NATIONAL CARP CONTROL PLAN

WHAT ARE THE CARP VIRUS BIOCONTROL RISKS AND HOW CAN THEY BE MANAGED?

The socio-economic impact assessment and stakeholder engagement

APPENDIX 4: Socio-economic impact assessment — tourism sector

This suite of documents contains those listed below.

NCCP TECHNICAL PAPERS

1. Carp biocontrol background
2. Epidemiology and release strategies
3. Carp biocontrol and water quality
4. Carp virus species specificity
5. Potential socio-economic impacts of carp biocontrol
6. NCCP implementation
7. NCCP engagement report
8. NCCP Murray and Murrumbidgee case study
9. NCCP Lachlan case study

NCCP RESEARCH (peer reviewed)

Will carp virus biocontrol be effective?

1. 2016-153: Preparing for Cyprinid herpesvirus 3: A carp biomass estimate for eastern Australia
2. 2018-120: Population dynamics and carp biomass estimates for Australia
3. 2017-148: Exploring genetic biocontrol options that could work synergistically with the carp virus
4. 2016-170: Development of hydrological, ecological and epidemiological modelling
5. 2017-135: Essential studies on Cyprinid herpesvirus 3 (CyHV-3) prior to release of the virus in Australian waters
6. 2020-104: Evaluating the role of direct fish-to-fish contact on horizontal transmission of koi herpesvirus
7. 2019-163 Understanding the genetics and genomics of carp strains and susceptibility to CyHV-3
8. 2017-094: Review of carp control via commercial exploitation

What are the carp virus biocontrol risks and how can they be managed?

9. 2017-055 and 2017-056: Water-quality risk assessment of carp biocontrol for Australian waterways
10. 2016-183: Cyprinid herpesvirus 3 and its relevance to humans
11. 2017-127: Defining best practice for viral susceptibility testing of non-target species to Cyprinid herpesvirus 3
12. 2019-176: Determination of the susceptibility of Silver Perch, Murray Cod and Rainbow Trout to infection with CyHV-3
13. 2016-152 and 2018-189: The socio-economic impact assessment and stakeholder engagement
    Appendix 1: Getting the National Carp Control Plan right: Ensuring the plan addresses community and stakeholder needs, interests and concerns
    Appendix 2: Findings of community attitude surveys
    Appendix 3: Socio-economic impact assessment — commercial carp fishers
    Appendix 4: Socio-economic impact assessment — tourism sector
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    Appendix 8: Socio-economic impact assessment — koi hobbyists and businesses
    Appendix 9: Engaging with the NCCP: Summary of a stakeholder workshop
14. 2017-237: Risks, costs and water industry response
15. 2017-054: Social, economic and ecological risk assessment for use of Cyprinid herpesvirus 3 (CyHV-3) for carp biocontrol in Australia
    Volume 1: Review of the literature, outbreak scenarios, exposure pathways and case studies
    Volume 2: Assessment of risks to Matters of National Environmental Significance
    Volume 3: Assessment of social risks
16. 2016-158: Development of strategies to optimise release and clean-up strategies
17. 2016-180: Assessment of options for utilisation of virus-infected carp
18. 2017-104: The likely medium- to long-term ecological outcomes of major carp population reductions
19. 2016-132: Expected benefits and costs associated with carp control in the Murray-Darling Basin

NCCP PLANNING INVESTIGATIONS

1. 2018-112: Carp questionnaire survey and community mapping tool
2. 2018-190: Biosecurity strategy for the koi (*Cyprinus carpio*) industry
3. 2017-222: Engineering options for the NCCP
4. NCCP Lachlan case study (in house) (refer to Technical Paper 9)
5. 2018-209: Various NCCP operations case studies for the Murray and Murrumbidgee river systems (refer to Technical Paper 8)

UNIVERSITY OF CANBERRA | HEALTH RESEARCH INSTITUTE

National Carp Control Plan socio-economic impact assessment: Tourism Sector

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SUMMARY

Introduction

In 2016 the Australian Government announced the development of the National Carp Control Plan (Plan). The Plan focuses on evaluating the feasibility of releasing the carp virus Cyprinid herpesvirus-3 (referred to as the 'carp virus' from here) for reducing carp numbers. Critical to the success of the Plan and use of its recommendations in subsequent carp control actions is support from the diverse range of stakeholders who depend on or have an interest in carp, freshwater health and fisheries, as well as from people living and spending time in the regions where carp control measures will be implemented. Researchers at the University of Canberra were commissioned to develop understanding of community and stakeholder attitudes across these areas and to evaluate anticipatory and potential socio-economic impacts of the Plan, focusing on potential use of the carp virus. This is one of several reports produced from this project.

