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Bureau of Rural Sciences

## **Community Perceptions of Aquaculture: Final Report**

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Social Sciences Program  
Bureau of Rural Sciences

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## Acknowledgements

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The project team would like to thank the Australian Government Department of Agriculture, Fisheries, and Forestry (DAFF) for its overall support of this project, particularly Glenn Hurry, John Talbot, Emily Stutterd, Andrew Buckley and Inga Davis. We also appreciate the cooperation and support of Anthony Forster, John Garnham, Peter Appleford, Anthony Plummer, Gaynor Jones, Peter Lawson, John Mercer, and Luke Cromie of Fisheries Victoria.

We would like to acknowledge the support of the Aquaculture Committee of the Australian Fisheries Managers Forum, in particular Anthony Forster, Robert Gott, Ian Nightingale, Greg Paust, Nick Rayns, Glen Schipp, and Ian Yarroll. In addition, Ric Fallu, Helen Atkinson, Heather Montgomerie and Jo McCrea provided invaluable assistance.

We would like to thank all those people with an interest in aquaculture who gave up their valuable time to participate in the stakeholder/community interviews for the Eyre Peninsula and Port Phillip Bay case studies. We also appreciate the time that the residents of the Eyre Peninsula and the City of Greater Geelong, the Borough of Queenscliff and the Mornington Peninsula took to respond to the household mail survey.

Finally, the project team would like to acknowledge other Social Sciences Program staff who contributed time to support this project: Anne Maree Casey, Con Charalambou, Jean Chesson, David Hyndman, Shannon Kelson, Catherine Mobbs, Jacki Schirmer, Robyn Tottenham, Trevor Webb and Alice Woodhead.



## Executive Summary

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### ***A project to support the ecologically sustainable development of the Australian aquaculture industry***

This report provides key findings of the Community Perceptions of Aquaculture Project, which used a literature review and two case studies to understand different views about marine and coastal aquaculture. This information is required to build the social, economic and environmental sustainability of aquaculture.

The two case study regions were the Eyre Peninsula, SA, and the Port Phillip Bay, Victoria. Primary data were collected through 66 in-depth interviews with State and Local Government staff, aquaculture industry representatives, researchers, conservation organisations, and community members. Mail surveys (500 – 700 households) were undertaken in each region, with response rates of 68% (SA) and 57% (Victoria).

### ***Regional settings will be relevant to aquaculture perceptions***

Important differences between the two case study areas suggests that particular features of regions are likely to have some influence on perceptions of and responses to aquaculture, including population densities, economic diversity, competing uses of marine/coastal environments, the size and structure of the aquaculture industries, and the existence of aquaculture-related conflicts.

### ***Differences and similarities detected in mail survey respondents' profiles and views***

The two mail survey samples had similar age profiles (majority over 50 years of age), but were different in terms of gender, education levels, preferred activities and their level of direct contact with the aquaculture industry. These features were linked to all respondents' support for and concerns about aquaculture, trust in the industry and governments, and risk perceptions.

There were also similarities and differences between the SA and Victorian respondents' knowledge and support for aquaculture, concerns about environmental risks, degree of trust in the industry and governments, and support for involving communities in decision-making.

### ***Support for aquaculture as well as mixed opinions about its sustainability***

Most interviewees and mail survey respondents recognised aquaculture's general socio-economic benefits, with SA mail survey respondents more aware and supportive of the industry's particular contributions. Most mail survey respondents agreed that aquaculture had a role in supplementing (wild-caught) seafood supplies, but they were more unsure about its specific environmental benefits and impacts. Marine and coastal environments were valued highly by all interviewees and mail survey respondents. Both sets of mail survey respondents rated environmental impacts as the most important aquaculture issue. More Victorian interviewees and mail survey respondents had strong environmental interests.

### ***Some industry sectors attract greater trust and lower perceived risk***

Interviewees had mixed trust in the aquaculture industry. Their judgements were informed by their perceptions of the industry sectors' motivations and environmental performance, the presence of environmental or social problems, and the appropriateness of governments' environmental regulations.

Mail survey respondents trusted some aquaculture sectors more than others, with differences revealed between the regions: the SA aquaculture industry, SA oysters, SA abalone, SA tuna and SA mussels received the *highest* trust ratings; while the SA kingfish and SA tuna sectors and the Victorian aquaculture

***Mixed opinions about trustworthiness of governments' decisions and actions***

industry received the *lowest* trust ratings. Respondents also saw a greater risk of future environmental damage from some aquaculture sectors. Respondents were most *unsure* about the Victorian aquaculture industry. The *greatest* risk was attributed to the SA kingfish and tuna sectors, while the SA shellfish sectors attracted the *lowest* risk ratings.

Interviewees' judgements about governments' aquaculture decisions were influenced by their perceptions of: governments' impartiality and responsiveness towards different stakeholders, and the appropriateness of environmental regulations and management.

Mail survey respondents were generally more unsure about or mistrusting of governments' aquaculture decisions and actions than they were trusting. The SA respondents were more supportive of State and Local Governments actions, than the Victorian respondents.

***Mail survey respondents often rated their knowledge about aquaculture as 'low'***

Interviewees were more informed about aquaculture matters, given their particular interest in the industry. Mail survey respondents in both regions rated their knowledge as 'low', but Victorian respondents were much less aware of aquaculture than their SA counterparts. Both sets of respondents knew the least about governments' roles and Indigenous communities' interest/involvement in aquaculture.

***Some sources of information are perceived to be more important and credible than others***

Mail survey respondents used varied sources to obtain information about aquaculture. Other research and the Victorian case study show that sources rated *most important* often receive lower credibility ratings (e.g. media, governments), while sources used less frequently receive *higher credibility* ratings (e.g. universities/research centres, the aquaculture industry, libraries, the internet, personal experience).

***Strong support for improved dialogues among government, the aquaculture industry, and communities***

Interviewees in both regions were interested to see improved relations among governments, the aquaculture industry and communities through greater governmental transparency and coordination, firm regulations, clear and accessible information, and more inclusive dialogues with communities.

Mail survey respondents were equally supportive of public input into aquaculture planning decisions, with a third interested in being directly involved. There was stronger support for more interactive ways of participating.

***Caution is required when addressing risk and uncertainty***

It will be increasingly important to understand and value the different ways societal groups perceive risk, particularly the risk that aquaculture might have negative impacts on the environment and human health. Differences between 'expert' and 'lay public' risk perceptions can often result in an over-reliance on older communications models. In these cases, 'experts' use increasing amounts of technical information to convince the public the risk is negligible and/or under control and rely on one-way information delivery. This approach is known to invite public suspicion.

***Opportunities to disprove negative stereotypes***

Key communications messages and activities aimed at building public trust will also need to disprove some of the more commonly held negative stereotypes of governments and industries by clearly demonstrating:

- The aquaculture industry's transparency, and concern and care for the public interest and for environmental protection; and
- The governments' commitment and ability to lessen negative

environmental (and social) impacts and to be responsive to a wide range of interests.

***Public information about aquaculture should be accessible and credible***

Easy access to credible information is another key component to building public trust in aquaculture. It will be valuable for governments and the aquaculture industry to further investigate ways to:

- Increase the use of information sources seen as more credible, such as the ABC radio, direct contact with the aquaculture industry, and universities/research centres;
- Selectively use important but less credible sources, such as the mass media; and
- Improve the use and credibility of governments' aquaculture information

***Communities will need to be engaged***

More innovative participatory strategies and fora could complement existing community consultation activities, thereby increasing the effectiveness of decision-making and building public trust. These initiatives should ideally be more inclusive, occur earlier in decision-making, match methods to clearly-stated objectives, be delivered at regional/local scales by people with credibility and community engagement expertise, and offer genuine opportunities to influence decisions.

***Targeted communications meet interests of varied audiences***

Some parts of 'the public' are more likely to support or oppose aquaculture, depending on socio-demographic features of communities, people's experiences, aquaculture industry sectors and practices, and other factors. In addition, interest-based communities, like the ones identified in this project, are likely to be more informed and interested in being involved in decision-making. Communicating about aquaculture – whether simply providing information or by involving the public in decision-making - will be more effective when it is tailored to those differences.

***Informed decisions will avoid costly delays and conflicts, and build public trust***

Comprehensive and timely information on aquaculture's social dimensions is needed to avoid costly delays and conflicts and build public support. There is a need for continued and expanded use of social research and assessments, including:

- More frequent use of the full range of social assessment tools earlier in aquaculture decision-making, including consistent and extensive social criteria to complement the biophysical criteria used in resource assessments, project feasibility studies and development approvals;
- Stocktakes and evaluations of governments' and the aquaculture industry's use of social assessment and community consultation tools to identify best practice principles to support implementation;
- Regular monitoring of public opinions about aquaculture, utilising baseline information and key indicators used in this study to track changes;
- Additional case studies of aquaculture regions with a particular focus on social conflict prevention and management strategies; and
- An education and training inventory to identify knowledge and skills required to understand aquaculture's social dimensions, which could then be incorporated into curricula, competency standards, and accreditation schemes for employees, consultants and trainers in the aquaculture industry.



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# Chapter One: Introduction

## Aquaculture in Australia

Aquaculture is the farming of aquatic organisms such as fish, molluscs (shellfish), crustaceans and marine plants, and involves practices such as regular stocking, feeding, and/or protecting stock from predators. Aquaculture takes place in inland, marine and coastal settings using a variety of methods, including raceways, cages, ponds, tanks, ropes, rafts and racks.

The Australian aquaculture industry is quite diverse. Figure 1 shows that a wide range of aquaculture species is farmed across Australia. Five major sectors contribute to the bulk (91%) of the industry's gross value of production (GVP) in Australia: southern bluefin tuna (\$261 million), pearls (\$175 million), Atlantic salmon (\$112 million), edible oysters (\$57 million) and prawns (\$65 million) (Love & Langenkamp 2003). The remaining 9% of the industry's GVP is comprised mainly of other finfish (trout, barramundi and inland freshwater fish), freshwater crayfish and mussels (Love & Langenkamp 2003).

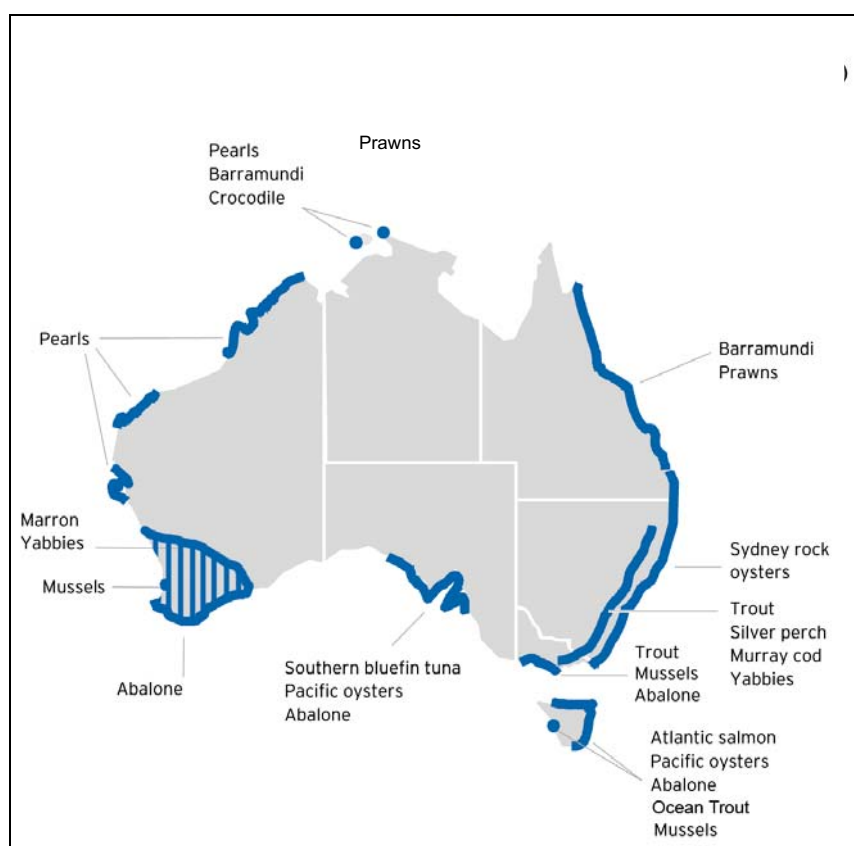


Figure 1: Location of aquaculture in Australia (Source: National Aquaculture Council 2004)

## The sustainability challenge

Aquaculture is a growing and high value industry whose development depends on access to, and the sustainable use of, shared natural resources in inland, coastal and marine environments. A range of stakeholders and communities has an interest in how these public resources are used, and much of that interest is focused on aquaculture's sustainability.

There are strong community expectations of, and formal government commitments to developing and managing the aquaculture industry according to the principles of Ecologically Sustainable Development (ESD). Achieving ESD is recognised as the overriding strategic issue and challenge for global aquaculture (FAO 2002: 23). ESD remains a challenge for aquaculture (and other industries), because different values and belief systems operating in society mean that ESD is subject to varying interpretations about what kinds of activities are truly 'sustainable' and how we can best balance the social, economic and environmental priorities of resource use.

For example, it is now well recognised in Australia and internationally that there are mixed opinions about aquaculture (FAO 2002; Kaiser & Stead 2002; PMSEIC 2002). These dialogues are focused on aquaculture's environmental, social and economic benefits and costs. Widely noted is the industry's potential to bring considerable economic opportunity and diversity to remote/rural regions and to supplement declining seafood supplies in the face of increasing demand (FAO 2002; PMSEIC 2002; Katranidis et al. 2002). In contrast, others have pointed to negative (current and potential) environmental impacts from aquaculture, which produce an 'ecological footprint' that is unsustainable (Black 2001: 199; Naylor et al. 2001; Pauly et al. 2002; Meffe 1992). These include siting and construction impacts, and local and off-site impacts from farm operations, some of which may also produce some social impacts – most often noted as effects on multiple use and amenity values (see Appendix 1).

These differences of opinion about aquaculture's sustainability may lead to conflict, which in turn make it difficult to apply ESD principles to on ground situations and can have negative impacts on aquaculture and other primary industries and communities. These situations signal the need to consider how to build the social sustainability of aquaculture. There are few agreed definitions of aquaculture's social sustainability, however, further dialogues among governments, the aquaculture industry and communities might consider the extent to which the aquaculture industry:

- Contributes to meeting the basic needs of current and future generations (e.g. secure and safe food supplies);
- Is acceptable to diverse communities;
- Helps build human and social capital;
- Provides for on-going and meaningful employment; and
- Persists over time with minimal social conflict and maximum social justice.

Understanding and anticipating aquaculture conflicts and developing policies and approaches which are responsive to varied interests is an important part of (clarifying and) securing aquaculture's social sustainability. In turn, this information also increases the effectiveness of marketing, communications and consultation/engagement programs. It is, therefore, especially pertinent and timely to seek a better understanding of how stakeholders and communities perceive aquaculture.

### **Community perceptions of aquaculture project**

The Community Perceptions of Aquaculture Project was designed to provide important information about the values that communities and other stakeholders attach to aquaculture. The broad objective of the study has been to contribute to the long-term viability of aquaculture by helping government, stakeholders and communities to:

- Understand the range of different perspectives held about aquaculture;
- Develop policies and programs that are responsive to a wide range of interests; and
- Improve participation, consultation and communication processes.

While aquaculture is undertaken in a range of environments, this project has a specific focus *marine* and *coastal* aquaculture.

The Community Perceptions of Aquaculture Project has been funded by the Australian Government's Department of Agriculture, Fisheries and Forestry and Agriculture - Fisheries and Aquaculture Branch (FAB-DAFF), the Bureau of Rural Sciences (BRS), and the Victorian Department of Primary Industries - Fisheries Victoria (DPI). The project also benefited from the support of the Department of Primary Industries and Resources South Australia – Aquaculture (PIRSA).

This study involved case studies of two aquaculture regions in Australia: the Eyre Peninsula, South Australia, and the Port Phillip Bay, Victoria. Primary data were collected through a total of 66 in-depth interviews with State and Local Government agency staff, aquaculture industry representatives, researchers, conservation organisations, and community members. Mail surveys (500 – 700 households) were undertaken in each selected aquaculture region.

The Community Perceptions of Aquaculture Project has produced several BRS reports detailing the background research for the project and the case study findings:

- *Community perceptions of aquaculture: related social research* (Mazur 2004);
- *Community perceptions of aquaculture: report on the Eyre Peninsula* (Mazur et al. 2004a); and
- *Community perceptions of aquaculture: report on the Port Phillip Region* (Mazur et al. 2004b).

This report integrates the findings from those reports to identify key implications and recommendations for improving the social acceptability of marine and coastal aquaculture in Australia.

## **Report structure**

**Chapter One** introduces the project and specifies the report structure.

**Chapter Two** provides a preliminary analysis of the key stages of aquaculture decision-making, and how social research and assessments and community consultations are used in those processes.

**Chapter Three** provides a brief review of the two case study regions: the Eyre Peninsula, South Australia and the Port Phillip Bay area, Victoria. It includes a comparison of the regions' key social and economic features, including the different aquaculture industry sectors and their respective economic contributions to the regions.

**Chapter Four** compares the findings from the stakeholder and community interviews and mails surveys conducted in 2003 in each of the two regions. These data are presented in graphs and discussed in the text.

As a supplement to the extensive detail provided in Chapter Four, **Chapter Five** discusses highlights from the interview and mail survey findings. **Chapter Six** identifies several important conclusions, which flow from the projects' findings.



## Chapter Two: Social information for aquaculture decisions

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### Decision-making systems

All levels of government in Australia play a role in aquaculture decision-making. However, the State and Territory Governments have primary responsibility for aquaculture, and those duties are wide ranging, including support for industry development, allocating and approving sites for aquaculture operations, and regulating and managing aquaculture activities. There are also significant differences in how aquaculture is regulated and administered across the States/Territories. In addition to varied management and regulatory arrangements, the aquaculture industry itself is quite diverse. There are many different species under production, and a variety of farming methods are used. There are also varying levels of cohesion across and within aquaculture industry sectors.

