013-14, with an additional 750 employed in aquaculture. The most valuable South Australian commercial fisheries are the lobster fisheries, representing around 50% of the total value of wild-caught fisheries production as well as around 50% of the total fisheries employment. Most of the lobster are taken in the eastern side of the GAB. Other key fisheries (e.g. prawns, blue crab and sardines) largely operate within Spencer Gulf, although catch is taken outside of the Gulf also. The most extensive fishery – the Marine Scalefish Fishery (MSF) – operates along the central and west coast. While relatively low in value (around 17% of the total GVP), and also relatively low in terms of profitability, this fishery is the largest in terms of fleet size, and represents around 25% of the total employment in the wild-caught fishing sector.

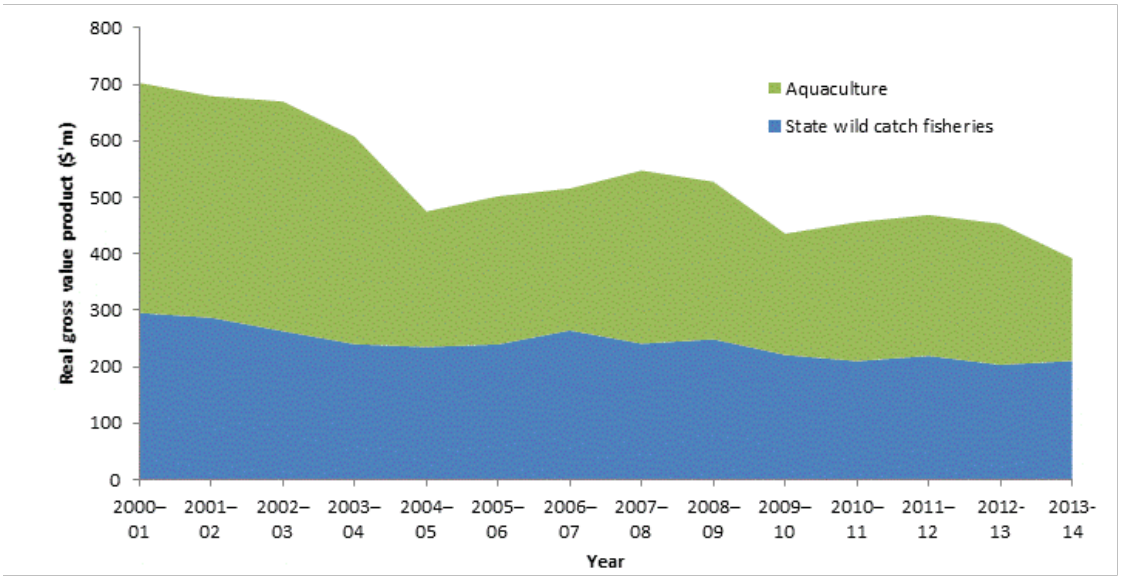

Figure 5. Real gross value of production, SA fisheries, 2013-14 dollars

South Australian aquaculture production is largely found along the EPWC. Tuna ranching represents around two thirds of the total aquaculture value, and takes place largely around Port Lincoln, on the Eyre Peninsular near the mouth of Spencer Gulf. Oysters are grown primarily along the west coast from Coffin Bay and account for around 17% of the total aquaculture value. Oyster production has increased substantially over the last decade – by around 10% per annum – although the recent (2016) outbreak of Pacific Oyster Mortality Syndrome (POMS) in Tasmania has limited the supply of spat available for SA producers. As much as 80 per cent of oyster spat had been obtained from Tasmania, the supply which was banned following the POMS outbreak. As a result, oyster production will be substantially lower in 2017 and 2018, with oyster production not expected to fully recover to recent levels until mid-2019.

The estimated downstream and flow on effects to other sectors associated with fishing and aquaculture in South Australia are substantial. Downstream impacts include fish processing and other economic activities dependent on the industry, while flow-on impacts represent the derived demand for other services in the region such as boat building, fuel supplies and other related input supplying industries. In South Australia, combining these effects, both wild fisheries and aquaculture each result in total output of around $700 million a year – a combined impact of around $1.4 billion – and the generation of household incomes of around $350 million a year. As well as the 1,900 people directly employed (as noted above), these sectors are estimated to generate an additional 3,700 jobs in upstream and downstream industries.