This report examines the potential socio-economic impacts of proposed carp control for tourism-dependent businesses operating in carp affected areas of Australia, with a particular focus on those whose business is reliant on freshwater or estuary areas. A large number of tourism businesses operate across carp-affected areas of Australia, many of which derive their revenue either from activities taking place directly on waterways (e.g. houseboats on the Murray River) or from being located adjacent to water-based areas with high amenity (e.g. accommodation businesses and restaurants based overlooking rivers or lakes). Tourism businesses operating in areas invaded by carp have potential to be directly affected – in both positive and negative ways - by actions implemented to control carp.

This is the second edition of this report. At the time of this report, NCCP research into feasibility of the carp virus was ongoing, and the actions that would be recommended for future carp control were not yet known. Given this, the focus of this report is on identifying *potential* impacts on the tourism industry, the circumstances under which they could occur, and the types of actions that could increase potential for positive impacts and reduce risk of negative impacts. This follows best practice approaches to socio-economic impact assessment (SEIA), which recommends beginning SEIA as early as possible in order to ensure the design of a project or program incorporates consideration of social and economic impacts at all stages. This report does not attempt to quantitatively estimate potential impacts in terms of changes in numbers of jobs or economic activity. Instead the overall size of the tourism sector is described as far as is possible together with its likely trajectory in the near future based on recent trends. This provides baseline information relevant to enabling assessment of impacts of future actions once they have been determined.

This report examines four key areas important to early impact assessment that can then inform development of proposed actions: i) current status, conditions, constraints and opportunities for the inland tourism industry; ii) impacts of the development phase of the

Plan on the industry ('anticipatory impacts'); iii) potential impacts of implementation of carp control, and iv) recommendations for actions to reduce negative and increase positive impacts as part of future carp control actions.

Methods

This second edition of the report is primarily based on data from qualitative interviews, an online survey of tourism businesses operating in areas experiencing carp invasion, and a survey of community attitudes:

- Phone interviews were conducted with 23 tourism industry representatives and business operators
- 69 tourism operators completed a survey asking about their business, current status, ability to cope with changes in business revenue, impacts of past events involving poor water quality or changed water flow, and views about carp control and potential release of the carp virus
- 4,428 people completed an online survey that, amongst other questions, examined potential changes in visitation behaviour associated with controlling carp using release of the carp virus.

Inland tourism industry: Current conditions, opportunities and constraints

The existing conditions being experienced by a person or business will impact on their ability to successfully adapt to or cope with a change, and also give an understanding of the potential size of socio-economic impacts.

In Australia, as of 2017-18 the tourism industry was estimated to generated $131.4 billion of spending across both domestic and international visitors, and to directly employ 598,200 people across 288,614 businesses nationwide. The focus of this report is on tourism in regional communities in which carp invasion has occurred. In 2017-18, an estimated 44% of tourism spending occurred in regional areas, generating $51 billion in spending in those communities. There are noted challenges to growing the tourism industry in many regional areas, with relatively less investment in significant tourism projects in regional areas compared to cities, and regional investments in expanding tourism being more likely to require government support. Data on employment in tourism from Tourism Research Australia were overlaid with spatial data on carp invasion from the 2016 State of the Environment Report to identify the number of regional tourism jobs based in areas in which carp invasion has occurred. Employment generated by tourism in major cities such as Melbourne was excluded, even if carp invasion was occurring, as it was considered unlikely a significant proportion of tourism activity in these areas was highly reliant on freshwater areas. In regional areas identified as having a moderate to high density of carp in 2016, excluding those where tourism is known to depend largely on saltwater or non-freshwater related attractions, an estimated 78,000 people were employed in tourism across 58