### Governmental decision-making

While there is considerable variety in specific regulations and administrative arrangements, Figure 2 offers a summary of the basic stages of State/Territory Governments' aquaculture decision-making. At Stage 1 State and Territory departments of primary industries (fisheries), planning, environment and land administration, as well as environment protection authorities, administer overarching policies and regulatory frameworks relevant to aquaculture and other kinds of development. Aquaculture may be governed by State and Territory legislation covering fisheries or aquaculture, environment protection, coastal management, land administration, land use planning, native wildlife and water management.

At Stage 2 (Figure 2), decision-making is often focused on formulating State and regional scale policies, regulations and/or management plans that are *specific to aquaculture*. For example, in SA, PIRSA has separate policies laying down broad principles and frameworks for environmental management, licensing and leasing, aquatic animal health, shellfish quality assurance and tenure allocation for the State's aquaculture industry. There are also policies to guide industry development for each of SA's regional aquaculture zones. Victoria and NSW have broad strategies for aquaculture development across the State. In Victoria, the Department of Primary Industries (DPI) prepares plans for the management of each of its aquaculture fisheries reserves. The NSW Department of Primary Industries (NSW-DPI) has a broad aquaculture strategy for the State, and is preparing several aquaculture strategies to encourage growth and guide aquaculture industry development in designated regions across the State.

Both the higher order policies and regulations (Figure 2 - Stage 1) and the aquaculture specific policies, regulations and management plans (Figure 2 - Stage 2, 2a) are used for resource planning: identifying available natural resources and processes for setting aside areas for aquaculture use and providing for tenure. In some jurisdictions, such as Qld, WA and the NT, the process of identifying and allocating resources is less structured than in SA and TAS (see Productivity Commission 2004 for further details). At Stage 3 (Figure 2), tenure and the right to occupy and use a specific site may be provided for through the allocation of leases. Each jurisdiction has a different approach to leasing, and linkages between leasing and licensing procedures vary as well (see Productivity Commission 2004).

At Stage 4 (Figure 2), governments generally use approvals, such as licenses and permits, to regulate activities by requiring application and consent before the activity can legally begin. These approvals often include conditions that holders must comply with (Productivity Commission 2004: 97). The types of and requirements for aquaculture development approvals varies across the States, and some States and Territories require separate environmental approvals. (see Productivity Commission 2004 for details). All States and Territories in

Australia require some form of monitoring for commercial aquaculture operations, and those requirements are typically set out in an environmental license or permit (Productivity Commission 2004).

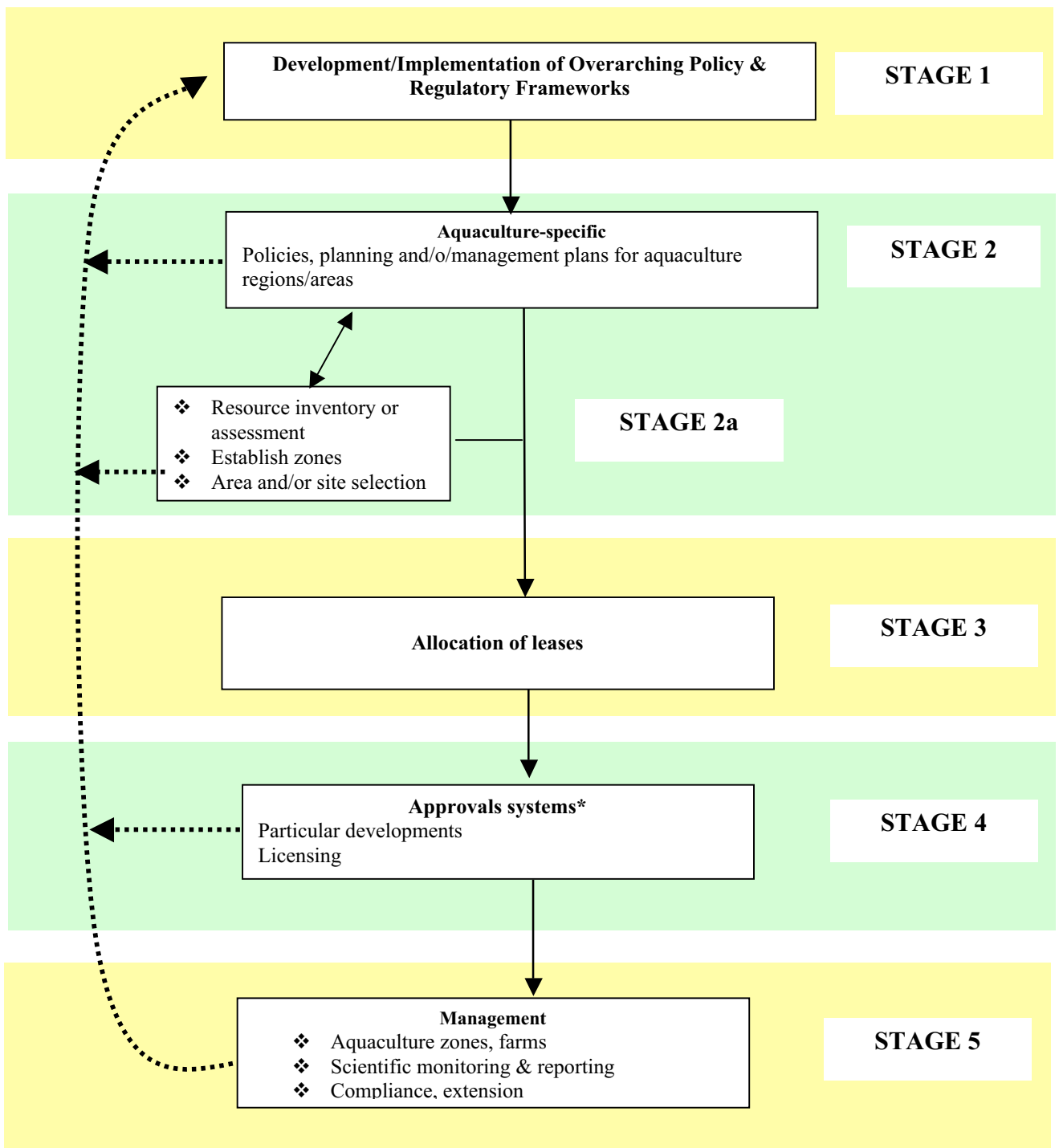
Stage 5 (Figure 2) entails the on going management of aquaculture zones and particular farms. At this stage of decision-making, extensions service and scientific monitoring may take place and be fed back into other decision-making stages.

### **Industry decision-making**

Figure 3 depicts basic stages of decision-making that aquaculture industry developers, managers and operators will undertake. Stage 1 represents the scoping phase where project feasibility is determined by considering suitable sites, species and market conditions. Stage 2 entails further development of the project parameters, and is followed by Stage 3 where aquaculture industry representative engage with (State and Local) Governments to seek approval(s) for the project(s). Provided approvals are won, an aquaculturalist moves to Stage 4 where they construct and continue to operate their facilities. At this stage of the decision-making cycle, there may be further and on-going interaction with governments in relation to management activities, such as scientific monitoring and reporting. Stage 5 of the overall process entails moving products to market through wholesalers and/or retailers. This discussion provides a preliminary analysis of the industry's decision-making environment. More in-depth investigations are needed into how the aquaculture industry uses social analyses and community relationships to make decisions about achieving the best balance of social, economic and environmental outcomes.

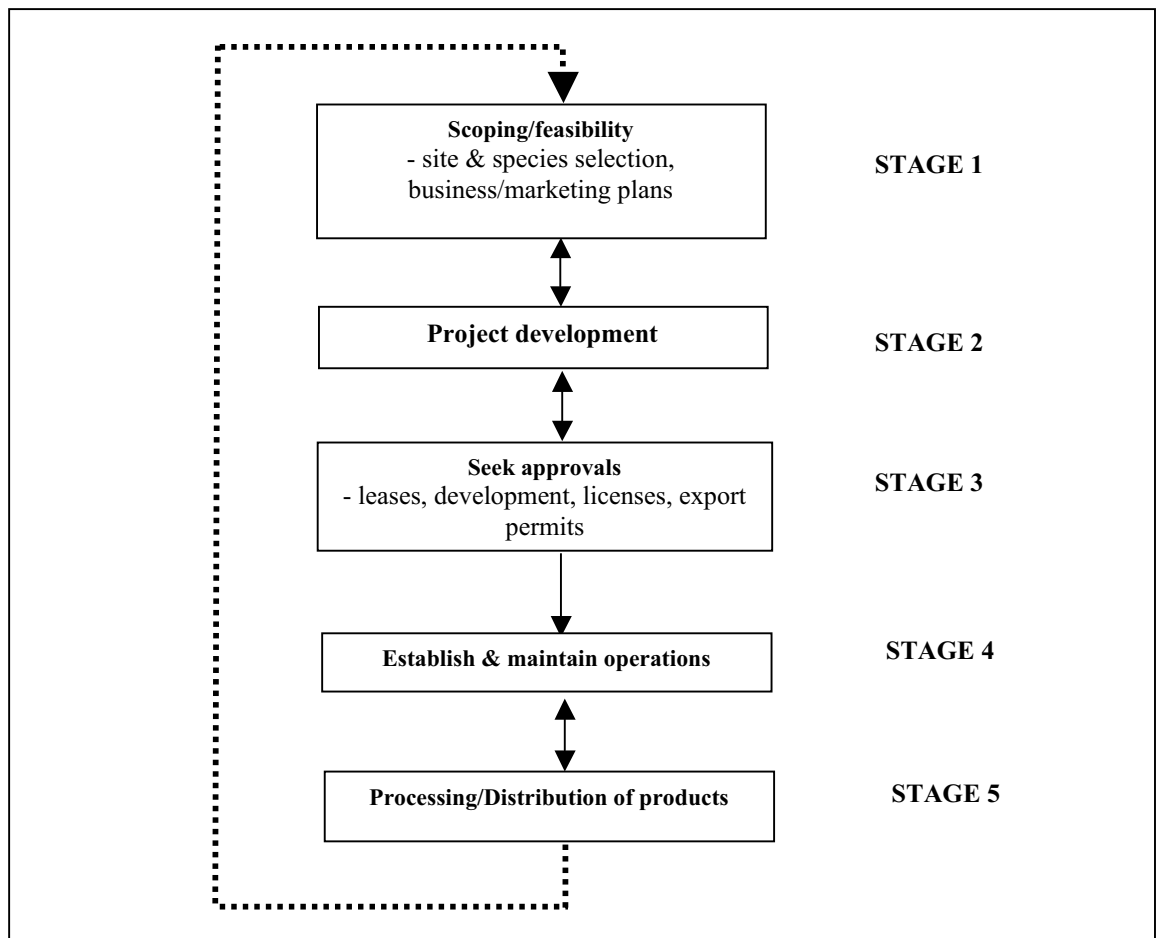
Towards that end, and as part of its training scheme for recent entrants into the public service, DAFF is sponsoring a project which is seeking information on the different ways that the aquaculture industry interacts with communities at different stages of its decision-making. Similarly to the Community Perceptions of Aquaculture Project, this Graduate Project has a regional focus – DAFF staff are interviewing a selection of marine and coastal aquaculture farmers in the Brisbane area. To date, the project has found that these farmers were inclined to:

- Define 'community' as those living in close proximity to their operations and/or who have a direct impact on their operations (e.g. other industries, customers, visitors, neighbours);
- Include governments (State and Local) as the key focal point in their formal consultation processes;
- Use information provision (e.g. tours, media stories, promotional videos) in their informal interactions with communities; and
- Varied their community consultation practices, depending on the size and scale of their operations.



\* Some responsibility for approvals shared by the Australian and Local Governments

Figure 2: Different stages of government and aquaculture industry decision-making



**Figure 3: General stages of aquaculture industry decision-making**

### **Social research for government decision-making**

A range of information on the social dimensions and impacts of aquaculture can support government and industry decision-making. More lasting and socially acceptable policies and programs are those that include extensive consideration of a range of social conditions influencing resource management and use [e.g. stakeholder and community needs and interests, and historic and current issues operating in different communities, etc].

The remaining sections describe the following kinds of social information and provide a preliminary exploration of how such information is used at different stages of State/Territory Government aquaculture decision-making:

- Identifying public values, attitudes, beliefs and behaviour in relation to aquaculture;
- Understanding how impacts from changes to aquaculture policy, development and management are distributed across communities;
- Providing opportunities for stakeholder and community input into aquaculture planning and management decisions.

### **Public opinion studies**

To date, there have been few Australian studies that systematically explore communities' perceptions of and responses to aquaculture development, planning and management (see Mazur 2004 for a review of relevant studies). State and Territory Governments' primarily rely on information about 'social' issues relating to aquaculture gathered during their respective (formal and informal) community consultation processes. However, there are examples of some policies and projects that signal an increasing interest in understanding select social dimensions of aquaculture development and management, and that have produced information that can inform all stages of government and industry decision-making.

As part of its strategy to develop aquaculture in Victoria, the DPI has been an active partner, alongside DAFF and BRS, in the Community Perceptions of Aquaculture Project. Much of the current aquaculture development activity has focused on the Port Phillip Bay Area where several new zones for marine farming (predominately native blue mussels) are being designated, and Management Plans for those areas are being finalised. DPI identified the need to understand community and stakeholder perceptions of and responses to aquaculture development in their region, and to undertake sound consultation and participation processes associated with sustainable industry development. The information from the Victorian case study will inform development of DPI's (regional) aquaculture management plans (Figure 2 - Stage 2a), and on-going management of these aquaculture areas (Figure 2 - Stage 5).

The Queensland Government's Department of State Development (DSD) implemented a policy that encourages aquaculture developers to understand and seek the support of communities (see Box 1). DSD has stated that in order to achieve responsible and sustainable development of aquaculture in the State, communities must be engaged and informed through *ongoing* communications efforts. DSD recognises that there may be several 'communities' that have an interest in aquaculture – including all three levels of government - and that community support for an aquaculture project, or the lack of it, can influence project feasibility.

#### **Box 1 - Communications Fact Sheets**

DSD produces a series of Aquaculture Industry Fact Sheets that are provided to industry as part of its industry support program. The Communications Strategy Fact Sheet contains information about the need to engage with communities at all stages of decision-making. The Fact Sheet includes some fundamental principles for industry to follow, which include the need to:

- Develop an understanding of the information the community wants on aquaculture projects
- Be honest and truthful in communicating with communities
- Utilise media outlets that communities both use and find credible
- Highlight how industry can benefit particular regions, and
- Utilise success and expertise of community engagement professionals.

As a result of this policy, a key component of determining the feasibility of major aquaculture developments in the Bowen region was a community consultation project undertaken by the developer, which identified the nature and intensity of community concerns about aquaculture development in their region (Wilson 2001). The project methods and key findings are shown in Appendix 2.

### **Social (impact) assessment**

The development and management of natural resources (such as marine and coastal environments) will generate costs, benefits and other social impacts that are unevenly distributed (in space and time) across different people, groups, organisations, cultures, sectors

and regions (Dale et al 2001: v). A particular kind of social analysis is used to understand the (negative and positive) impacts of particular resource development, policies and plans at local and regional levels. This analysis may also include plans or strategies to mitigate adverse consequences and enhance the extent of benefits (Lane et al 2001:5).

Different terms are used to refer to this kind of social analysis, and generally refer to different types and levels of assessment involved (see Table 1). Different types of social information may be gathered to assess the social impacts of an existing activity or a planned change, and different methods may be used depending on the types of information being collected and analysed. For the purposes of this discussion, the term 'social assessment' will be used to refer to all three types and levels of analyses.

**Table 1: Different levels of social assessment**

<b>Type of analysis</b>	<b>Function</b>
<b>Social profiling</b>	Using secondary data (i.e. existing data, such as the Census, other social data) to produce socio-demographic profile of the community associated with a particular industry or region.
<b>Social assessment</b>	Explores issues in more depth, by collecting primary data from surveys, interviews, focus groups etc. Involves the community by using their knowledge to build a picture of the social effects of a particular activity.
<b>Social impact assessment (SIA)</b>	When a change is proposed, SIA is used to evaluate the likely impacts of a planned activity, develop strategies to mitigate adverse impacts, and monitor outcomes of change. Before doing this, a complete profile and assessment are required.

In natural resource contexts in Australia, there are four types of legislation that may contain some degree of social assessment requirements including:

- development legislation (particularly State-initiated development);
- environmental planning and protection legislation;
- legislation for conserving natural and cultural resources;
- natural resource development legislation (Cox et al. 2001).

Social assessment is generally not required by law, but is included in expanded definitions of the environment, which often make reference to the human or social aspects. There may also be guidelines for preparing environmental impact statements (EISs) that make some reference to assessing the social dimension. In their review, Cox et al. (2001) determined that:

- The biophysical aspects of assessments tend to be emphasised more strongly than SIA; and
- EIS guidelines tend to lack clear specification of appropriate SIA parameters.

The legislative bases for social assessment in the States/Territories and aquaculture-specific requirements for or reference to social assessment are listed in Appendix 3. Generally, there are no formal requirements for social assessment in an aquaculture context. Where there is reference in regulations for the need to account for social dimensions or impacts of aquaculture, it is generally to be undertaken at two key stages of decision-making: Stage 2 (planning for aquaculture zones or areas), and Stage 4 (development approvals)(Figure 2).

The use of social assessment in natural resource management contexts tends to be at the discretion of the authorities, and there are few specific guidelines for assessing social impacts. In the fisheries sector overall, there has been low awareness of the need for social assessments. More recently, however, there has been increased recognition and use of these kinds of analyses, particularly for identifying the implications of changes to fisheries activities.