Social surveys of the South Australian fishers have found widely varying satisfaction levels. For the MSF, around 50% of the fishers are unsatisfied with how the fishery is performing. In contrast, over 90% of fishers in the southern zone rock lobster and blue crab fisheries are satisfied. These satisfaction levels largely reflect profitability levels, with the MSF being consistently marginal in terms of profitability over the last two decades. However, attachment to the industry is strong, with relatively few fishers keen to exit the industry.

Western Australian fisheries along the GAB are relatively small by comparison, with a GVP of around $21 million in 2013-14. This value, however, derives from a wide range of fisheries, mostly inshore and estuarine based. While aquaculture is undertaken in the area, only a handful of operators exist and information on the value of production is unavailable. The impact on the local economy of these fisheries is uncertain as the only previous (and non-recent) study was at the State wide level. From

this, the fisheries may generate up to an additional $23 million in flow-on benefits to the regional economy.

Commonwealth fisheries in the GAB contribute around $60 million to the fisheries GVP in the GAB. This has declined by 50% in real terms from its peak in 2001-02. Production is dominated by the Southern Bluefin Tuna fishery, which provides the stock for the tuna ranching industry, the largest aquaculture sector by value in South Australia.

Recreational fishing in South Australia involves a charter boat sector as well as non-charter boat fishing. The GVP of the charter boat sector is around $4.3 million a year – relatively small compared with the commercial fishing fleet. However, GVP in this case is based on revenue raised from charging recreational fishers rather than reflecting the value of the fish caught. Charter boat based recreational fishing provides other indirect economic impacts, namely as most anglers also need to travel to the ports and stay in local accommodation. This is estimated to generate an additional $20 million in benefits to the local economies.

From the last available recreational fishing survey (2013-14), over a quarter of a million recreational fishers were estimated to have fished for nearly one million days (with around 20,000 of these days potentially included also in the charter boat GVP). Based on these values, and assuming similar levels of recreational benefits per trip as found in other South Australian studies, recreational fishing in South Australia may generate around $115 million a year in non-market benefits.

Potential impacts of an oil development on the fishing industry

A review of experiences elsewhere suggest that the development of an oil industry in the GAB may produce both benefits and challenges for the fishing industry both onshore and offshore.

The development of onshore infrastructure may provide benefits to fisheries such as improved port and handling facilities, lower cost access to inputs and services previously not supplied locally, and improved safety facilities (e.g. search and rescue helicopters). Many of the potentially negative onshore related impacts experienced elsewhere are expected not to be substantial in the GAB. Numerous ports exist along the South Australian coast, exporting agricultural and mineral products. South Australia also has a substantial mining industry, and hence the fisheries have evolved in the presence of strong competition for labour, while regional communities have been faced with the cost of living pressures associated with high incomes in the mining sector. For some fishers who are currently unsatisfied, the development of new alternative employment options may provide an opportunity to exit the fishery. For many fishers, their attachment to the industry is sufficiently strong that they will not be attracted out of the industry. Further, any increase in labour demand in the regions will be for skills not currently available in the fishing industry.

The most substantial fisheries economic impacts experienced elsewhere were in relation to oil spills. In most cases, these were the result of oil tanker accidents, often close inshore. In such cases, fisheries impacts were substantial in the short term, mostly as a result of fishery closures which reduced production and market responses which reduced price. For most fish species, little or no lasting impact on the stocks were observed, and fisheries generally recovered fairly rapidly. For many shellfish species, such as non-hatchery based oysters, both physical and market recovery took longer. The Deepwater Horizon oil spill in the Gulf of Mexico in 2010 provided an example of the effects of a large scale oil spill from an offshore oil platform. Many fisheries were closed for several months, resulting in substantial loss of fishing incomes – ranging from 25% to 60% depending on the study methodology. As above, in most cases these impacts were short lived, with most fish stocks recovering to pre-spill levels fairly rapidly. In some cases, the extended fishery closure was believed to have benefited some stocks.

While the likelihood of an oil spill in the GAB is small, the potential economic consequences may be considerable. The impact of an oil spill will largely depend on a wide range of factors, including when it occurs, the direction and strength of the currents, how far away it is from the fishery, and the sensitivity of the target species and associated habitat to oil. Potentially more significant is the management response in terms of closure, the ability of the vessels to move to alternative fishing grounds, the market response to the spill and the resilience of the industry to short term shocks. Assessing the impacts with so many variables is complex without some form of model, and a qualitative Bayesian Belief Network (BBN) model was developed to identify which fisheries, if any would be most adversely affected.