regional local government areas (LGAs). Many of these jobs will not depend directly on tourism in freshwater areas, however a significant proportion will. This also excludes the many people employed in tourism who work in areas in which low densities of carp were identified, and excludes some smaller LGAs for which tourism employment statistics are not reported. It is therefore an underestimate of total tourism employment in carp affected areas, but indicates likely magnitude of employment in those areas with higher densities of carp located outside major cities. In most of these 58 LGAs, 10% or more of local employment depends on tourism. The types of tourism businesses that can depend on freshwater are diverse in these regions. They include (but are not limited to) those directly using freshwater and estuary areas, such as houseboats, kayak/canoeing hire and guide businesses, recreational fishing related businesses, water skiing, and many nature tourism businesses; and those reliant on areas adjacent to freshwater and estuary areas, such as accommodation located on riverbanks and lakes; restaurants, cafes and takeaway food shops; and some hire and retail shops. December and January are peak months for most businesses (76% in December and 83% in January). Most autumn and spring months, and February, are peak or shoulder seasons for the large majority of businesses. The winter months are off-peak for around half of businesses, but are peak times for some (9% to 16%) and shoulder for others (18% to 25%). Most tourism businesses (74%) earned half or more of their total annual revenue during their peak months, and 28% earned three-quarters or more of their revenue during peak season.

Conditions in the industry were reasonably positive as of late 2018: 89% of businesses were confident they would be operating in one year's time, and 85% that they would be operating in five years. Most – 77% - felt confident they could adapt to change in the tourism industry, and 66% felt their business revenue was likely to grow in the near future. Just over half were in a better position compared to previous years. While 42% felt well supported by tourism industry organisations, 27% did not, indicating this is an area of stress for some. Only 36% reported having adequate access to finance, with others either not having adequate finance or being unsure if they did. Twenty three per cent reported that their business was under a lot of stress at the time of completing the industry survey. More than half – 55% - found it difficult to recruit workers with the right skills for their business, indicating this is a key constraint area for many. Only 13% reported lower than average revenue during 2018, while 33% reported similar and 55% higher than average revenue.

Most tourism businesses interviewed reported that wild carp currently have minimal impact on tourist business operation or viability, or on tourist visitor numbers. In the survey, 34% of businesses reported carp had negative impacts on their business, 39% reported neither positive or negative impacts, 11% reported positive impacts, and 16% were unsure whether or how carp affected their business. The negative impacts reported were principally related to the impacts of carp on local amenity in the form of turbid water, reduced native fish populations, and the impacts of dead carp being left on riverbanks by fishers. Most

businesses supported investment in controlling carp, and felt that reducing carp numbers would have benefits both for their business and their region more generally through improving water quality in natural water bodies such as rivers, lakes, and wetlands.

A key aspect of existing conditions is the impact of 'adverse water events' for tourism businesses – meaning events in which poor water quality (e.g. a blackwater event or blue-green algae event) or very high or low water flows affects visitation to a region. All tourism businesses interviewed and surveyed had experienced at least one of these events in the last decades, and many had experienced two or more. Understanding the impacts of these events in tourism businesses provides insight into the capacity of businesses to cope with any short-term reductions in water quality and amenity if they occur as a consequence of a release of the carp virus.

Adverse water events typically cause loss of revenue resulting from reduced visitation. The impact of decline in visitation varied depending on the proportion of visitation lost and the amount of time it was lost for: for some businesses, impacts of adverse water events on business financial reserves took many years to recover from. A key factor raised in all interviews was the importance of addressing perceptions that often exacerbate impacts of adverse water events on the tourism sector. Most reported that while an adverse water quality event would impact visitation, often the decline in visitation last substantially longer than the actual water event, or was driven more by negative perceptions rather than actual change in amenity or ability to use areas. The key factor most interviewees and survey participants identified as critical to reducing impacts of adverse water quality events was therefore ensuring media coverage of events did not lead to ongoing decline in visitation due to negative perceptions. Other actions that assist in coping with these events are provision of regular, up to date information to tourism businesses that enables them to plan ahead and implement strategies for alternative tourism activities, and diversifying businesses.