In many cases, aquaculture developers – with varying degrees of guidance and support from the relevant authorities – are responsible for undertaking social assessments associated with development approvals processes, often through the use of consultants. Where social issues are considered in aquaculture contexts, there tends to be a stronger focus on social profiling (eg. identifying basic demographics of a region), and identifying the economic benefits that aquaculture would bring to an area. Some authorities may rely more heavily on formal and informal community consultation processes to identify relevant social issues, as opposed to more systematic social assessments of the social effects of a particular activity and the strategies required to mitigate negative impacts. Recently, the NSW DPI has compiled a list of social criteria, which will be included in the Oyster Industry Sustainable Aquaculture Strategy (OISAS) and alongside a range of biophysical criteria, will be used to assess the feasibility of oyster leases in estuarine areas along the NSW coast (see Box 2).

### **Box 2 - The Oyster Industry Sustainable Aquaculture Strategy (OISAS)**

The NSW State Aquaculture Steering Committee has initiated the Oyster Industry Sustainable Aquaculture Strategy (OISAS) as a means to achieve a whole of government approach to the planning and management of that industry in NSW. OISAS will identify areas within estuaries where oyster farming is a priority outcome and enable these areas to be incorporated into State Environmental Planning Policy 62 – Sustainable Aquaculture (SEPP 62). The inclusion of priority oyster farming areas within SEPP 62 will establish the long-term availability of these areas, guidelines for sustainable development practice, and streamline the oyster lease approval process. A feature of particular interest is the use of a range of social criteria that are being used alongside biophysical criteria in an audit of all oyster leases, which in turn will help determine priority areas for oyster aquaculture in NSW. Those social criteria include an existing lease's:

- impacts on visual amenity;
- proximity to wharfs, boat ramps, mooring areas;
- proximity to recreational fishing areas, swimming beaches, and/or nature conservation areas;
- proximity to residential zones; and
- impacts on cultural and Indigenous heritage.

OISAS is expected to be finalised early in 2005.

## **Community consultation**

As discussed earlier, involving communities provides significant opportunities to strengthen decision-making and the social acceptability of government and industry practices by:

- Building a more complete picture of social contexts;
- Supporting the public's 'right to know'; and
- Proactively identifying stakeholder and community concerns.

These in turn can increase public confidence and acceptance of decisions, and allow for informed discussion of issues, resulting in mutual learning and recognition of participant interests (POTS 2001; Shindler et al. 2002).

Different terms are used for involving people in decision making, such as 'public participation', 'community consultation', and 'community engagement'. These terms generally reflect the different ways that people understand the terms 'the public', 'the community', 'stakeholders' and the range of ways there are to participate (Aslin & Brown 2004). 'The public' or 'the community' are catch-all phrases used to describe those with an

interest in a decision other than a proponent or responsible authority. The term ‘stakeholder’ can be understood as those with a (often financial) stake or interest in an issue, such as government agencies, industry, Non Government Organisations (NGOs). The term can also be interpreted quite broadly, to include people who may or may not belong to organised groups, who may or may not have declared their ‘stake’, but who have a ‘right to know’ if their interests may be affected (Petts & Leach 2000: 2). The Community Perceptions of Aquaculture Project has identified that there will be a variety of individuals and groups who have a specific interest in aquaculture (communities of interest), as well as those who are interested in aquaculture because they live in close proximity to it (place-based communities).

There are different degrees of participation in decision-making according to how much power is transferred from the responsible ‘authority’ to the public (see Appendix 4). Different situations will require different levels of participation. In addition, community consultation programs need clear goals, which identify what level of impact participants can expect to have, and methods and tools that match the degree of involvement. They should also be tailored to particular situations and local/regional conditions.

### **Multi-stakeholder groups**

Declining public trust in governments and industries has seen many decision-makers turn their consideration to forms of public participation that are fundamentally different from the more common forms of consultation, such as surveys and opinion polls, public meetings and written submissions. The latter have been found to trigger less enthusiasm, offer very limited opportunity for deliberative dialogues, and can be unrepresentative of particular social groups (POST 2001). Three key features of more interactive fora include:

- **Deliberation:** careful consideration of information and views through social interaction; face-to-face and other forms; using processes that respect different views, values and encourage participants to reflect on their views and re-evaluate their positions on issues as dialogues proceed;
- **Inclusion:** include participation by individuals and groups from broad and diverse range of perspectives, particularly those previously excluded; and be representative of interests rather than represent interests. (POST 2001: Petts & Leach 2000); and
- **Action/Power:** the power and ability of participants to influence outcomes and actions through participation.

Depending on the degree to which multi-stakeholder initiatives are timely, inclusive, and participative, they have considerable potential to improve the quality of natural resource development, planning and management.

### **Governments’ use of community consultation**

The States/Territory’s procedures for (broad-scale) community consultation on aquaculture matters are listed in Appendix 5. Most States have formal requirements to consult with communities about aquaculture planning and development, and use less formal, ad-hoc forms of engaging with communities. Most of these activities:

- Rely more on passive forms of consultation (e.g. public notification, written submissions, public meetings);
- Take place during the development approvals stage (Stage 4) of aquaculture decision-making; while
- Some occur at the (regional, zone) planning stages (Stage 2, 2a).

In some cases, State/Territory decision-makers may have (formal and/or informal) policies that encourage proponents to proactively consider a range of social issues and consult with communities in the earlier stages of decision-making, such as the DSD’s use of Industry Fact Sheets (see Box 1). Given a lack of formal evaluation criteria and mechanisms, it is not currently possible to fully determine the effectiveness of these consultation mechanisms.

### **Use of multi-stakeholder groups**

The State and Territory Governments use multi-stakeholder advisory bodies at different stages of the decision-making process. Generally, most of these groups are used to inform Stage 2 of aquaculture decision-making: advice is provided on aquaculture regulatory reform, policy, and development approvals processes (Figure 2). Some States use this type of group to provide advice on Stage 3 - tenure allocation (SA, TAS) and/or Stage 4 - environmental aspects of development approvals (WA)(Figure 2).

There are some less formal multi-stakeholder initiatives relevant to aquaculture, and the example of the Marine Fishfarmers Association is shown in Box 3. The key features of interest in this initiative are its:

- Diverse membership and consultation/participation of sectors (governments, research/education, the aquaculture industry, conservation groups), including those with positive *and* negative views about aquaculture;
- Use of deliberative forum enabling meaningful dialogues about aquaculture; and
- Efforts to encourage understanding and involvement of communities as early as possible in decisions about aquaculture development, planning and management.

#### **Box 3 - The Marine Fishfarmers Association**

The Marine Fishfarmers Association (MFA) was formed in 2001 to address the sustainable development of marine finfish industry in WA. Funding was secured for a project that would:

- Identify guidelines for the sustainable development of the industry in WA; and
- Develop a Vocational Education and Training course on the environmental management of marine finfish farming that would support the principles embodied in the guidelines.

The Guidelines for Sea-Based Sustainable Marine Finfish Farming are comprised of a list of issues for consideration in Environmental Management Plans for finfish farms. In addition to a range of objectives specifying best-practice environmental management and monitoring, is an objective that encourages industry proponents to ensure local communities are involved in decision-making by:

- Developing an understanding of the information needs of the community regarding particular aquaculture projects;
- Determining what kinds of change communities see as acceptable;
- Demonstrating to communities how environmental issues will be managed;
- Establishing and maintaining community-based advisory forum; and
- Providing records of farm operations and environmental audits to authorities, regulators and communities.



## Chapter Three: The case study regions

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### Regional case studies

The Community Perceptions of Aquaculture Project has utilised case studies of aquaculture in two regions in Australia. A case study can provide high levels of detailed, region-specific information. Using more than one case study can provide valuable insights into variation between groups and settings, and identify common issues across cases, but does not necessarily lay claim to statistically generalisable findings.

This project's case studies were focused on the Eyre Peninsula and the Port Phillip Bay areas, and the insights derived from these studies are likely to have relevance for aquaculture planning and management in other regional areas of Australia. The degree to which the findings will be generalisable depends largely on how similar those regions and their populations are to the two aquaculture case study areas in the following ways:

- Socio-demographic characteristics (e.g. similar age and sex profiles, levels of education);
- Behaviour patterns and experiences (memberships of relevant organisations, participation in relevant recreational activities, degree of contact with aquaculture industry);
- The aquaculture industry's structure and profile (e.g. similar size, sectors and public profile);
- Economic diversity of the region (e.g. degree of dependence on specific industries or sectors);
- Degree of competing uses of coastal/marine environments; and
- Presence of aquaculture-related controversy (e.g. historic, current, level of intensity).

### Regional features of interest

South Australia's **Eyre Peninsula** was the focus for the first case study. The Peninsula is home to a significant aquaculture industry, which is of particular interest to residents in that area, as well as others living in other parts of South Australia. The industry has some of the highest value aquaculture sectors in Australia. There have also been public conflicts and controversies associated with the industry.

The Eyre Peninsula is a large remote region situated in western SA. The Peninsula boasts 2000 km of coastline, which is bounded by the Spencer Gulf in the east and the Great Australian Bight in the west. The Gawler Ranges lie to the north. The region's natural features, particularly its remoteness and marine and coastal environments, figure prominently in its tourism industry. The region is home to over 30 national parks, including the Great Australian Bight Marine Park, and other key tourism destinations and activities, such as the Seafood and Aquaculture Trail. Key growth areas in employment have been the service and recreation sectors, and the fishing, transport and agriculture industries.

Eyre Peninsula has ten Local Government areas (LGAs). Five of these were selected for the case study: Ceduna, Streaky Bay, Lower Eyre Peninsula, Port Lincoln and Cleve, because of their location on the coast and close proximity to where the aquaculture industry is either well developed or in more preliminary stages of development. Port Lincoln, the largest and only city, serves as the regional centre for industry and commerce, particularly the region's aquaculture industry.

The **Port Phillip Bay** region in Victoria was selected for the second case study. The region's (and the State's) aquaculture industry is smaller in production and dollar value terms than the industry on the Eyre Peninsula. However, the industry's setting provides an important illustration of the challenges faced in a place where there are so many competing uses for scarce coastal and marine resources/sites.

Three LGAs were included in this case study. Mornington Peninsula Shire Council, the City of Greater Geelong and the Borough of Queenscliffe form the promontories at the entrance to Port Phillip Bay. These LGAs were identified because they are in close proximity to where the aquaculture industry is either well developed or in more preliminary stages of development. A large part of these LGAs' geographical boundaries are made up of coastline, and each proudly advertises a combination of seaside village and urban lifestyles. It is also significant that Victoria has the highest population-to-coastline ratio of all the Australian states and territories, and coastal environmental and economic resources are both highly valued.

The Mornington Peninsula Shire has 190 km of coastline, with the majority of its population clustered along the eastern side of Port Phillip Bay. This LGA is home to traditional beach holiday resorts and the Mornington Peninsula National Park, which is the most visited national park in Victoria. Geelong is Victoria's largest regional city and Australia's eleventh largest urban centre. It has easy access by road and rail to Melbourne. It includes semi-rural settings, urban communities and extensive coastline. Geelong hosts several major industries, serves as the gateway to key tourism destinations, and has an active retail and commercial precinct. Queenscliffe is located close to Geelong at the end of the Bellarine Peninsula. This LGA has a strong urban conservation tradition, which supports its heritage-based tourism. There are also eco-tourism, recreational and commercial fishing ventures that rely on the Peninsula's coastal and marine features of high ecological value.

The socio-demographic features of particular regions will have some bearing on perceptions of aquaculture. Of particular interest is communities' awareness of and support for the aquaculture industry's (and its sectors') socio-economic contributions to local and regional economies (e.g. employment, flow-on benefits, etc.). Table 2 lists some key differences and similarities between the two regions. Generally, the industry's socio-economic benefits may be more readily detected and felt by the Eyre Peninsula community because, compared to the Port Phillip Bay area, there were generally:

- Lower population densities and more population declines;
- Lower economic diversity;
- Higher percentage of people on lower incomes and higher rates of disadvantage; and
- Lower percentage of people who had completed their tertiary qualifications.

**Table 2: Key socio-demographic features of the case study regions (Source: ABS 2001 Census)**

	<b>Eyre Peninsula*</b>	<b>Port Phillip**</b>
<b>Location</b>	Considerable distance from major capital city (Adelaide)	Close proximity to major capital city (Melbourne)
<b>Population density</b>	30,000	300,000+
<b>Age profile</b>	Largely comparable to non-metropolitan averages	N/A
<b>Population growth rates</b>	<ul style="list-style-type: none"> <li>• Port Lincoln and the Lower Eyre Peninsula were growing at high rates (double the average for non-metropolitan areas);</li> <li>• Other LGAs in decline (two had growth rates below the non-metropolitan average);</li> <li>• Nearly half of the Peninsula's LGAs had decreasing populations.</li> </ul>	<ul style="list-style-type: none"> <li>• Mornington's rate nearly double the metropolitan and non-metropolitan averages</li> <li>• Queenscliffe had a negative growth rate</li> <li>• Geelong's rate comparable to the non-metropolitan average</li> </ul>
<b>Indigenous community</b>	<ul style="list-style-type: none"> <li>• Less than 5% of the broader population</li> <li>• 22% of Ceduna population</li> </ul>	<ul style="list-style-type: none"> <li>• Less than 1% of population</li> </ul>
<b>Rates of disadvantage</b>	<ul style="list-style-type: none"> <li>• Greater percentage of residents on low incomes than the non-metropolitan average</li> <li>• Higher overall rates of disadvantage than the non-metropolitan average</li> </ul>	<ul style="list-style-type: none"> <li>• Generally lower than average rates of disadvantage</li> </ul>
<b>Education</b>	<ul style="list-style-type: none"> <li>• Higher rates of residents with no post-school qualifications than the non-metropolitan average</li> <li>• Comparable rates of trade qualifications compared to non-metropolitan average</li> <li>• Lower rates of tertiary qualifications compared to non-metropolitan average</li> </ul>	<ul style="list-style-type: none"> <li>• Higher percentage of Queenscliffe residents with tertiary qualifications than the metropolitan and non-metropolitan averages</li> <li>• Higher percentage of Geelong and Mornington residents with tertiary qualifications (10%) than the metropolitan average but lower than the non-metropolitan average</li> </ul>
<b>Unemployment</b>	<ul style="list-style-type: none"> <li>• Lower rates of unemployment than the non-metropolitan average</li> <li>• Port Lincoln's unemployment rates equivalent to the non-metropolitan average</li> <li>• Whyalla's unemployment rates nearly double the non-metropolitan and national averages</li> </ul>	<ul style="list-style-type: none"> <li>• Geelong's rate (8.6%) was higher than the non-metropolitan average</li> <li>• Mornington (6%) and Queenscliffe's (5.2%) rates were below the non-metropolitan average and much lower than the metropolitan average</li> </ul>
<b>Economic diversity</b>	<ul style="list-style-type: none"> <li>• Generally lower economic diversity than the non-metropolitan average</li> <li>• Ceduna and Port Lincoln had greater economic diversity than the Peninsula's other LGAs</li> </ul>	<ul style="list-style-type: none"> <li>• Geelong had lower economic diversity than the metropolitan and non-metropolitan averages</li> <li>• Mornington had levels comparable with the metropolitan and non-metropolitan averages</li> <li>• Queenscliffe had slightly less economic diversity than the non-metropolitan average</li> </ul>

## Aquaculture industry features

The Australian aquaculture industry is diverse, comprising numerous sectors. Given its intensive requirements for labour and materials, the industry can help support regional and local economies, which may be in decline due to the contraction of other industries (EconSearch 1999).

Table 3 highlights some of the differences between the aquaculture industry in the Port Phillip and Eyre Peninsula regions. The most obvious difference is the scale and total value of the aquaculture industry in South Australia compared to the Victorian industry. Table 3 also illustrates some significant differences in the employment associated with the industry, which will partly inform how aware the public is of the industry's socio-economic contributions to particular regions. For example:

- Direct employment in aquaculture comprises a low percentage of *total* employment in all industries in both regions, but is generally stronger on the Eyre Peninsula;
- The Eyre Peninsula had a much higher number of people employed directly by the aquaculture industry;
- The number and percentage of (direct) aquaculture jobs can vary significantly between regions, but also between localities in a region; and
- (Direct) Aquaculture jobs constitute a substantial percentage of jobs in the commercial fishing sector, and that percentage varies within regions as well as across regions.

**Table 3: Select features of the aquaculture industry in SA and Victoria**

	South Australia and Eyre Peninsula	Victoria and Port Phillip Bay	
<b>Industry features</b>			
Total industry value	\$264 million	\$21 million	
Total no. of sectors	10	7	
<b>Aquaculture employment</b>			
Employment in commercial fishing sector*	45 – 85%	30 – 74%	
Employment in all industries*	1 – 9%	negligible	
No. of direct jobs	1, 210	438	
No. of total - indirect and direct – jobs**	2,600	Data not available	
No. of direct jobs in sectors (2001/02)**			
	Tuna	Salmonids	149
	Oysters	Mussels/other shellfish	100
	Other aquaculture	Yabbies	67
	Barramundi	Warmwater finfish	57
	Abalone	Abalone	42
	Atlantic salmon	Ornamental fish	23
	Mussels		31

\* Source: ABS 2001 Census

\*\* EconSearch (2003) and NRE (2003)

## Chapter Four: Interview and mail survey findings

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Interviews and mail surveys were used in this project to:

- Combine the strengths of qualitative and quantitative methods, namely being able to capture the breadth and depth of aquaculture issues;
- Identify the views of those with long-standing interests in aquaculture (through the interview process), as well as those of the wider community (through the mail surveys); and
- Elicit information about people's awareness of and knowledge about aquaculture, trust in governments and the aquaculture industry, risk perceptions, and views about public participation in aquaculture decision-making.

This chapter reviews the key findings from the interviews and mail surveys conducted for both case studies: the Eyre Peninsula and Port Phillip Bay (Mazur et al. 2004a; Mazur et al. 2004b). The key aim of this section is to compare the findings between the two regions. In some cases, comparisons are also made with similar questions from other coastal management and aquaculture-related surveys. More extensive coverage of these related surveys can be found in the BRS report, *Community perceptions of aquaculture: related social research* (Mazur 2004).