The key outputs of the model are presented in Figure 6 for the two key hypothetical oil spill scenarios (145 days and 35 days duration), with the impact estimated for different seasons in which the spill may occur (which influences the current strength and direction and hence the oil distribution). The impact is expressed as a relative scale, with 0 being no impact and 3 being a substantial impact. Two measures were obtained: a measure of short term fishery profitability impacts (Figure 6 (a) and (b)), and a measure of the effective economic impact taking into consideration the resilience of the industry to short term disruptions (Figure 6 (c) and (d)). The results suggest that some fisheries, such as the Southern Bluefin Tuna fishery, will most likely experience only a small impact from an oil spill, although others, such as the Marine Scalefish fishery, may have a moderate short term impact (Figure 6). Others still, such as oyster aquaculture, may have a substantial short term impact, depending on the assumptions about how much oil was released and the direction of currents at the time. Medium to longer term impacts were not addressed for the hypothetical oil spill scenarios, although hatchery-based restocking of the oyster industry may negate biophysical impacts of the oil.

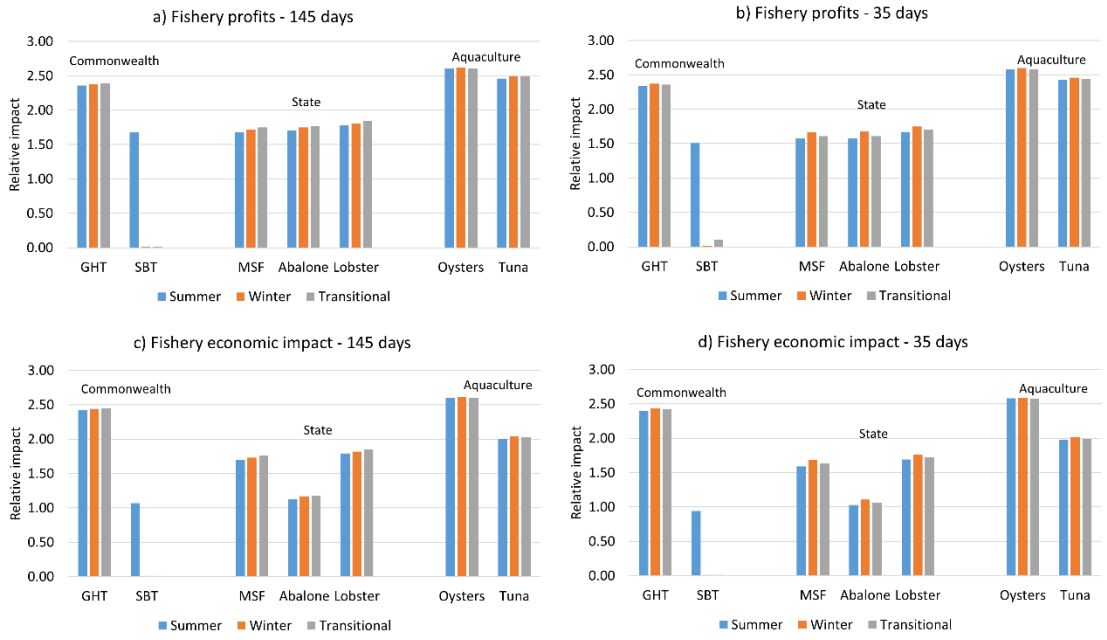

Figure 6. Outcomes from BBN models – overall relative impacts scores

Assessing compensation in the event of an oil spill

In the unlikely event of an oil spill, compensation to the fishing industry will need to be paid. While compensation will ultimately be based on individual claims, this may take a considerable time before all claims are settled, and information at the fishery level is often not made available. Estimating the economic impacts in different fisheries provides a means to rapidly assess priorities for fisheries support following such an event.

To this end, the study reviewed previous approaches to estimate fishery economic impacts ex post to determine which may be most appropriate if ever needed in the GAB. The review focused on both theoretical methods proposed for assessing oil spill impacts, as well as reviews of estimates of such impacts using a range of methods. A wide range of approaches have been used and/or proposed, ranging from complex modelling based approaches to simple comparisons of values before and after the event.