Impacts of developing the Plan

The period in which a proposed action is being developed, but when its exact nature is not yet known, is often associated with social and economic impacts for those who have potential to be impacted by the proposed action. Tourism businesses reported that during the development of the NCCP, a three year period, many had experienced some uncertainty about the future, which had for some led to delaying decisions about investment in the business. Many reported that customers were asking about potential release of the virus in future, however none reported downturn in business during this 'anticipatory' period. More reported experiencing positive impacts than negative during this period: 38% of businesses reported having a more positive outlook about their long-term future due to the announcement of development of a carp control plan, while 28% reported having greater confidence in planning for future business development or investment, compared to 25% experiencing uncertainty about business development and investment decisions, 22%

experiencing increased uncertainty about promoting their business, and 17% reporting increased personal stress and customer uncertainty. This indicates limited negative anticipatory impacts on businesses.

Potential impacts of carp control via release of the carp virus

The principle way in which tourism businesses would be affected by virus release or other carp control measures is through any impacts carp control actions have on visitation. Visitation levels, in turn are largely driven by the extent to which there are either actual and/or perceived changes (negative or positive) in the amenity of an area – which depends on the extent to which virus release causes short-term and long-term negative amenity impacts in the form of dead carp or water quality problems (real or perceived), and results in long-term amenity improvement. Reduced visitation was considered more likely to occur if implementation of carp control combined with other events that also impacted visitation, such as drought or high water flows.

The NCCP's research is focused in large part on assessing whether and to what extent release of the virus could result in the types of adverse impacts on water quality and amenity feared by tourism operators, and how risk could be reduced. In this project, we examined the extent to which *perceptions* of adverse impacts on water quality and amenity could impact visitation by domestic tourists. This was done firstly by identifying the types of concerns reported by community members after being given some initial information about the carp virus. This found that despite being provided with clear statements that the virus is not transmissible to humans or animals other than carp, 49% of people were concerned 'the virus could be transmissible to humans, despite research finding it is not', and 57% were concerned about potential transmissibility to fish or animals other than carp. Concerns about potential water quality problems resulting from virus release were high, at 63%. This suggests high potential for rapid formation of negative community perceptions about virus release, which have potential to flow on to choices made about visitation to areas in which the virus is released.

Potential consumer responses to virus release was then assessed by examining how likely people felt they were to visit areas, and to engage in activities such as swimming and fishing at them, under three scenarios: i) current conditions, in which there are occasional adverse water quality events, ii) a scenario in which a region 50 kilometres away has experienced an adverse water quality event, and iii) a scenario in which there was a 10% chance of a large fish kill occurring during a person's visit. The findings suggest that the second two scenarios would result in a decline in visitation, of up to one-third, although the actual decline in visitation would likely be less than this, as there is commonly a difference between stated intentions and a person's actual behaviour. This suggests potential for a decline in visitation associated with the potential risk of an adverse impact on amenity in a region (rather than actual impacts). They also showed that in many areas experiencing carp invasion, there is

already reasonably high reluctance amongst a large group of consumers to consume visit regions.

While most tourism businesses would be able to cope with a decline in revenue lasting a short period of time, albeit experiencing negative impacts from it, any long-term decline in visitation would be much more difficult to cope with, as would multiple different factors affecting visitation at any given time. When asked about potential short-term impacts of carp virus release, tourism businesses survey emphasised the critical role of perceptions in determining impact on the sector, with 80% reporting concern about the potential for 'negative media coverage of outcomes arising from virus release in the region my businesses operates in', and 62% being concerned about potential for longer term decline in reputation of their region as a tourism destination and associated decline in visitation. In the longer term, 86% reported their business would benefit from clearer waters in local areas, while 73% or more felt other improvements in environmental health such as increased native fish populations would benefit their business. These responses highlight the dependence of many tourism businesses on local environmental amenity, with high potential for positive impacts on the tourism industry if reduced carp numbers contribute over the longer term to improved environmental health.