### Interviewee sampling and profiles

The stakeholder groups represented in the sample from both regions were largely similar. In both cases *stratified purposeful sampling* (Patton 1990) was used to obtain a cross section of different interests at different scales (State, regional, local). The sample reflected the diverse range of interests in aquaculture: aquaculture industry, coastal management, industry development, commercial and recreational fishing, fish processors, tourism, recreational groups, conservation groups, and other community groups. Interviewees were selected on the basis of these interests, as well as for the scale at which their interest was focused (e.g. local, regional, State-wide). For both samples, a greater emphasis was placed on interviewing people at the regional/local scale. For the related industries stakeholder group, there was a stronger representation of tourism interests in the Victorian sample, while the SA sample had more fishing-related stakeholders represented.

### Mail survey

#### Response rates

Both mail surveys generated high response rates, with a higher response rate on the Eyre Peninsula (68%) than in the Port Phillip Bay region (59%). A possible explanation for these results might be that mail surveys can elicit higher response rates than other survey techniques. In addition, the Eyre Peninsula community may have a greater awareness of (and interest in) the aquaculture industry than the Port Phillip regional community. This greater awareness might be attributed to the industry's higher profile than in the Port Phillip Bay region. The industry's high public profile is a likely effect of the industry's greater overall direct impact on the region by virtue of its:

- Greater size and production value compared to the Victorian industry;
- Larger numbers of people employed in the industry;
- Lower population of the Eyre Peninsula region;
- Being featured as a key tourism activity (e.g. the Seafood and Aquaculture Trail); and
- Physical locations – many of the key sites are readily visible from populated areas.

### Respondent profile

Table 4 shows the respondent profiles for each case study and highlights some of the major differences of the respondents. The South Australian survey attracted a higher proportion of male respondents. This bias was redressed in the Victorian mail survey by asking half of the potential respondents to have a female in their household complete the questionnaire.

**Table 4: Eyre Peninsula and Port Phillip Bay mail survey respondent profiles**

	SA	VIC
Sex	72% male 28% female	51% male 49% female
Age	57% over 50 years of age	57% over 50 years of age
Education	13% tertiary qualifications	40% tertiary qualifications
Occupation	8% in fishing/aquaculture 35% farming/agriculture 11% professional 16% retired 31% other*	0% in fishing/aquaculture 2% farming/agriculture 23% professional 29% retired 33% other*
Group membership	13% - Yes	11% - Yes
Recreational activities	73% Recreation fishing 60% Beach activities 12.4% Conservation	31% Recreational fishing 69% Beach activities 48% Conservation
Visited aquaculture site	78% - Yes	40% - Yes
Social contact with aquaculture industry	85% - Yes	17% - Yes
Preference for wild-caught fish versus farmed fish	44% prefer wild-caught 45% no preference 10% don't know	20% prefer wild-caught 45% no preference 24% don't know

*\*This category included clerical, administration, retail, student and home duties.*

Both samples had a similar percentage of respondents over 50 years of age. And most respondents had lived in their local area for more than ten years. A higher percentage of the Port Phillip respondents had completed their tertiary qualifications. There were more Eyre Peninsula respondents who worked in the fishing and agricultural sectors, while the Port Phillip sample included higher percentages of retired respondents and those working as professionals.

Few respondents in either sample belonged to an organised group with a specific interest in coastal management. There appeared to be more active recreational fishers among the Eyre Peninsula respondents, while the Port Phillip respondents appeared to visit the beach and engage in conservation-related activities more frequently.

A majority of respondents in both regions reported eating seafood. There was a stronger preference for wild-caught fish among the Eyre Peninsula respondents, although both sets of respondents gave similar reasons for this preference, namely that they felt wild-caught fish were more 'natural', had a better taste, were fresher than 'farmed fish', and that they liked to eat what they caught. A similar percentage of respondents from both regions had no preference, most often because respondents did not perceive any taste difference or they enjoyed all seafood. More Port Phillip respondents were unsure about having a preference, because they wondered how one would know the difference.

In the United States, a national survey on consumer concerns of fishing found similar results to those reported here (Blackstone 2001). The data revealed that 34% of respondents

disagreed with the statement that there were no differences between wild caught fish to those raised in farms, while 45% did not know. Some 26% preferred wild-caught fish, with those preferences stronger in coastal regions, and 25% preferred farmed fish, with stronger preferences in inland areas.

### Representativeness of the mail survey samples

Comparisons were made between Eyre Peninsula and Port Phillip respondents and ABS Census data for the respective LGAs in which we sampled. Table 5 shows that when verified against factors of age, sex and education both samples had biases, with a stronger bias in the SA sample.

**Table 5: Sample biases resulting from mail surveys**

Demographic factors	Eyre Peninsula	Port Phillip Bay
Gender	<ul style="list-style-type: none"> <li>Bias towards males</li> </ul>	<ul style="list-style-type: none"> <li>No gender bias*</li> </ul>
Age	<ul style="list-style-type: none"> <li>Over-represented residents 40-59 years of age</li> <li>Under-represented residents younger than 19 years of age and those who were 20-39 years of age</li> </ul>	<ul style="list-style-type: none"> <li>Over-represented residents 40-49 years of age and those over 60 years of age; and</li> <li>Under-represented residents younger than 19 years of age.</li> </ul>
Education	<ul style="list-style-type: none"> <li>Skewed towards people with trade and university qualifications</li> </ul>	<ul style="list-style-type: none"> <li>Skewed towards people with university qualifications</li> </ul>

\* The mail survey instructions were designed to correct the bias towards male respondents in the Eyre Peninsula.

It is also worth noting that the survey forms requested that persons 18 years of age or older complete the survey, and the low probability that persons 18 years or younger would be listed in the White Pages Telephone Directory.

### General and aquaculture issues of importance

For both mail surveys, respondents were asked to rate the importance of social, economic and environmental issues in their regions. For the Eyre Peninsula survey, respondents selected from a list of issues, while the Port Phillip respondents were asked to identify those issues and rank them in order of importance.

For the Eyre Peninsula respondents, health, education, rural decline, crime and unemployment were identified most frequently as ‘very important’. The Port Phillip respondents ranked the following as the most important issues for their region: the environment, education, health, and ‘other’. Compared to the ABS’s national survey on the environment (1999), which found that 9% of people ranked ‘the environment’ as the most important issue, the Port Phillip results suggest a stronger interest in the environment among those respondents than for the Eyre Peninsula respondents.

Mail survey respondents also rated the importance of ten aquaculture-related issues. While it is worth noting that the design of this question was different between the two surveys, similar results were found from the two samples. Aquaculture’s environmental impacts, economic contributions, and impacts on other users, were consistently rated more important than other issues, such as aesthetic impacts, government regulations, community input, site availability, Indigenous communities’ involvement, or approval times.

### Coastal management

Given this project’s focus on marine and coastal aquaculture, respondents were asked about their views relating to coastal management. Table 6 makes direct comparisons between the SA and Victorian mail surveys and makes indirect comparisons between those data and

similar attitude questions from other surveys, such as the national Fisheries Research and Development Corporation (FRDC) survey of community perceptions of fishing and the National Oceans Office survey of the South-east region (Aslin & Byron 2003; NOO 2002).

- Over half of all respondents agreed that overfishing by the commercial sector was a problem for their region, with the highest level of agreement among Victorian respondents (72%) and FRDC survey respondents (65%);
- Fewer respondents felt that recreational fishing was a problem, and results were largely comparable across the four surveys;
- A majority of respondents to the SA, Victorian and NOO surveys agreed that protecting the coastal environment should have a high priority;
- Nearly half of respondents in SA and Victorian were unsure about the quality of coastal management regimes in their respective States;
- There were differences in levels of support for increasing marine protected areas: the SA respondents showed the lowest support, while over half of Victorian respondents and a majority of FRDC and NOO respondents supported more marine protected areas; and
- There were similar responses to respecting the rights of Indigenous communities in coastal and marine matters: SA respondents showed the lowest support, while nearly half of Victorian respondents and a majority of FRDC and NOO respondents agreed.

**Table 6: Attitudes towards coastal management issues**

Survey attitude statements		% of responses		
		Disagree	Neutral/ Don't know	Agree
Overfishing by Australia's commercial fishers is a big problem in this area	SA	21	26	53
	VIC	7	22	72
	NOO	18	34	46
	FRDC	12	23	65
Overfishing by Australia's recreational fishermen is a big problem in this area	SA	40	30	30
	VIC	47	21	32
	NOO	43	32	25
	FRDC	42	26	32
Care of the coastal environment comes first before anything else	SA	11	24	65
Care of the marine environment comes first before anything else	VIC	13	15	72
	NOO	11	21	68
Overall the management of the coastal region is extremely poor	SA	29	50	20
Overall the management of Victoria's coastal region is extremely poor	VIC	21	47	32
We must use coastal resources in the region to ensure economic growth	SA	12	23	65
	VIC	21	21	58
It is essential to use the resources to ensure economic growth for the future	NOO	18	28	53
I think there should be a lot more marine protected areas	SA	29	38	34
	VIC	20	26	54
	NOO	11	21	68
There should be more marine protected areas	FRDC	7	18	75
It's important to respect the rights of Indigenous Australians in the coastal areas	SA	32	37	31
	VIC	23	29	49
It's important to respect the rights of Indigenous Australians in the marine area	NOO	18	24	58
It's important to respect the rights of Indigenous Australians in Australian waters	FRDC	13	22	65

The SA and Victorian case studies also sought to explore community positions on how to prioritise environmental and economic tradeoffs that are inherent in coastal management.

Figure 4 shows that approximately half of respondents in both regions supported giving equal priority to the environment and the economy. There was slightly stronger support among Port Phillip respondents (49%) for prioritising environmental imperatives over economic ones than among the SA respondents (39%).

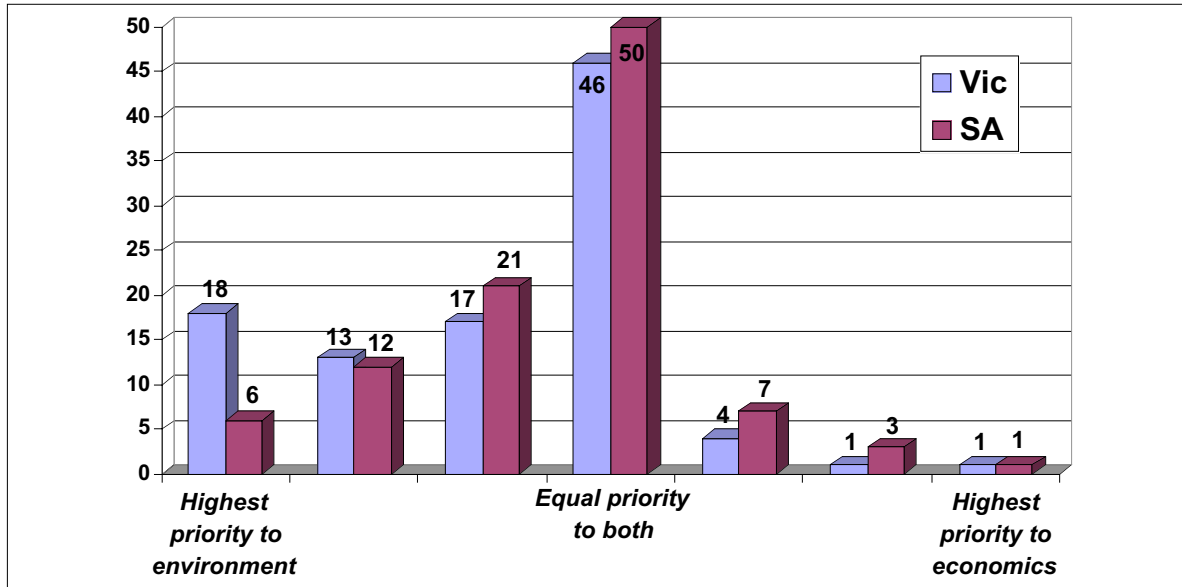


Figure 4: Respondents' positions on environmental and economic trade-offs in coastal management

### Aquaculture's sustainability challenges

Figure 5 shows that interviewees in both regions perceived a range of challenges associated with aquaculture. Many were focused on negative environmental and social impacts (current and potential) *from* aquaculture. Some interviewees identified problems *for* aquaculture, namely detrimental economic impacts from negative community views, a lack of resource security, meeting a range of environmental requirements, and insufficient Research and Development.

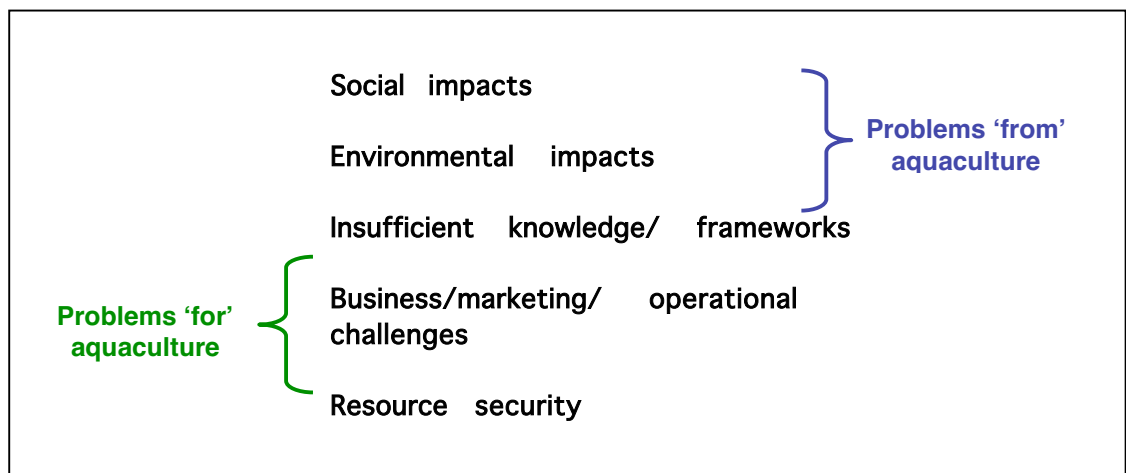


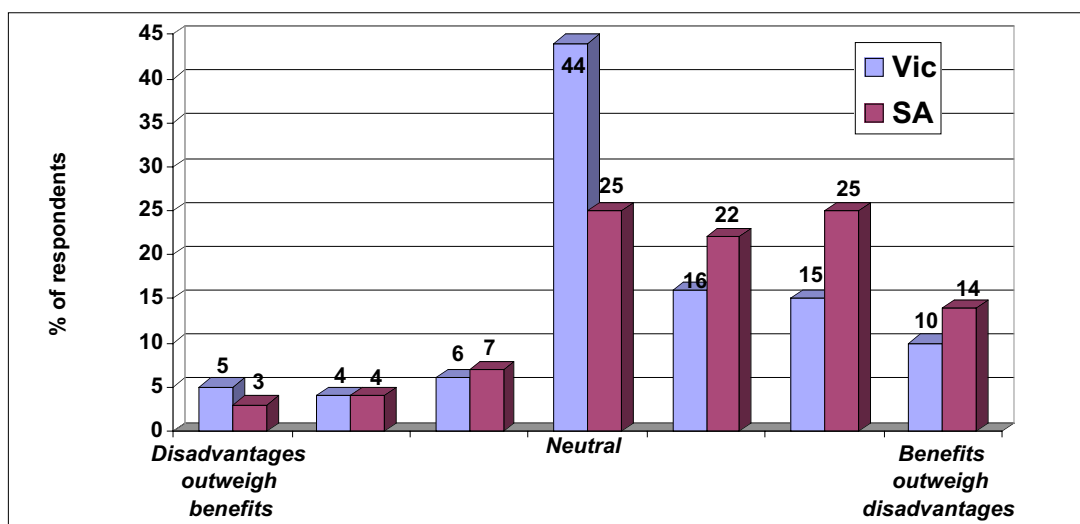
Figure 5: Perceived challenges associated with aquaculture

For the South Australian interviewees who strongly supported aquaculture, there was a stronger interest in how aquaculture might bring economic benefits to remote regions, such as the Eyre Peninsula. Those South Australian interviewees who were more equivocal about their support, were concerned that aquaculture benefits were not overstated and that sensitive environments were protected against negative impacts from the industry.

Victorian interviewees also recognised aquaculture’s economic contribution, but were generally more interested in the industry’s potential to be environmentally sustainable. They felt that the environmental aspect of aquaculture’s sustainability had yet to be fully proven.

*Overall and Socio-economic benefits*

Figure 6 shows respondents’ positions in relation to debates about the benefits and disadvantages of aquaculture in their region. Results show stronger support for aquaculture amongst Eyre Peninsula respondents (61% believed its benefits outweighed disadvantages), while there were greater numbers of Port Phillip respondents who chose a neutral position.



**Figure 6: Respondents’ positions regarding the benefits and disadvantages of aquaculture**

Other findings in these mail surveys suggest that there may be stronger support for aquaculture on Eyre Peninsula than in the Port Phillip region. Eighty-one percent of SA mail survey respondents said they approved of the industry overall. The results also suggest that parts of these communities and some regional areas may be uncertain about aquaculture’s benefits. While 76% of Eyre Peninsula respondents agreed that the industry had flow through benefits for other industries, only 47% of Port Phillip respondents agreed. In addition, 40% of Port Phillip respondents ‘didn’t know’ about the number of aquaculture jobs in their region.