Compensation claims are most commonly based on individual loss of fisheries profits, supported by a comparison of profits during the impacted period (usually the year in which the spill occurs) with information on profits, catches, prices and costs over the preceding three years, it is suggested that a similar approach be adopted for ex post evaluation of these potential costs. Such an approach is imperfect as it does not take into account longer term impacts, although to capture these some form of detailed bioeconomic model would be required which encompasses fleet behaviour, market behaviour and biological responses to the oil spill. Such a model would be dependent on the existence of information that is generally not available until sometime after the event (e.g. identifying fish stock responses to the oil spill, and subsequent behavioural responses by the fishers will not be known with certainty until after they have been observed). While assumptions about these relationships can be made, the results are then sensitive to these assumptions, and may be no better than the simple approach with known deficiencies.

Even the simple approach requires information on previous catch, effort, price and cost information on the fisheries. A major difficulty identified in the review of past spills was the lack of appropriate data to estimate the impacts. South Australian commercial fisheries are fortunate in many respects as detailed economic data have been collected for some time on the fisheries. For aquaculture, which may also be adversely affected, data are less publicly available, particularly on cost structures and profitability – both essential factors for determining any economic impacts. For Western Australian and Commonwealth fisheries, regular economic data collection from the fisheries is not undertaken.

The potential impact of any oil spill on markets for fish products is also poorly understood. From the qualitative analysis undertaken using the BBN, most commercial fisheries profits were sensitive to changes in price. For aquaculture, particularly the molluscs (i.e. oysters) which are filter feeders, a potential pollution event such as an oil spill may have a substantial impact on the price received.

4. CONTRIBUTION TO THE GABRP

4.1 How does the theme contribute to the research program?

A key characteristics of many of the themes undertaken under the Great Australian Bight Research Program was the establishment of baseline data. For the biophysical and natural environment oriented research themes, these included identifying background levels of hydrocarbons, identifying the existing benthic flora and fauna in the region as well as gaining a better understanding of the basic oceanography of the area. Other themes considered potential environmental impacts for the development of an oil industry, including the potential impact of exploration on the distribution of cetaceans and other pelagic species such as tuna.

This theme extends this analysis into the social and economic environment in the GAB, as well as considering potential impacts in this environment arising from the development of an oil industry. For the onshore and fisheries economic baselines, much of the information was already available, but from a wide range of sources that were not necessarily compatible. A major task of the theme was the compilation of these data into a form that would be useful for policy makers and developers in planning the future economic development of the region, including but not limited to the development of an oil industry. For the social theme, demographic information was also available through a range of sources, but information about the pressures on the region and the drivers of change were not available. The theme made a major contribution to the understanding about the social and economic environment of the region by identifying these through primary information collection.

The theme also made a substantial contribution to the understanding of how the development of an oil industry may affect the area. The regional economics project developed a multi-region general equilibrium model that can be used to assess how changes in different sectors of the economy will affect the region as a whole. The social component of the theme identified key areas of concern by local residents about the development, including their perceptions as to the likely impacts on their wellbeing. The fisheries economic component of the theme identified the potential range of impacts of the development of an oil industry based on experiences elsewhere , and also developed a qualitative modelling framework for assessing which fisheries may be most adversely affected in the unlikely event of an oil spill.

The three projects, while undertaken separately, have considerable overlap, demonstrating the strong link between the social and economic environments (Figure 7). Employment, incomes and drivers of population change are important components of both the social and economic systems. The region has a strong, export-focussed economy, largely reliant on the production of primary products such as grains, seafood, and livestock. The fisheries component, while focused on economic baselines and impacts, also overlapped with the other two components. Fisheries are a major source of employment in the region, while recreational fishing is an important contributor to individuals' attachment to the region and sense of place. Fishing also has a cultural significance to the Indigenous population in the region.