The extent to which tourism businesses experience either short or long-term impacts as a consequence of virus release will depend on a number of factors. In particular, interviews and survey findings suggest they depend on:

- Extent and duration of carp kills and water quality impacts resulting from virus release – something being assessed through biophysical research as part of the NCCP, and not discussed further in this report
- Timing of virus release and how this intersects with tourism activity, particularly whether amenity impacts occur during busy tourism periods
- Investment in clean-up and extent to which areas important to tourism are prioritised for clean-up in the short-term and in longer-term episodic outbreaks of the virus
- Level of investment in marketing and communication to counter inaccurate perceptions: to be successful, this should involve
    - early communication and development of marketing and communication strategies in collaboration with the tourism industry (prior to implementation of carp control)
    - investment of resources in these strategies and ensuring businesses have access to up-to-date and timely information during implementation of carp control
    - ensuring there is ability to rapidly respond to inaccurate media portrayals of negative impacts during and after implementation

    - design of strategies to encourage recovery of visitation and engagement in monitoring environmental recovery.
- Investment in other forms of support to reduce negative impacts, particularly ensuring clean-up crews utilise local tourism businesses for accommodation and services where possible, and providing access to advice and support for impacted businesses, and
- Whether reduction in carp numbers is accompanied by improved environmental health in the long term.

Many of the 58 regional local government areas with moderate to high carp densities identified have a higher than average proportion of jobs dependent on tourism. This does suggest potential for any impact to tourism businesses to have broader impacts on the local economy. This type of flow-on impact affecting the broader community is most likely to occur if either i) longer term negative impacts are experienced, or ii) impacts resulting from carp control occur at a time when other stresses are already affecting the tourism industry, such as drought. To reduce potential for broader impacts on communities, emphasis should be on reducing the severity and length of impacts to visitation, particularly through effective marketing and communication strategies.

Recommendations

The following actions are recommended as part of future carp control strategy development and implementation, in order to reduce potential for negative impacts on the tourism sector, and increasing potential positive impacts:

- Provide clear advice on the likely timelines for future decision making about carp control and timing of implementation of carp control actions. This enables tourism businesses to better plan for the future, including assessing whether they should make business investments they are currently planning. Associated with this, providing regular updates on progress of decision making processes is important to improve levels of certainty and support ability to make business decisions.
- Ensure tourism industry representatives are actively involved in each local area in determining priorities for clean-up to reduce potential impacts on tourism businesses.
- Ensure carp control investment includes sufficient investment in high-quality, proactive and well-coordinated communication to the public, including to tourists, that actively involves the tourism industry. Ensure communications are clear and do not create negative perceptions that reduce visitation to areas not affected by issues such as fish kills or water quality problems.
- Invest in communication to ensure tourists are aware when an area has recovered after an impact on amenity, and to clearly communicate risk of low amenity for a future booking.

- Support tourism industry to develop approaches to building confidence in tourism bookings, such as implementing refund schemes if an area is affected by a fish kill when a visitor planned to visit.
- Invest in citizen involvement in actions to improve environmental health after virus release, with these programs supporting recovery of visitation if a decline occurs related to virus release, and more generally supporting visitation and awareness of the regions as tourism destinations.
- Actively track impacts on tourism visitation and identify areas where short-term impacts from virus release are adding to other existing negative impacts. Consider provision of support in these areas.
- Coordinate carp control actions with investments in environmental recovery being made by others, and ensure appropriate investment in achieving improved environmental health. This is important as positive impacts on the tourism industry are dependent on whether carp control leads to improved environmental health and amenity over the longer term.
- Ensure clean-up activities source accommodation, food and other resources from local businesses where possible to offset some effects of downturn in visitation.
- If long-term reduction in visitation occurs, consider providing active support for affected tourism businesses.

2. INTRODUCTION

THE NATIONAL CARP CONTROL PLAN

In 2016 the Australian Government announced a $15 million investment to develop the National Carp Control Plan (Plan). The Plan is being developed through research and consultation with stakeholders and community members. It focuses on evaluating the feasibility of releasing the carp virus Cyprinid herpesvirus-3 (referred to as the 'carp virus' from here) for reducing carp numbers. The Plan will be submitted to the Australian Government in December 2019, and the Government will draw on the Plan recommendations to make decisions about and inform development of future carp control strategies.

STAKEHOLDER AND COMMUNITY SUPPORT

If the carp virus is found to be a feasible strategy for reducing carp numbers, it would be delivered over a large geographic area, in waterways and waterbodies that are essential to Australia's traditional owners, primary industries, household water consumption, and millions of recreational users each year.