*Environmental benefits and impacts*

In addition to aquaculture’s socio-economic benefits and impacts, mail survey respondents were also asked their opinions about aquaculture’s environmental benefits and impacts. Table 7 compares the perspectives of the SA and Victorian respondents, and makes some comparisons to similar questions from the United States survey. A majority of respondents in all three surveys agreed that aquaculture provided an alternative to wild-catch fishing, or was at least equally acceptable. There were relatively high levels of uncertainty across all respondents in regard to aquaculture’s more specific benefits and impacts. More SA respondents were concerned about sea cage aquaculture’s impacts relative to impacts from

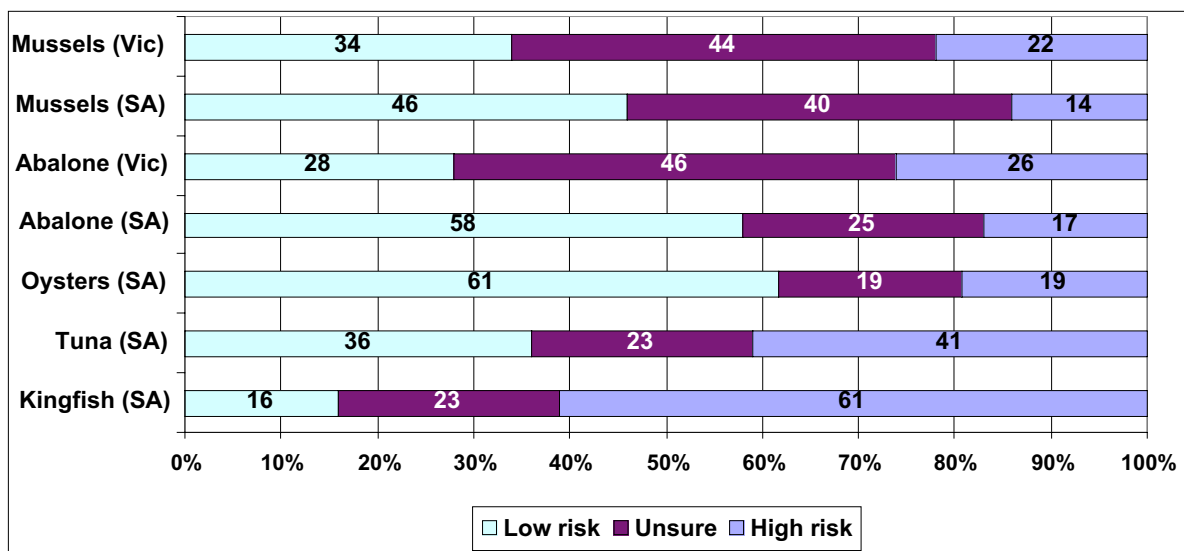
shellfish farming, but more of these respondents *disagreed* that aquaculture pollutes the ocean. More Victorian and US respondents were unsure about whether aquaculture polluted the marine environment.

**Table 7: Respondents’ perceptions of aquaculture’s environmental impacts and benefits**

Mail survey topics		% of responses		
		Disagree	Neutral/ Don’t know	Agree
Aquaculture is a good alternative to wild catch fishing	SA	8	20	72
	VIC	7	25	68
	USA*	4	28	48
If the fish in sea cages or shellfish grown on racks/ropes are healthy, then aquaculture is not affecting the marine environment	SA	31	42	27
	VIC	21	39	40
Farming fish in sea cages has a greater negative impact on coastal environments than farming shellfish does	SA	14	56	30
	VIC	13	68	19
Farming shellfish helps coastal environments by removing nutrients from water	SA	29	61	10
	VIC	17	64	19
Aquaculture has contributed to the ocean’s pollution and decline in health	SA	41	39	20
Aquaculture has contributed to the pollution in our seas, bays and estuaries	VIC	21	67	12
Aquaculture has contributed to the ocean’s pollution and destruction	USA	25	55	20

\* The American survey included a fourth category, ‘equal’, which 20% of respondents selected.

Figure 7 shows how mail survey respondents rated the risk that different aquaculture sectors would have some kind of negative environmental impact in the next 5-10 years. The data suggest that people had greater concerns about environmental risks from sea cage sectors (e.g. Kingfish, tuna) than from the shellfish sectors (e.g. mussels, abalone, oysters). Overall, there were high levels of uncertainty about aquaculture’s future impacts. And more Port Phillip respondents were unsure about aquaculture’s environmental risks than the Eyre Peninsula respondents, although these respondents were equally unsure about the mussel sector.



**Figure 7: Respondents’ perception of the risk of future environmental damage from aquaculture**

## Views on procedural issues

### Trust in Government

The interview data showed that when asked to rate their degree of trust that the different levels of government were making ‘good decisions’ about aquaculture, people from *both* regions tended to make their judgements on the basis of perceived impartiality, ease of access to decision-makers, and degree to which they felt their interests were being seriously considered and responded to.

Figure 8 shows mail survey respondents’ level of trust that governments were making good overall decisions about aquaculture. The data show there were generally higher levels of trust in government amongst SA respondents than their Victorian counterparts. The highest levels of trust were for Local Governments in SA. The lowest levels of trust were found in Victorian respondents’ ratings for the Federal Government. Approximately one quarter to a third of respondents in both regions were unsure about how much they trusted governments’ aquaculture-related decisions.

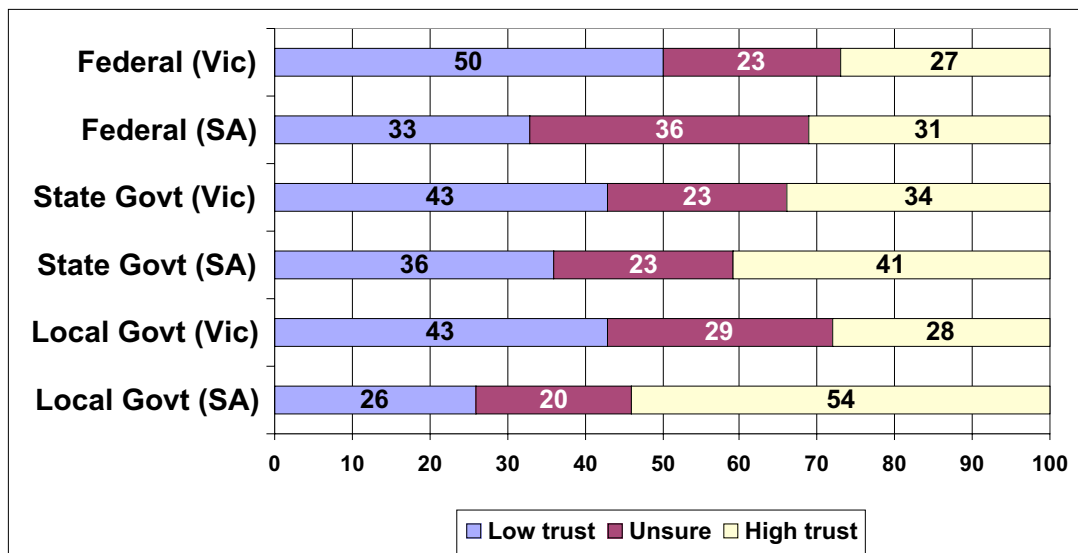
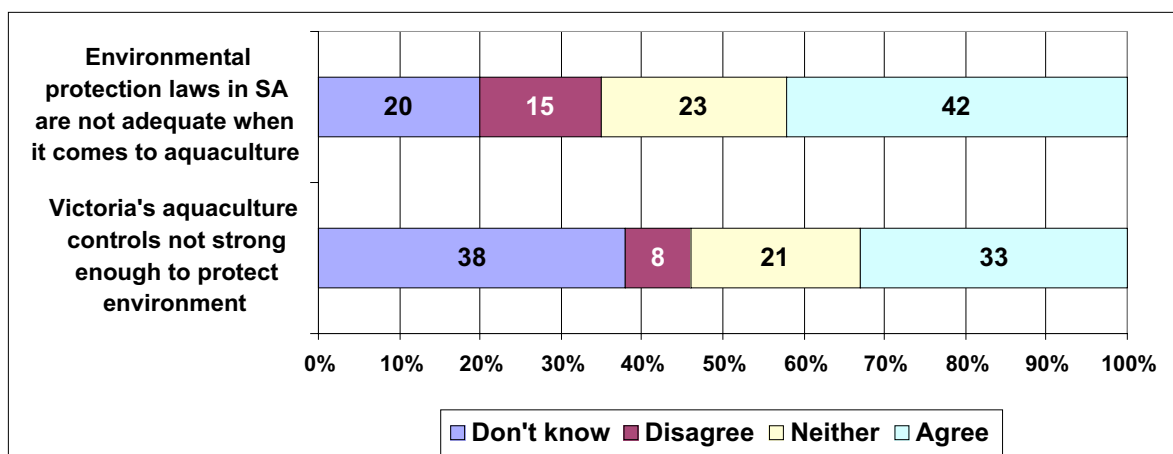


Figure 8: Respondents’ trust in governments’ aquaculture decision-making

The mail surveys included additional items to measure public views on how well aquaculture regulations protected the environment. Figure 9 shows that there were higher levels of uncertainty in both sets of respondents about this matter, although the Port Phillip respondents were less sure than their Eyre Peninsula counterparts. More Eyre Peninsula respondents (42%) felt aquaculture regulations were inadequate than Port Phillip respondents (33%).



**Figure 9: Respondents' perceptions of State Governments' aquaculture regulations**

Similar surveys on perceptions of the commercial fishing industry reveal different views about fishing industry regulations. In Australia, more people (27%) agreed that the fishing industry was well regulated (Aslin & Byron 2003), compared to aquaculture respondents, and in the US that figure rose to 40% (Blackstone 2001). However, similarly to the aquaculture surveys, these surveys found high percentages of respondents who were unsure about the efficacy of fishing industry regulations.

Surveys undertaken by the NSW EPA (1994, 1997, 2000, 2003) revealed that the majority of the community believe that strong regulations for industry are appropriate, and that the community has a role in ensuring the environment is protected.

### **Trust in industry – overall and environmental performance**

Interviewees were asked to rate how much they trusted that the aquaculture industry was making good overall decisions and were responsibly managing potential environmental impacts. The interview data were largely similar in the two regions. Interviewees who gave industry lower trust ratings, did so because they believed there was:

- Variable environmental performance, motivation and skills across different industry sectors ('some do it better than others');
- Weak enforcement of environmental protection regulations; and
- Short-term economic goals taking priority over longer term environmental goals.

Industry was given higher ratings by interviewees in both regions who reported that they:

- Were unaware of any significant environmental problems or controversies;
- Were satisfied with regulatory regimes that protected against environmental impacts; and/or
- Believed that it was in the aquaculture industry's best interest to perform their best.

Mail survey respondents were asked to rate their trust that the aquaculture industry and specific sectors were making sound decisions. Figure 10 shows that there were varied levels of trust in different sectors and a relatively high degree of uncertainty about the overall industry in both regions. There was also:

- Greater trust in the SA aquaculture industry and its sectors, particularly the oyster industry;
- Generally greater uncertainty about the Victorian aquaculture industry, but a comparable degree of uncertainty about the SA mussel sector;
- Greatest mistrust in the SA kingfish industry; and

- Comparable levels of mistrust in the SA tuna sector and the Victorian aquaculture industry, but higher uncertainty about the Victorian industry.

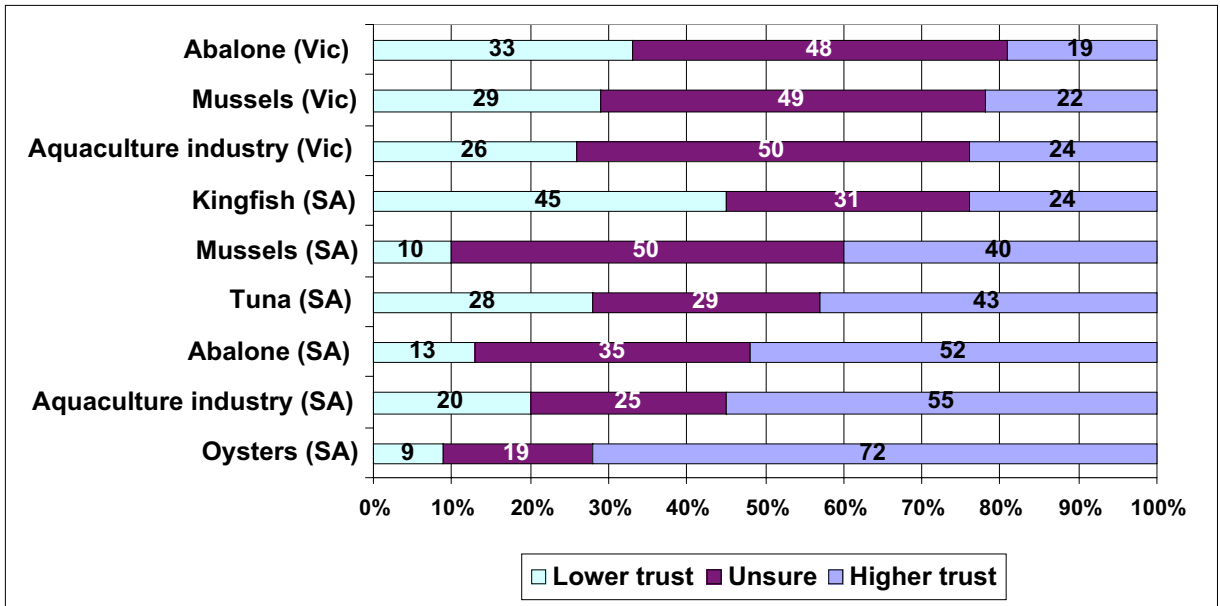


Figure 10: Respondents' level of trust in the decisions of different aquaculture industry sectors

Figure 11 shows the additional items from the mail survey, which measured perceived effectiveness of industry's environmental performance. The data show that there was some uncertainty among respondents about how 'environmentally responsible' the industry is, and that uncertainty was higher in Victoria than in SA. In Victoria, more respondents seemed to believe that industry needed to improve its efforts to protect the environment. In SA, close to half of the respondents supported the industry's response to its environmental responsibilities and to environmental controversy.

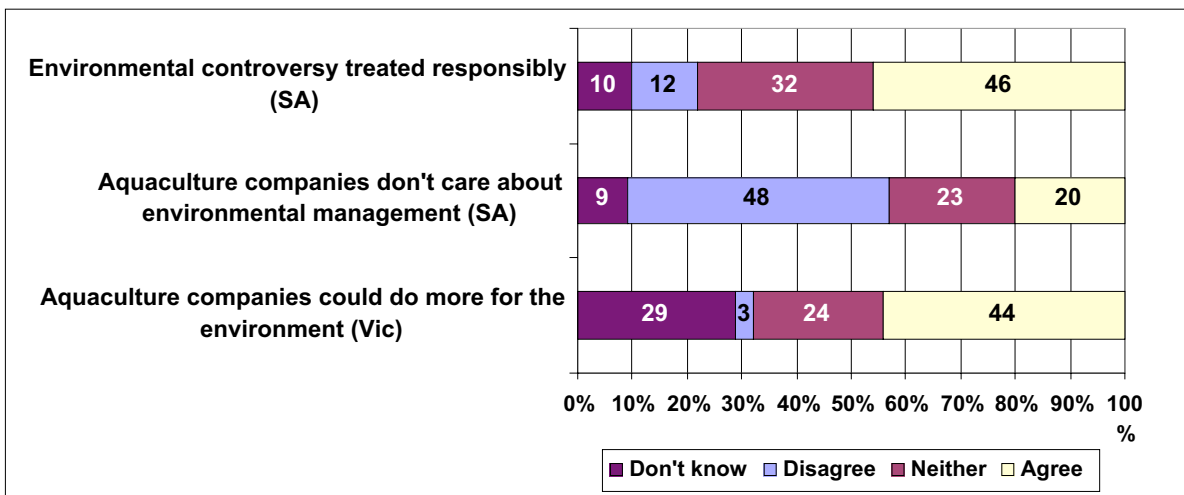
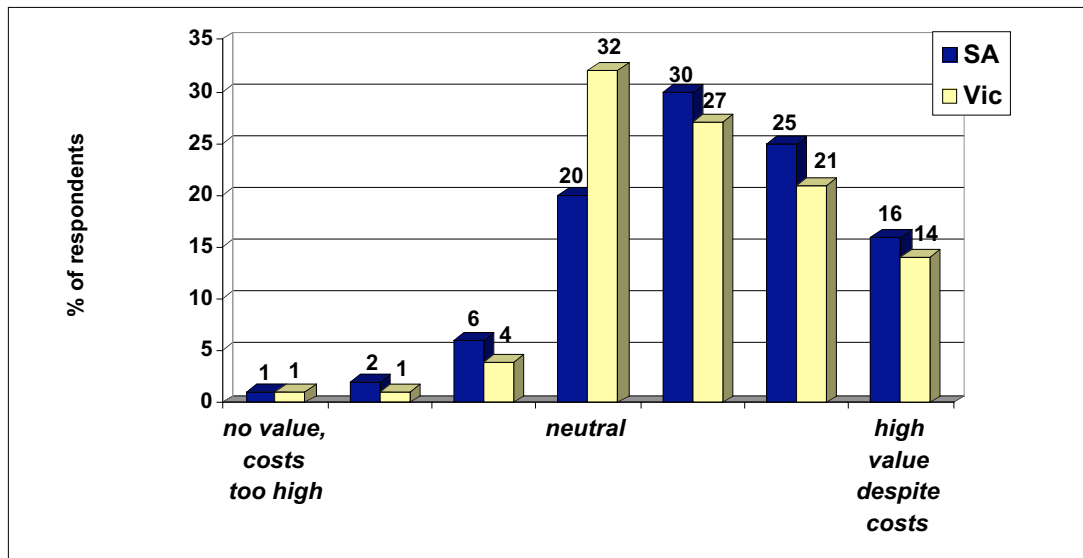


Figure 11: Respondents' perceptions about the aquaculture industry's environmental responsibility

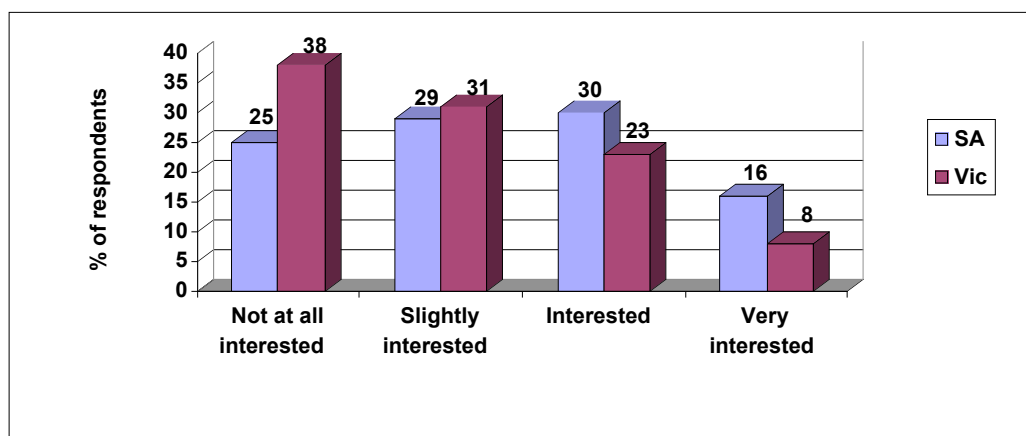
### Public participation

Figure 12 shows respondents' positions on the value of community input into aquaculture decision-making. The majority of respondents in both regions valued the principle of 'having a say'. There were more respondents in the Port Phillip region than on Eyre Peninsula who chose a neutral position, which may be due to their lower awareness of and knowledge about the aquaculture industry.