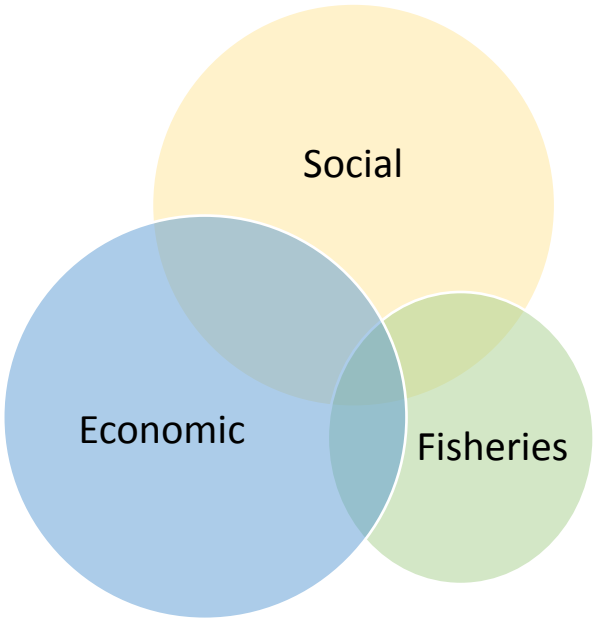

Figure 7. Interrelationships between the different projects in the theme

4.2 Common findings

The projects identified a range of potential positive and negative impacts of the development of an oil industry in the region. Lack of appropriate infrastructure was identified as a major constraint to development in the region, with both social and economic consequences for the region. Many participants in the social project's focus groups and surveys had expectations that the development of an oil industry would contribute to the improved development of infrastructure such as roads, rail, port facilities and airports. This in turn would have spin-off effects for tourism (through better access) and the exporting industries, as well as contributing to safety (through better roads) and better access to health services. Further, better airport infrastructure would also facilitate an increase in fly-in-fly-out workers, with possible benefits in terms of being able to expand the mining industry in the region. Expectations of an improved helipad in the western GAB are also believed to contribute to safety for the fisheries sector as well as the region as a whole though an enhanced rescue facility.

Expectations of a range of alternative employment opportunities were also seen as potential positive impacts from the development. While it was recognised that much of the labour associated with development would most likely be specialised, the increase in population in the region would increase the demand for support services. Population decline in the region is a particular concern, with many of the younger generations leaving the region in search of employment in the major centres. An influx of workers associated with the development of the oil industry would not only increase the population directly, but may also contribute to the retention of many young people who may otherwise leave.

Concern was raised in the social baseline study about the potential environmental consequences of the proposed development, and the effect that this may have on fisheries (both commercial and recreational) and other marine life (particularly whales). The pristine marine environment was a key factor underlying the attachment to the region for many participants. Given the importance of ecotourism to the region, any environmental damage was also considered to have potential negative economic consequences. From a fisheries perspective, the major potential threat was an oil spill,

with other (potential) environmental impacts having little direct effect on fisheries production. Qualitative modelling of different hypothetical oil spill scenarios suggested that coastal aquaculture (particularly the oyster industry) was particularly at risk from an oil spill. While the likelihood of such a spill is low, its consequences could be substantial for the region.

Despite these environmental concerns, the regional communities were largely supportive of the development, with the identified perceptions of the benefits exceeding the perception of the potential negative aspects.

4.3 Where to from here?

The studies provide a snapshot of the social and economic status of the EPWC region, with a more detailed (and GAB-wide) snapshot of the fishing industry. These snapshots have a limited life as an effective baseline against which changes can be identified. The regional economy is influenced by many external factors. Given the importance of the export industries to the region, fluctuations in exchange rates can have substantial impacts on gross regional production over a short time period. Social aspects are potentially less dynamic, although norms and attitudes also change over time.

Although BP and Chevron have decided not to move to drilling, other oil companies are progressing exploration programs in the GAB. Ongoing monitoring may be necessary to ensure that, if the development does proceed in the future, an appropriate baseline exists across the key communities and industries likely to be impacted.

The economic study developed a model with which a range of potential development scenarios could be simulated. This tool has considerable potential to aid future planning in the region, not just of the oil industry but of other industries that may be considering expansion (e.g. mining).

5. CONCLUSION

The theme provides a snapshot of the social, cultural, and economic conditions of individuals, groups, communities and organisations living in the EPWC region. The profile that has been developed in the different projects is intended to both inform decisions and provide a baseline of social and economic conditions in the region.

For many, the EPWC offers a high quality of life in a near-pristine environment. However, change has been evident in the communities of the EPWC over the last three decades, including a decline in conventional agriculture, the rise of aquaculture and value-added fishing and the emergence of mining and tourism, both in the recent past and in prospect. Today, the region has a complex socio-economic structure based on a wide range of industries and communities – but is also confronted by significant challenges including population loss in its interior, restricted water supply, emerging shortages in electricity and other infrastructure, a limited skills base, and out-migration of youth. The decline of some communities within the EPWC was a recurrent theme, with many of the smaller townships and settlements now under threat.

The development of an oil industry in the region offers both opportunities and threats. Expectations about the potential positive impacts of such a development on the regional economies are high, and may exceed the reality of what can be achieved in terms of increased population, employment and infrastructure development. Similarly, concerns about potential environmental impacts are also significant, although most communities are generally supportive of the development.

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