**Figure 12: Respondents' positions on the value of community participation in aquaculture planning/management**

In terms of their degree of interest, Figure 13 shows that a majority of respondents had low interest in being personally involved in aquaculture planning, while one third to just under a half of respondents were interested. There was stronger interest in being involved in aquaculture planning among SA respondents than among the Victorian respondents. Fewer Victorian respondents than SA respondents had taken part in a range of public participation activities. The Victorian respondents who had participated tended to rate most activities as 'slightly useful' for increasing their understanding of aquaculture and allowing for their input, with direct industry contact faring better than public meetings and written submissions. SA respondents showed greatest interest in activities providing direct industry contact and lowest interest in making written submissions or serving on an advisory group.

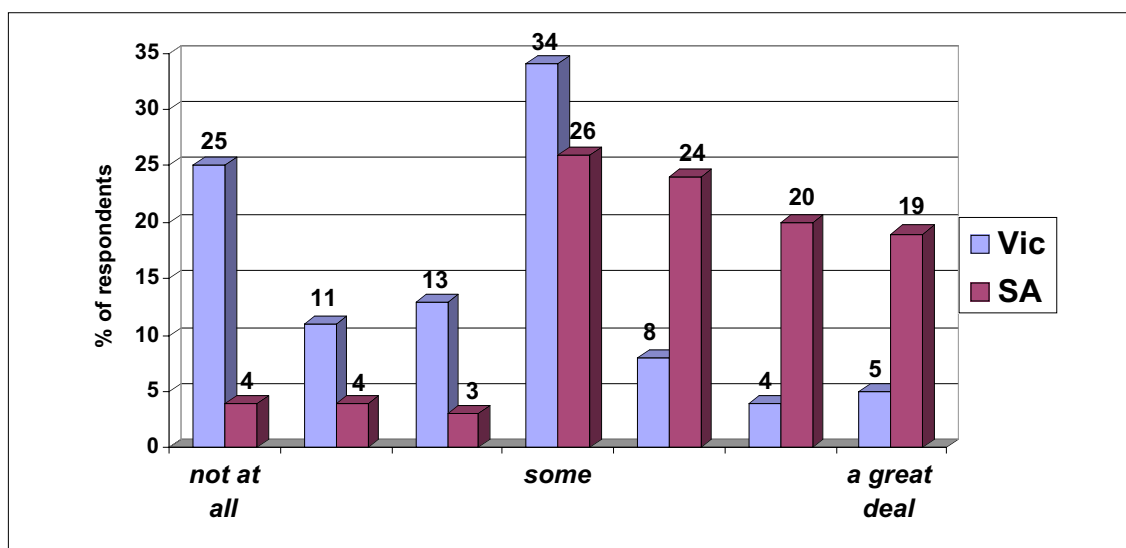


**Figure 13: Respondents' interest in being involved in aquaculture planning**

## Awareness and Knowledge

Several items in the mail surveys were designed to test the community's awareness and knowledge about aquaculture and a range of related topics.

Respondents were asked how much they had thought about aquaculture issues before taking the survey. Figure 14 shows that a striking difference in how much consideration the Eyre Peninsula and Port Phillip respondents had given to aquaculture. These results suggest that the aquaculture industry has a considerably higher public profile on the Eyre Peninsula than in the Port Phillip Bay region.



**Figure 14: How much respondents had thought about aquaculture issues before being surveyed**

Respondents were also asked to rate their knowledge about aquaculture and other related topics, and they generally rated their knowledge as 'low'. When asked about the different roles in aquaculture that State and Local Governments play, the survey results showed:

- Respondents' knowledge was lowest for this topic area, except for knowing about Indigenous communities' involvement in aquaculture;
- Respondents' knowledge was *lower* among the Victorian respondents (89% - 95%: 'little or no knowledge') than among the South Australian respondents (53% - 77%: 'little or no knowledge'); and
- SA respondents rated their knowledge about Local Government approvals and State Government management processes *higher* than their knowledge about State Government processes for approving aquaculture developments and selecting aquaculture zones.

Respondent's self-rated knowledge of the aquaculture industry and its specific culture techniques was:

- Lower in Victoria than in SA: 71-82% of Victorian respondents felt they knew 'little or nothing' about industry sectors or practices;
- One third of SA respondents believed they had 'some knowledge' about the State's aquaculture industry sectors, with the highest rating for oysters, shellfish farming techniques and tuna.

Respondents' self-rated knowledge about aquaculture's environmental benefits and impacts was generally higher among SA respondents than Victorian respondents, and highest in relation to the follow topics:

- Aquaculture’s impacts on coastal recreation: 74% of SA respondents had ‘good’ to ‘some’ knowledge’, 34% of Victorian respondents had ‘good’ to ‘some’ knowledge’;
- Stormwater impacts on aquaculture: 64% of SA respondents had ‘good – some knowledge’, 46% of Victorian respondents had ‘good’ to ‘some’ knowledge’; and
- Marine ecology: 31% of SA respondents had ‘good’ to ‘some’ knowledge’, 30% of Victorian respondents had ‘good – some knowledge’.

## Respondent differences

Statistical tests showed that perceptions of aquaculture differed across a range of respondent variables. Specific details about the way these variables were related to people’s responses can be found in Mazur et al. (2004a, 2004b). Table 8 details how those variables were linked to particular responses. For the Eyre Peninsula and Port Phillip surveys, there were similarities and differences in the way that variables and responses were linked, as well as differences in the strength of those links. The variables with the strongest relationships with particular responses included: gender, education, involvement with coastal groups, visits to aquaculture sites, knowing someone in the aquaculture industry, and attending public meetings.

**Table 8: Relationships between respondent variables and respondent perceptions of aquaculture**

Variable	Type and strength of relationship
<b>Age</b>	<ul style="list-style-type: none"> <li>• Stronger relationship in SA survey</li> <li>• Older respondents in SA more likely to be interested in aquaculture’s social impacts/benefits and to prioritise the economy</li> <li>• Younger respondents in Victoria more likely to see the environment as most important aquaculture issue</li> </ul>
<b>Gender</b>	<ul style="list-style-type: none"> <li>• Largely comparable strength and type of relationship</li> <li>• Female respondents in both regions more likely to be concerned about aquaculture’s environmental impacts, have lower trust in governments’ aquaculture decisions and regulations, want to see improved environmental protection, have lower approval of and trust in the aquaculture industry</li> </ul>
<b>Completed higher levels of education</b>	<ul style="list-style-type: none"> <li>• Largely comparable strength of relationship, with slight difference type</li> <li>• Respondents in both regions more likely to see limits to aquaculture’s growth and have lower trust in government and the aquaculture industry</li> <li>• SA respondents were more likely to question aquaculture’s environmental benefits and to perceive differences between wild-caught and farmed fish</li> <li>• Victorian respondents were more likely to identify environmental impacts and community participation as most important aquaculture issues and to support more marine protected areas</li> </ul>
<b>Long-standing resident of local area</b>	<ul style="list-style-type: none"> <li>• No relationship to Victorian responses</li> <li>• SA respondents were more likely to prioritise the economy, trust the sea cage sectors, agree that aquaculture had environmental benefits, and disagree with the need for more marine protected areas</li> </ul>
<b>Involvement in a group with coastal management interests</b>	<ul style="list-style-type: none"> <li>• Comparable type of relationship, but stronger link to SA responses</li> <li>• Increased likelihood that SA and Victorian respondents would not support aquaculture’s benefits over its disadvantages and question that aquaculture had environmental benefits</li> <li>• Increased likelihood that SA respondents had low trust in government and the aquaculture industry</li> <li>• Increased likelihood that Victorian respondents would believe sea cage aquaculture’s environmental impacts were stronger than shellfish aquaculture and prioritise the environment over the economy</li> </ul>
<b>Visited aquaculture sites/farms</b>	<ul style="list-style-type: none"> <li>• Stronger relationship with Victorian responses than with SA responses</li> <li>• Increased likelihood that SA and Victorian respondents trusted the aquaculture industry and the shellfish sectors</li> <li>• Increased likelihood that Victorian respondents perceived (socio-economic, environmental) benefits from aquaculture</li> <li>• Increased likelihood that Victorian respondents were less concerned about aquaculture’s limits to growth, aesthetic impacts, or regulations</li> </ul>

<p><b>Knew someone in the aquaculture industry</b></p>	<ul style="list-style-type: none"> <li>• Different relationships to Victorian and SA responses, and stronger link with SA responses</li> <li>• Increased likelihood of SA respondents supporting aquaculture’s benefits, and prioritising the environment over economy in coastal management choices</li> <li>• Increased likelihood that SA and Victorian respondents more likely to trust the aquaculture industry, but <i>lowered</i> likelihood of SA respondents trusting the sea cage sectors</li> <li>• Increased likelihood that SA respondents valued community participation, with opposite effect for Victorian respondents</li> <li>• Decreased likelihood that Victorian respondents were concerned about aquaculture’s social impacts or valued community participation</li> </ul>
<p><b>Participate in marine/coastal recreational activities</b></p>	<ul style="list-style-type: none"> <li>• Comparable strength of relationship, but different kinds of links with Victorian and SA responses</li> <li>• SA respondents more likely detect differences between farmed and wild-caught fish and limits to aquacultures growth, and to question aquaculture’s environmental benefits</li> <li>• Victorian respondents more likely to prioritise the environment over economy, support more marine protected areas, and value community participation</li> </ul>
<p><b>Participate in recreational fishing</b></p>	<ul style="list-style-type: none"> <li>• Different relationships to Victorian and SA responses, and slightly stronger link with Victorian responses</li> <li>• SA respondents more likely to mistrust sea cage aquaculture and be concerned about aquaculture’s aesthetic impacts</li> <li>• Victorian respondents more likely to support shellfish aquaculture’s environmental benefits, agree that aquaculture’s growth had limits, agree that coastal management was inadequate, and were less likely to support more marine protected areas</li> </ul>
<p><b>Attended public meetings about aquaculture</b></p>	<ul style="list-style-type: none"> <li>• Stronger relationships with SA responses</li> <li>• SA respondents less likely to trust aquaculture industry and sea cage sectors, more likely to question the industry’s responsibility to the environment and adequacy of aquaculture regulations, and more likely to trust shellfish sectors</li> <li>• Victorian respondents more likely to agree coastal management was inadequate, value community participation and were less likely to trust the Federal government</li> </ul>
<p><b>Attended aquaculture open days/displays</b></p>	<ul style="list-style-type: none"> <li>• Different type and strength of links with Victorian and SA responses</li> <li>• SA respondents more likely to trust the aquaculture industry and prioritise commercial uses in coastal settings</li> <li>• Victorian respondents were more likely to agree that coastal management was inadequate, support more marine protected areas, agree that aquaculture could do more for the environment, but also to support aquaculture’s benefits over its disadvantages</li> </ul>

## Building trust, reconciling different interests

In addition to seeking to determine how much trust stakeholders and communities have the aquaculture industry and governments, the interview and mail survey were designed to elicit information about constructive ways to reconcile differences and/or mistrust.

### Improving trust in Government

Interviewees were asked how they thought trust in governments’ decisions and actions in relation to aquaculture could be improved. For both regions there were a variety of views, with differences evident primarily in terms of how much people felt that governments’ decision-making should be transparent and seek to involve communities. Interviewees’ suggestions included:

- Placing less emphasis on responding to ‘the noisy minority’; (SA)
- Address differences and similarities of industries’ and communities’ information needs:
  - industry seeks efficient procedures; and
  - communities want assurances of aquaculture’s sustainability;
- Provide for greater governmental transparency; (SA)
- Improve communications with communities – more balanced representation; (SA) and

- Build and improve State Government and Local Government partnerships to deliver more timely information about aquaculture to communities (Victoria).

#### *Improving trust in the aquaculture industry's environmental performance*

Many community interviewees in SA believed that firmer approaches were needed to ensure that the aquaculture industry's was performing at its best with respect to protecting the environment. On the other hand, some believed that 'softer' approaches were required to bring industry on board, but cautioned that the community might grow impatient with the time this kind of approach can take. In contrast, the Victorian community interviewees were strongly focused on the long-term benefits of the aquaculture industry's meeting its environmental obligations and believed that required:

- Firm government regulations;
- Clear and accessible public information on how regulations and codes of practice were to be enforced;
- Incentives to reward best practice (e.g. accreditation programs);
- Industry capacity building for environmental management; and
- Improved opportunities for community input.

#### **How the aquaculture industry can build Governments' and community's trust**

The Victorian aquaculture industry interviewees were primarily of the view that existing measures, such as management plans and their links to scientific and government networks, would eventually reassure people that they were doing all they could to protect the environment. They also felt that more effort could be made to improve the community's awareness of the industry's environmental management requirements and practices. The SA aquaculture industry interviewees were more varied in their views about how to build trust. While some believed that nothing further needed to be done, others made calls for:

- increasing industry's commitment to current public communications and consultation processes and to improving general industry practices; or
- becoming more transparent, proactive and progressive regarding public outreach.

#### **Working more effectively with different interests**

When commenting on how to reconcile the different interests in aquaculture, interviewees suggestions in both regions again varied on the basis of how much people thought that decision-making should be more transparent and inclusive. Their suggestions included:

- More inclusive, open, frank and deliberative dialogues;
  - to build trust and meet range of needs and interests; (SA)
  - at 'front end' of decision-making; (Victoria)
- Greater governmental transparency; (SA)
- Greater on-ground presence of State Government;
- Provide industry liaison and/or extension services;
- Improve links between aquaculture industry and coastal management networks;
- More cohesive industry responses to community concern; and
- Maintain current approaches.

While many community interviewees in both regions believed that dialogues about aquaculture should be opened up, SA community interviewees were more focused on ways for governments and the aquaculture industry to make a greater effort to include communities in dialogues about aquaculture planning and management that were more open and frank. In contrast, the Victorian community interviewees were more focused on the State Government building on recent improvements to its consultation processes by avoiding adversarial forms of public participation and creating more timely (the 'front end' of decision-making), inclusive processes that allowed people to debate trade-offs.

Research/education interviewees in Victoria were also interested in open and proactive communication among interested parties, but had different opinions about how inclusive decision-making should be.

Some State Government interviewees in SA were enthusiastic supporters of improved aquaculture industry-government-community dialogues and were also interested in better interagency communication and coordination. These interviewees tended to believe that governments needed to be more responsive to a wider range of stakeholder groups, so that these groups felt more reassured that they were being listened to. Victorian Government interviewees also had different opinions about reconciling different aquaculture interests. Some felt that current processes were sufficient, while others supported improvements. Those seeking improvements also made the point that opening up dialogues needed to happen earlier on in decision-making processes.

Local Government interviewees in SA had diverse views. Some were satisfied with existing practices and pointed out that low attendance at public meetings on aquaculture indicated low public interest in the issues. Others held the view that mirrored those of the community interviewees mentioned earlier. Victorian Local Government interviewees also mentioned improving public awareness of aquaculture and improving opportunities for the public to voice its opinion. But these interviewees were generally more focused on a greater on-ground presence by the State Government and for the State Government to work more closely with Local Governments and the aquaculture industry in building links with coastal management networks.

Aquaculture industry interviewees in SA and Victoria had similar views about effective communication. Some were more interested in seeing more and better facilitated dialogues that lead to different interests being met. Others talked about the ‘inevitability’ of resource use conflicts, the need to motivate all the industry sectors to build their respective profiles, and/or the need for the industry to respond to community concerns in a consistent fashion. There was a stronger focus among Victorian aquaculture industry interviewees on receiving clearer information about planning and approval processes from the State and Local Governments.

There were some differences among the SA and Victorian interviewees from related industries. Interviewees in SA also wanted to see improved communications, but they also made repeated calls for a better funding balance across different fishing industry sectors and for mechanisms like an aquaculture liaison officer who could bridging industry-government-community communications gaps, and help build the aquaculture industry’s business and environmental management skills. The Victorian interviewees were more interested in increasing the number and genuineness of dialogues about aquaculture by making them more inclusive and providing clear information about environmental standards being used to judge the environmental sustainability of the aquaculture industry.

## Chapter Five: Discussion

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### **Social analyses and processes for aquaculture decision-making**

Chapter 1 provided an introductory analysis of how social research, social assessments and community consultation are used in aquaculture decision-making in particular. While there is some related social research and recent work specific to aquaculture that can be used to inform aquaculture decision-making, there has generally been a shortage of social research to support aquaculture development, planning and management.

Furthermore, this analysis suggests that social assessments in aquaculture decision-making:

- Occur largely at the discretion of authorities;
- Are likely to be limited in number and to vary widely in their coverage of the full range of aquaculture's social effects and the required strategies to mitigate adverse impacts of change; and
- Are undertaken primarily in the latter stages of aquaculture decision-making.

In addition, Chapter 1 suggests that State/Territory Governments' formal requirements for and general use of community consultation favour passive (as opposed to interactive) activities that take place in later stages of aquaculture decision-making, and that places the onus of responsibility on the public to identify that an issue may be of interest and then to take steps to comment. There is considerable evidence to suggest that communities prefer more interactive involvement that provides genuine opportunities to contribute to decisions, and that these activities are critically important for preventing and managing social conflict.

### **Perceptions of aquaculture**

In response to the shortage of social research, the Community Perceptions of Aquaculture Project has obtained valuable information about how people perceive the environmental, social, and economic sustainability of aquaculture, their knowledge about aquaculture, their trust in government and industry decision-making, and their preferences for information and being involved in aquaculture.

#### **Socio-economic sustainability**

Most interviewees and mail survey respondents recognised aquaculture's socio-economic benefits, such as its contribution to local economies in rural/remote regions. Among the SA interviewees there was slightly stronger recognition of those benefits, compared to most of Victorian interviewees who were primarily focused on the industry's (environmental) sustainability. Similarly, most SA mail survey respondents supported aquaculture's benefits over its disadvantages and agreed that aquaculture had flow-on benefits for the region (other industries, employment). In contrast, more Victorian respondents were unsure about these matters.

Greater support for aquaculture's socio-economic benefit and priorities were linked to those mail survey respondents who were older, long-standing residents of the Eyre Peninsula, had direct contact with SA aquaculture industry (site visits, social links), or had visited aquaculture sites in Victoria.

#### **Environmental sustainability**

Most interviewees and mail survey respondents placed high value on the environment, particularly coastal and marine settings. Compared to their SA counterparts, the Victorian mail survey respondents placed greater importance on these values; more rated the environment as the most important general issue for their region, gave greater support to

marine-protected areas (MPAs), and prioritised the environment more strongly over the economy in coastal management choices.

Mail survey respondents in both regions rated environmental impacts as the most important aquaculture issue, followed by the industry's economic contribution and its impacts on other users of coastal and marine resources. While a majority agreed that aquaculture generally provides a good alternative – or was at least equally acceptable – to wild-caught seafood, there was some uncertainty. That uncertainty rose considerably when respondents were asked more detailed questions, and more Victorian respondents were unclear about these matters than were SA respondents. Mail survey respondents' concerns about the future environmental risks from aquaculture also varied between sectors, with respondents from both regions generally perceiving lower risk from shellfish than from sea-cage aquaculture.

Higher environmental concerns were linked to female mail survey respondents and those involved in groups with coastal management interests and Victorian respondents who were younger and who had higher levels of education.

### **Community knowledge of aquaculture**

The interview process for this project targeted individuals who had a particular interest in, and were likely to be more informed about aquaculture matters. Adults living close to aquaculture activities were targeted for the mail survey in order to test place-based communities' awareness and knowledge of aquaculture matters.

Generally, mail survey respondents in both regions rated their knowledge as 'low', and those ratings were lowest in relation to State and Local Governments' role in aquaculture and Indigenous communities' interest/involvement in aquaculture. Furthermore, there were significant differences between the two regions:

- Four times as many SA respondents as Victorian respondents said they had thought about aquaculture issues;
- Far fewer SA respondents than Victorian respondents gave themselves low ratings for knowledge about governments' aquaculture roles and aquaculture industry sectors and practices;
- Knowledge ratings about aquaculture's specific environmental impacts and benefits were higher amongst the SA respondents, and highest for both sets of respondents in relation to aquaculture impacts on coastal recreation, stormwater impacts on aquaculture, and marine ecology.

### **Sources of information**

The media were important sources of information about aquaculture for both sets of respondents, with more respondents rating the local newspaper as important than television and radio. For SA respondents, the ABC radio, social links to the industry and local government were more important sources of information than for Victorian respondents.

Other research and the Victorian case study suggest that people may rely more on certain information sources (e.g. the media, governments) they do not always see as highly credible, and unless they have a particular interest do not always seek out sources of information they rate as more credible (e.g. universities/research centres, the aquaculture industry, libraries, the internet and personal experience).

### **Perceptions of procedural issues**

#### *Trust in government decisions*

When rating their trust in governments' aquaculture-related decisions, interviewees from both regions made judgements on the perceived impartiality of decision-makers, their accessibility,

and how responsive they were to different interests, and the presence of environmental problems related to aquaculture.

Mail survey respondents also had varied trust in (Australian, State and Local) governments' aquaculture-related decisions and procedures. More SA respondents than Victorian respondents had high trust in government, particularly in Local and State Governments, while one quarter to a third of respondents in both regions were 'unsure'. There was greater uncertainty in both regions about the adequacy of aquaculture's environmental regulations, with more Victorian respondents being dissatisfied than their SA counterparts.

Mail survey respondents *less likely* to trust governments' aquaculture decisions were females, those involved with SA coastal groups and people who attended aquaculture public meetings in Victoria.

#### *Trust in aquaculture industry*

Interviewees in both regions had mixed opinions about and used similar criteria to rate their trust in the aquaculture industry, including the:

- Motivations and consistency of performance across different industry sectors;
- Adequacy of environmental regulations and their enforcement; and/or
- Presence and intensity of environmental problems/issues.

Mail survey respondents rated their trust in the industry and its environmental performance, and the results show that:

- Trust varied across industry sectors – generally more respondents had high trust in the SA shellfish and tuna sectors than for the SA kingfish and Victorian industry sectors;
- There were high levels of uncertainty (one quarter to one half) about trusting the industry, with more uncertainty among Victorian respondents; however
- Nearly half of the Victorian respondents felt the industry could *do more* for the environment, while a similar percentage of SA respondents *supported* the industry's environmental responsibility and response to controversy.

Mail survey respondents *more likely* to trust the aquaculture industry included those who had been to aquaculture farms and knew someone in the industry, and/or were long-standing residents of the Eyre Peninsula. Yet SA respondents with social links to the industry were less likely to trust the sea cage sector of the industry. Other respondents *less likely* to trust the industry included those with higher levels of education, involvement in SA coastal groups, interest in recreational fishing in SA, and/or were women.

#### **Building trust/reconciling differences**

Interviewees in both case studies had the opportunity to discuss ways to improve trust among governments, the aquaculture industry and communities. While views within regions varied to some degree, there was a strong focus in both case studies on the following themes:

- Greater transparency of (State, and to a lesser degree Local) Government decisions relating to aquaculture;
- Improved communication and coordination between State and Local Governments for aquaculture development, planning and management;
- Firm government regulations and incentives to reassure (place-based and interest-based) communities that the aquaculture industry's environmental impacts will be prevented and/or minimised;
- Clear, accessible and regular information about those requirements;
- Improved consultation with and engagement of (place-based and interest-based) communities that seek to build trust, are continuous, interactive, more timely (take place as early as possible in decision-making), and include a more diverse range of interests; and

- Building the aquaculture industry’s capacity for environmental management and community consultation/engagement.

Mail survey respondents also highly valued the principle of the public ‘having a say’ in aquaculture planning (and to a lesser degree management). Approximately a third of them expressed interest in being involved. There was stronger support for interactive forms of participation than for the passive, more traditional forms (e.g. making written submissions, public meetings). Respondents who knew someone in the Victorian aquaculture industry were *less likely* to support public participation, while those with social links to the SA industry were *more likely* to be supportive.

### The utility of regional case studies

The use of case studies and multiple methods in this project have provided valuable insights about the ways in which aquaculture is perceived. Multiple methods (literature review, interviews, mail survey) secured data on different aquaculture perspectives and contexts, which in turn provided a more comprehensive understanding of the issues than might have been achieved through using a single method.

The interviews and mail survey findings revealed similarities and differences in aquaculture perceptions in the two regions (see Table 9), and the following features are likely to be linked to those results:

- The SA aquaculture industry’s higher (regional, State) public profile than the Victorian aquaculture industry;
- The SA aquaculture industry’s greater size and (local) effects on the region’s economy;
- A stronger history of public controversy and conflict over aquaculture planning/management in SA than in Victoria;
- Higher levels of competing use of the marine and coastal environments in Victoria; and
- Certain socio-demographic characteristics, behaviour patterns and experiences of interview and mail survey respondents (e.g. majority of SA mail survey respondents had social links to the aquaculture industry, environmental interests of Victorian respondents).

**Table 9: Regional similarities and differences in regional mail survey results**

Topics	Similarities	Differences
<i>Support for aquaculture</i>	Overall good support	Stronger support among SA respondents
<i>Environmental interests</i>	Environmental impacts most important aquaculture issue	Environmental values/interests stronger among Victorian respondents
<i>Knowledge of aquaculture</i>	Overall levels were low	Knowledge lower among Victorian respondents
<i>Trust in aquaculture industry</i>	High levels of uncertainty, some sectors attract more trust than others	Overall trust higher among SA respondents
<i>Perceived risk of environmental impacts</i>	High levels of uncertainty, some sectors attract greater concern than others	Greater uncertainty among Victorian respondents
<i>Trust in governments’ decisions</i>	High levels of uncertainty, mixed levels of trust	Higher trust among SA respondents
<i>Public participation in aquaculture decisions</i>	Strong support for community involvement, preference for certain activities	Slightly stronger interest among SA respondents

These case study findings will be relevant to aquaculture planning and management in other regional areas depending on how similar or different those regions, their populations, and their aquaculture industries are to the Eyre Peninsula and the Port Phillip Bay area. In addition, these regional similarities and differences have important implications for designing and implementing social research, communication, marketing, education and community consultation and engagement policies and programs.



## Chapter Six: Conclusions

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The Community Perceptions of Aquaculture Project has identified important implications for governments' and the aquaculture industry's use of social research, communications, and community consultation and engagement programs for decision-making. Achieving socially sustainable aquaculture will require a mix of strategies. It is recommended that governments and the aquaculture industry continue to share responsibility for identifying and responding to stakeholder and community views about aquaculture.

The background research and two case study findings suggest that the general public is likely to be supportive of aquaculture, given some positive perceptions of the aquaculture industry's economic contributions to regions and its potential to help meet increased demand for seafood supplies. There are opportunities for governments and the aquaculture industry to build on this support and increase awareness of the industry's more specific socio-economic and environmental benefits. There are also opportunities to regularly monitor public opinion, because public perceptions can change quickly and were found to vary across different aquaculture industry sectors.

### **Environmental interests inform public perceptions**

The project findings suggest the aquaculture industry's environmental impacts are of concern to the public, and there are some perceived risks of aquaculture's future (negative) environmental impacts. Where place-based and interest-based communities have strong environmental values and interests, there are likely to be higher expectations of: lowering risks to the environment; clear, specific and readily accessible information about how environmental sustainability is being achieved; and regular and meaningful opportunities for public input into decision-making.

### **Opportunities to raise awareness of aquaculture**

The project results suggest that a large part of the general public is likely to be relatively uninformed about a range of aquaculture related topics. Levels of awareness and knowledge will vary between regions, in relation to industry sectors and practices, and according to communities' socio-demographic characteristics, behaviours, experiences and interests. And while not all members of the public will be interested in knowing more about aquaculture, there is considerable opportunity to increase public awareness and understanding of the industry. Information programs could be designed to target those topics that mail survey respondents knew least about and be tailored to different aquaculture regions and industry sectors. The information needs and interests of more informed audiences will differ, and are addressed below.

### **Building public trust**

The background research, interview and mail survey data showed different levels of public trust in governments and the aquaculture industry, with more people inclined to be uncertain or mistrustful than they are to be trusting. While there have been some notable aquaculture-related controversies overseas and in Australia, there are still considerable opportunities to improve on and build public trust in the industry. It is recommended that trust building be a central, long-term goal of strategies to achieve a sustainable aquaculture industry. Building trust is not easy, because it requires numerous opportunities for parties to interact and is the product of many factors. However, without it, it will not be possible to achieve widespread public support for the industry or for governments' aquaculture-related policies and programs.

What follows are several essential considerations for building public trust, including risk and uncertainty, key communications messages, quality information delivered through credible sources of information and tailored to meet different interests, and providing meaningful opportunities for governments, the aquaculture industry and communities to interact.

### **Addressing risk and uncertainty**

Public concerns are often focused on the risk that aquaculture might have negative (and possibly irreversible) impacts on the environment and human health. Therefore, it will be important for governments and the aquaculture industry to understand that there are significant differences in how different sections of society perceive risk. One common distinction is that of ‘experts’ and the ‘lay public’. The public is more likely to be concerned about the unknown effects of risky activities, significantly negative consequences - irrespective of their low probability of occurrence, and what the ‘experts’ do not know and why they cannot agree.

Wherever communications involve information about the ‘risks’ from aquaculture, it will be important to avoid using older risk communications models. These approaches typically define the public as ‘naïve’ and distribute increasing amounts of technical and scientific information in an effort to raise literacy levels, to counteract ‘irrational’ opinions and to build support for various policies and programs in the face of concern and/or opposition. These approaches are known to have exacerbated public concern and mistrust in several high profile risk issues (e.g. BSE in Europe).

More recent risk communication models value different kinds of knowledge (‘experts’ as well as ‘lay public’), take concerns about risk seriously, and advocate more participative approaches to risk assessment. Most advocates of these models recognise the significant challenges in facilitating more and inclusive dialogues with the public and recommend a range of capacity building strategies that target industry and policy and scientific communities, as well as the public.

### **Key messages required**

Public judgements about how much to trust governments and industry are influenced by slightly different factors. Disproving negative stereotypes will be an important part of building the public’s trust in *both* institutions. Government and industry managers and communications experts will need to consider the extent to which key messages inherent in communications and consultation activities clearly and consistently demonstrate that:

- The aquaculture industry is concerned about the public interest and environmental protection, is willing to be open about its activities, and can provide meaningful information in that regard; and
- Governments have sufficient knowledge, expertise and degree of commitment to regulate and manage the industry in an environmentally-friendly way, and will respond to a wide range of stakeholder and community concerns.

### **Readily accessible and credible information**

This project has provided evidence to suggest that some sources of information about aquaculture are judged as more important and/or credible than others. Furthermore, people seem to rely more on less trustworthy sources of information unless they have a particular interest in the issue at hand and seek out sources they think are more credible (Aslin & Byron 2003). In order to increase understanding and support for aquaculture, it is important for the public to receive aquaculture information, as well as to trust that information to be well balanced, accurate and reliable. The Port Phillip Bay case study outlined several key considerations for improving the delivery and uptake of aquaculture-related public information:

- Ensuring public information is generally widely available, particularly for people who might not have a particular interest in aquaculture (e.g. use of familiar sources and locations so that a special effort to access information is not required);
- Increasing the use of information sources rated *more credible* that were accessed *less frequently* by mail survey respondents (e.g. aquaculture industry, universities/research centres, libraries, the Internet – fisheries-related sites and links maintained by sources independent of government and industry).;
- Using information sources rated as both *more important and credible* by mail survey respondents (e.g. ABC radio, personal experience – this might also include measures to increase the public’s interaction with the aquaculture industry through site visits, open days);
- Selective use of widely used information sources that were rated *lower in credibility* (e.g. the media – television documentaries that provide balanced perspectives on aquaculture and its contributions to Australian society and economy, detailed newspaper articles); and
- Consider strategies to improve the *lower credibility and low usage* of governments’ public aquaculture information.

### **Building trust by engaging communities**

Information provision provides an important role in building public understanding and support for aquaculture, but it is not sufficient because public judgements are complex, changeable and formed in response to a range of social factors. As mentioned earlier, conventional risk communications models which emphasise one-way delivery of formal, scientific/technical and promotional information by ‘experts’ to an ‘uninformed’ public can increase public mistrust and social conflict.

There is also information suggesting that interested communities are not entirely satisfied with the type of community consultation approaches that predominate in aquaculture and other natural resource industry decision-making. These measures alone are not always effective in meeting stakeholder and communities’ needs or helping to prevent or address social conflict.

In order for the Australian aquaculture industry to achieve extensive public support, more innovative participatory fora are needed to complement existing community consultation programs and activities that:

- Provide for open and transparent discussions on current and future aquaculture issues;
- Are more inclusive of the different interests in aquaculture;
- Are used as soon as possible in the earlier stages of aquaculture decision-making, as well as within each stage of decision-making (Figure 2);
- Match the methods and tools to fit the objectives (see Appendix 4);
- Are delivered at regional/local scales by those with credibility, knowledge of local issues, and community engagement expertise; and
- Give participants a real opportunity to influence outcomes.

Governments and the aquaculture industry may wish to consider developing community engagement strategies for key aquaculture regions across Australia. For example, the Murray Darling Basin Commission (MDBC) designed a community engagement program for its Living Murray Initiative to provide opportunities for people to become familiar with the issues and have input into options for environmental flows and improved water quality for the River Murray. The MDBC also commissioned the production of a manual, *Towards Whole of Community Engagement: A Practical Toolkit* (Aslin & Brown 2004), that provides a practical set of tools that can be used by governments and communities to implement appropriate and effective engagement processes.

### **Targeted communications meet interests of varied audiences**

This project has identified that while there was a general level of support for aquaculture, people’s views about more specific aquaculture matters varied as per socio-demographic features of communities, people’s interests and experiences, different aquaculture industry

sectors and practices, and other factors. That is, there may be some parts of ‘the public’ that are more likely to be supportive or to oppose the aquaculture industry, particular sectors and/or practices. Communicating about aquaculture – whether that is simply providing information or entails highly interactive community engagement activities - will therefore be more effective where it is tailored to meet those differences.

Since interest-based communities’ are likely to be more informed about aquaculture issues and more interested in having input into decisions than the broader public, their needs will be different. And some people may be more or less interested in contributing to different parts of aquaculture decision-making processes. The Eyre Peninsula and Port Phillip Bay case studies identified key interest groups and their broad areas of interest. This information could provide a starting point for determining which groups to target in communications, consultation and engagement programs (see Appendix 6).

### **The value of social assessments and social research**

In order for governments and the aquaculture industry to prevent and/or respond to differences of opinion and historic, current, or future conflicts relating to aquaculture, it is important to have sound, comprehensive and timely information on the social dimensions of aquaculture and effective strategies for public communications and engagement programs. Without them, there is a considerably greater risk of failed project approvals, policy/procedural changes, substantial time delays, loss of resources, social conflict, and/or decreased public confidence and support.

The examples listed in Chapter 2 demonstrate how useful these analyses and initiatives can be in understanding stakeholder and community needs and interests, and achieving greater social sustainability for aquaculture. Continued and expanded use of social research and assessments is recommended.

#### **Social assessments**

More frequent and systematic use of the full range of social assessment (from profiling to impact assessment) tools is required earlier in aquaculture decision-making. For example, a more consistent and comprehensive range of social criteria could be used through social profiling, social assessment and social impact studies to complement the biophysical criteria that are used in aquaculture site and project feasibility studies.

Several strategies and tools may also be required to build government and industry capacity for conducting and/or commissioning such assessments. The FRDC recently funded the development of a Social Assessment Handbook for Fisheries Managers (Schirmer 2004). The Handbook is a guide to assessing the current social and economic impacts of fishing and fishing industries on the wider community and people who depend on fishing for their livelihood. The Handbook contains an overview of social assessments, guidance on how to plan social assessments, and descriptions of the different types of social data that can be collected (e.g. target groups for assessment, types of social information, data collection methods and using and evaluating the assessment findings, given the capabilities for conducting such assessments). It will be released in early 2005 and will be made widely available. A similar product tailored to the particular features and challenges of the aquaculture industry could help aquaculture managers (government and industry) identify the social implications associated with aquaculture development, planning and management.

#### **Social research**

Aquaculture decision-making will benefit from continued use of social research. This project has highlighted the following opportunities to enhance aquaculture’s sustainability:

- 1. *Social analyses and data in aquaculture decision-making:***

Following on from the analysis undertaken in Chapter 1, a systematic stocktake could be undertaken of social assessments and other social analyses used by:

- The Australian and State/Territory Governments, and/or
- The aquaculture industry (at a sectoral and/or regional scale).

This information would seek to identify best practice principles and to generate more specific details regarding the institutional requirements for implementation (e.g. capacity, resources, etc).

**2. *Community consultation and engagement:***

Following on from the analysis undertaken in Chapter 1 and by the DAFF Graduate Project, a systematic stocktake and evaluation could also be undertaken of community consultation and engagement programs used by:

- The Australian and State/Territory Governments; and
- The aquaculture industry (at a sectoral and/or regional scale)

As mentioned above, this information would seek to identify best practice principles and to generate more specific details regarding the institutional requirements for implementation (e.g. capacity, resources, etc).

**3. *Community perceptions studies:***

Given the changeable nature of public opinion and the shortage of social surveys on aquaculture, community views should be regularly monitored to detect any changes in opinion. Other natural resource industries, such as mining, regularly use social surveys to measure their progress towards sustainability. This project established valuable baseline information about how regional communities perceive aquaculture, and the mail surveys (or parts of them) could be used at regular intervals to track any changes in public opinion (see Appendix 7 for list of potential indicators).

In addition, more regional case studies could be undertaken in areas featuring aquaculture industry sectors not covered by the earlier case studies, and could focus on understanding the causes of and preventing social conflicts associated with aquaculture. This work would provide valuable region-specific information, as well as building on the lessons gleaned from this project.

**4. *Improved understanding of aquaculture's social dimensions:***

The social sciences are critically important for identifying the social dimensions and impacts of government policies and programs on rural industries, communities and individuals. An inventory of aquaculture education and training in the tertiary and vocational sectors and extension activities would help identify skill and knowledge areas required for understanding and responding to aquaculture's social dimensions. This could be included in curricula, and incorporated into competency standards and appropriate accreditation schemes for employees, consultants and trainers in the aquaculture industry.

The Community Perceptions of Aquaculture project has provided important information about the way communities and other stakeholders value aquaculture. The project has demonstrated that there is support for the industry. There are also concerns about the industry's impacts, and parts of the public remain largely unaware of aquaculture. In order to improve public understanding and support for aquaculture, a mix of long and short-term approaches are needed to ensure that official decisions about aquaculture are informed by the most current and timely information about the industry's social dimensions and impacts, as well as by sound processes that provide for meaningful dialogues with communities.



## Appendix 1: Aquaculture's potential impacts

<b>Production system/species</b>	<b>Potential site impacts</b>	<b>Potential operation – local impacts</b>	<b>Potential operation – off-site impacts</b>
Cage culture (e.g. tuna, salmon, yellowtail kingfish)	Habitat modification or loss; changes to local fish populations; effects on amenity values (eg. reduced area for multiple use, reduced visual amenity, noise)	Marine floor degradation; lower water quality; disease, fish escape impact on wild stocks; loss of native wildlife	Disease; fish escapes and impact on wild stocks; cumulative impacts on environment; amenity values
Rack, tray and stick (e.g. oysters, mussels)	Habitat modification or loss; effects on amenity values (eg. reduced area for multiple use, reduced visual amenity, noise)	Marine floor degradation; removal of food for other filter feeders; spread of introduced marine organisms; improved water quality in some areas	Impacts on human health; cumulative impacts on environment; amenity values
Pond culturing (e.g. prawns)	Habitat modification or loss; effects on amenity values (eg. reduced visual amenity, noise)	Lower water quality; disease; competition with wild stocks; loss of native wildlife	Cumulative impacts on environment; amenity values

*Source: Productivity Commission 2004*



## Appendix 2: Key findings of a regional community consultation study – Bowen, Qld

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A survey was conducted in Bowen, Queensland as part of a community consultation process recommended by the Qld Department of State Development (Wilson 2001). The survey sought information about a community's views regarding the development of an aquaculture industry in their region. The survey covered 204 Bowen residents and 23 key stakeholders or opinion leaders.

A majority of residents in the Bowen Region were generally supportive of aquaculture development in the region (88%) and in Queensland (86%). The survey found that:

- Residents were more aware of new aquaculture developments than for other industries;
- Rated aquaculture as an 'important' industry sector for the region;
- When speaking of aquaculture's benefits, most frequently mentioned 'employment' (49%); followed by export benefits (26%), and boosting the local economy (25%);
- Over half (55%) saw no disadvantages with the industry; and
- The main disadvantages of the industry were focused on the industry's potential negative environmental impacts (17.6%).

The survey found that most people (54%) relied on the local newspaper to receive information about aquaculture. The survey was also used to elicit information about the Bowen Community's information needs. They found that people placed high importance on receiving regular information on the industry's and on specific projects concerning:

- Environmental impacts (e.g. water use and quality, impacts on fish breeding grounds);
- The number of jobs and job opportunities;
- Economic viability;
- Locations of existing and new projects;
- Environmental monitoring and regulations processes; and
- Organisational details and people involved.

The top priorities for the aquaculture industry identified by respondents were:

- Assessing its environmental impacts;
- Creating employment and employment opportunities;
- Ensuring its economic viability;
- Using local industries and materials;
- Securing export and domestic markets; and
- Educating and informing the public.



## Appendix 3: Use of social assessment in State/ Territory natural resource and aquaculture contexts

State	Social assessment features
SA	<p><b>Primary legislative base for SIA</b> <i>Development Act 1993</i></p> <ul style="list-style-type: none"> <li>• Development Plans <i>may</i> include objectives, principles relating to ‘social or economic issues’;</li> <li>• Major developments/projects may require EIS prepared by proponent and include statement of ‘expected environmental, social and economic effects’;</li> <li>• Crown developments with EISs called for by Minister incorporate social issues via public consultation processes.</li> </ul> <p><b>Aquaculture context</b> <i>Aquaculture Act</i></p> <ul style="list-style-type: none"> <li>• EIS required prior to establishment of aquaculture zones;</li> <li>• No formal requirement for SIA; some consideration of regional social profiles, available infrastructure;</li> <li>• Lease allocation: Development Assessment Commission (DAC) considers regional economic benefits of aquaculture activities.</li> </ul>
WA	<p><b>Primary legislative base for SIA</b> <i>Environmental Protection Act 1986</i> - major statute relating to social assessment</p> <ul style="list-style-type: none"> <li>• Definition of environment recognises interrelatedness of physical and social environments;</li> <li>• EIS as a ‘duty’ to be carried out for projects with likely significant environmental effects;</li> <li>• Codes of practice issued to LGAs re: development requiring formal assessment;</li> <li>• Range of issues <i>may</i> be considered when including social impacts in EIS (e.g. dislocation of communities, health issues, regional development, contingent valuation);</li> <li>• Environment Protection Authority (EPA) can include/exclude social issues in formal environmental assessment processes.</li> </ul> <p><b>Aquaculture context</b> <i>FRM Act</i></p> <ul style="list-style-type: none"> <li>• Specifies resource and environmental protection and socio-economic benefits must be ensured;</li> <li>• No specific requirement for an EIS or social assessments;</li> <li>• Projects requiring Consultative Environmental Review (CER) require significant community consultation.</li> </ul>
NT	<p><b>Primary legislative base for SIA/Aquaculture legislation</b></p> <ul style="list-style-type: none"> <li>• Different levels of environmental assessment required for aquaculture projects;</li> <li>• Level of assessment determined by Minister who considers project scale, ecological footprint and social acceptability;</li> <li>• Projects requiring Public Environmental Report (PER) or EIS do not necessarily include formal social assessment, but include community consultation procedures.</li> </ul>
NSW	<p><b>Primary legislative base for SIA</b> <i>Environmental Planning and Assessment Act 1979</i> - primary legislative base for SIA</p> <ul style="list-style-type: none"> <li>• System of land use plans and policies for State and local levels and procedures for environmental assessment and development control;</li> <li>• LGAs responsible for development assessment and must consider environmental impacts and social and economic impacts of development on local areas;</li> <li>• Project proponents (private or public) responsible for conducting social assessments;</li> <li>• State Environmental Planning Policies (SEPPs) include specific provisions for LGAs to assess the social impacts of particular kinds of development.</li> </ul> <p><b>Aquaculture context</b></p> <ul style="list-style-type: none"> <li>• Private sector proponents provided with guidelines and support from authorities (DIPNR, Fisheries NSW, LGA) to identify key issues;</li> <li>• Additional consideration of social issues when Draft EISs out for public comment.</li> </ul>

- TAS** **Primary legislative base for SIA**  
 Three major acts: *Environmental Management and Pollution Control Act 1994*, *Land Use Planning and Approvals Act 1993*, *State Policies and Projects Act 1993*)
- Based on key principles: maintaining ecological processes; fair use of the environment; public involvement; economic development; and shared responsibility between government, industry and community;
  - Different levels of assessment: Level 1 assessment – authority must consider social and economic effects and integrate decisions with other policies; other assessment levels less definite requirements for SIA.

**Aquaculture context**

*Marine Farm Planning Act 1995* and *Living Marine Resources Management Act 1995*

- Objectives for shared responsibility for resource management and planning between different spheres of government, community and industry;
- EIS required for marine farming development plans (MFDPs);
- No specific requirements for SIA – Section 21.1 requires consideration of social, economic, environmental and recreational aspects of region (e.g. regional population, economic factors, regional benefits);
- MFDPs include consideration of social impacts on amenities, other social issues may be raised during public comment period.

- Qld** **Primary legislative base for SIA**  
*Integrated Planning Act 1997* most relevant legislative basis for SIA
- LGA planning schemes must address basic matters of land use and development, infrastructure, and valuable features, includes social impacts;
  - Schemes must identify and support desirable environmental outcomes (social outcomes implied).  
*Where no legislative basis for assessing social impacts*
  - May be a general duty to regard impacts identified in local planning schemes;
  - Social impacts often not made specific.

*State Development and Public Works Organisation Act 1971*

- Coordinates significant public works and integrates impact assessment with IPA development assessment processes;
- ‘Significant projects’ require EIS: Coordinator General considers the EIS, submissions on the EIS and other relevant material;
- Department of State Development (DSD) develops terms of reference for EIS, intended to cover all aspects of development;
- Stakeholder consultation and public notification process for Draft EIS may raise site-specific social issues.

- Vic** **Primary legislative base for SIA**  
*Planning and Environment Act 1987*
- Addresses planning schemes and assessments of applications for development permits;
  - Aims to ensure ‘explicit consideration of social and economic effects when decisions are made about the use and development of land’ (s. 4(2)(d));
  - Environmental assessments are mandatory - consideration of significant social and economic effects are discretionary.

*Environmental Effect Act 1987*

- Basis for EIS of major projects;
- Proponents required to prepare Environment Effects Statement (EES) before starting project;
- Unclear requirements regarding scope and content of EES, and SIA component.

**Aquaculture context**

- EIS may be required depending on scale and focus of projects;
- Fisheries Victoria assesses projects’ economic feasibility and benefits to local area.

## Appendix 4: A spectrum of community participation

<i><b>Inform</b></i>	<i><b>Consult</b></i>	<i><b>Involve</b></i>	<i><b>Collaborate</b></i>	<i><b>Empower</b></i>
<p><b>Objective:</b> To provide communities with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.</p>	<p><b>Objective:</b> To obtain public feedback on analysis, alternatives and/or decisions.</p>	<p><b>Objective:</b> To work directly with communities throughout the process to ensure that public issues and concerns are consistently understood and considered.</p>	<p><b>Objective:</b> To partner with communities in each aspect of the decision including the development of alternatives and the identification of preferred solutions.</p>	<p><b>Objective:</b> To place final decision-making in the hands of communities.</p>
<p><b>Promise to communities:</b> We will keep you informed.</p>	<p><b>Promise to communities:</b> We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.</p>	<p><b>Promise to communities:</b> We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.</p>	<p><b>Promise to communities:</b> We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.</p>	<p><b>Promise to communities:</b> We will implement what you decide.</p>
<p><b>Example tools</b> Fact sheets, web sites, displays.</p>	<p><b>Example tools</b> Public comment, focus groups, surveys, public meetings, open houses.</p>	<p><b>Example tools</b> Workshops, deliberative polling.</p>	<p><b>Example tools</b> Citizen advisory committees, consensus building.</p>	<p><b>Example tools</b> Citizen juries, ballots, delegated decisions.</p>

*Source: International Association for Public Participation 2000*



## Appendix 5: Selection of community consultation in State/Territory governments' aquaculture decision-making

State	STAGES 2-2a Aquaculture policies, regional planning, management plans		STAGE 4 Approvals ( <i>Development proposals, EIS, licenses</i> )	STAGE 5 On-going management		
	Formal	Informal	Formal	Informal	Formal	Informal
SA	Public notification and submissions on zone plans	Monthly meetings with rural communities, fishing interests, others Ad-hoc use of public meetings	Public notification and submissions on development approvals Options for representation to DAC Licenses publicly advertised – amendments to conditions, but no appeals	Ad-hoc use of public meetings		
WA			Fisheries refers proposals involving coastal waters or Crown land to affected parties for written comment Licenses publicly advertised – aquaculture operators can respond	Multi-stakeholder reference groups for 'significant' proposals		
NT			Public notification and submissions on development application Options for representation to approval board EIS – public display, proponents respond to comments/objections	Ad-hoc use of public meetings		
NSW	Public notification and submissions for Regional Aquaculture Strategies	Regional Aquaculture Strategies include guidelines on consulting communities, site selection issues	Public notification of development applications EIS – public notification and submissions; significant projects trigger inter-agency review committee, also option for Commission of Inquiry	Regional Strategies encourage proponents to meet with affected local communities prior to assessment		Ad-hoc consultation where license conditions require monitoring/reporting
TAS	Public notification and submissions on marine farm development plans, with option for representation to Review	DPIWE-led stakeholder consultations, includes consideration of impacts on high use recreational areas				Multi-stakeholder environmental advisory committee

Panel			
Qld		LGAs determine level of consultation required for development approvals EIS – proponent must specify how community consulted; level as per project scale; Drafts out for public notification and submissions	Ad-hoc where local communities identify problems
VIC	Public notification and submissions for area management plans, State-wide assessment		

## Appendix 6: Key issues of concern to aquaculture interest groups

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Stakeholder group	Broad areas of interest
Related industry (e.g. tourism-oriented)	<ul style="list-style-type: none"> <li>• Aquaculture’s environmental impacts</li> <li>• Navigational issues</li> <li>• Use of marine ecology</li> <li>• Planned rates of growth for the aquaculture industry</li> <li>• Adequate consultation and engagement processes</li> </ul>
Related industry (e.g. fishing-related, regional development)	<ul style="list-style-type: none"> <li>• Aquaculture’s environmental impacts</li> <li>• Industry capacity building</li> <li>• Adequate consultation and engagement processes</li> </ul>
Research/Education	<ul style="list-style-type: none"> <li>• Aquaculture’s environmental impacts</li> <li>• Use of appropriate scientific research to address environmental and marketing challenges</li> </ul>
Local Government	<ul style="list-style-type: none"> <li>• Adequate consultation to enable effective infrastructure planning and responses to community concerns</li> </ul>
Community (e.g. conservation-based NGOs – local, regional, national; residents associations, individuals)	<ul style="list-style-type: none"> <li>• Aquaculture’s environmental impacts</li> <li>• Aquaculture’s social impacts (recreation, visual and/or noise impacts, pressure on coastal infrastructure)</li> <li>• Adequate consultation and engagement processes</li> </ul>
State Government	<ul style="list-style-type: none"> <li>• Adequate inter-agency coordination and processes to define and meet different and shared priorities</li> </ul>

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## **Appendix 7: Potential indicators to help measure aquaculture's progress towards social sustainability**

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The following items from the Community Perceptions of Aquaculture Project's Eyre Peninsula and Port Phillip Bay case study mail surveys could serve as indicators to help meet future benchmarks for the aquaculture industry's social sustainability:

- Level of awareness and knowledge of aquaculture;
  - How many respondents had been to an aquaculture farm before the survey;
  - How much respondents had thought about aquaculture issues prior to being surveyed;
  - Respondents' level of knowledge about particular industry sectors and farming practices;
  - Respondents' level of knowledge about State (and Local) Government's roles/responsibilities in relation to aquaculture;
  - Respondents' level of knowledge about a selection of aquaculture benefits and impacts;
- Support for aquaculture industry benefits over any disadvantages (this could also be applied to particular industry sectors);
- Perceived risk of aquaculture's future environmental impacts;
- Level of trust in Government and aquaculture industry decisions; and
- Use of information sources and perceived levels of credibility.



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