Critical to the success of the Plan and any subsequent use of its recommendations in carp control actions is widespread support from the diverse range of stakeholders who depend on or have an interest in carp, freshwater health and fisheries, as well as from people living and spending time in the regions where carp control measures will be implemented.

Support for the recommendations made in the Plan, and for action to control carp more broadly, will depend on a range of factors, including:

- The extent to which people believe investing in carp control is an appropriate and effective way of improving environmental health
- Expected benefits versus costs of proposed carp control methods for different groups and communities
- Trust in the processes and evidence used to develop the Plan and subsequent carp control actions, and in the agencies tasked with implementing carp control, and
- The perceived environmental, economic and social risks of actions proposed for carp control.

Researchers at the University of Canberra have been commissioned to develop understanding of community and stakeholder attitudes across these areas and to evaluate anticipatory and potential socio-economic impacts of the Plan, focusing on potential use of the carp virus, while also examining views and preferences about carp control more broadly. This work aims to inform development of recommendations that will have support from communities and stakeholder groups, through guidance on how these actions could be

designed in ways that appropriately address the needs, concerns and priorities of community and stakeholders.

UNDERSTANDING COMMUNITY AND STAKEHOLDER ATTITUDES AND ASSESSING SOCIAL EFFECTS – PROJECT OVERVIEW

The University of Canberra project focuses on:

- Identifying and understanding stakeholder and community needs, concerns and expectations regarding carp control, so these are considered throughout the development of the Plan and integrated in the recommendations under the Plan
- Identifying how best to ensure processes used to develop the Plan meet stakeholder needs and expectations
- Identifying potential socio-economic impacts of carp control for different stakeholder groups and communities, and measures to reduce negative and maximise positive socio-economic impacts, and
- Understanding the types of information, consultation and engagement needed by different stakeholders in the process of developing the Plan.

This work is being used to inform both the process used to develop the Plan (including communication, consultation and engagement with stakeholders and communities) and the content of the Plan. The work will inform evaluation of the feasibility of carp virus and strategies for minimising negative and maximising positive impacts of any carp control actions recommended in the Plan.

This project will also identify a framework for ongoing monitoring and evaluation of socio-economic impacts and community attitudes into the future beyond the life of this project. This is will facilitate capacity for rapid identification of actions needed to address community and stakeholder concerns during any future implementation of the Plan recommendations.

The project has included a strong focus on identifying stakeholder concerns, views and needs, and identifying the potential impacts of releasing the virus on different groups. An initial round of phone interviews was conducted in 2017 with 23 representatives of stakeholder groups with differing interests in carp control. This included representatives of environmental groups, commercial carp fishers, Traditional Owners, farming groups, koi organisations, water providers, native fish breeders, recreational fishing organisations, tourism businesses, animal welfare organisations, and freshwater scientists. A second round of interviews was conducted in 2018 and a workshop in 2019. The findings of the June 2019 workshop are documented in this report.

This initial round of interviews provided a baseline understanding of the views of stakeholders at the early stage of the Plan development (reported in the first report produced from the University of Canberra research). In the interviews most stakeholders

expressed *conditional support* for the Plan, meaning they would support the eventual Plan if the process of developing it and its content adequately addresses their key questions and concerns. A smaller number of stakeholders actively opposed the Plan, and a similarly small number unconditionally supported the Plan.

In these initial interviews, it was identified that stakeholder support for any future carp control strategy was contingent upon the strategy including the following elements:

- Multiple measures to control carp
- Identification of how to best integrate carp control with other actions to improve environmental health in freshwater and estuary areas
- Development of detailed guidance on the planned timing and management of carp control actions, particularly virus release
- Clear identification of risks and how they will be managed and mitigated, including planning for worst-case scenarios
- Identification and appropriate mitigation of potential social and economic impacts of carp control on specific groups
- Appropriate involvement of different groups in decision making processes
- Sound governance, including clear commitment of funding and other resources to carp control and identification of responsibilities of different agencies
- Development of appropriate monitoring and evaluation strategies to ensure outcomes can be identified.

When discussing the recommendations being developed for the NCCP, stakeholders also clearly identified a need to be able to engage with scientists undertaking research for the Plan, and in particular to be able to discuss and provide their views on the emerging findings of Plan research. To enable this, in June 2019 a workshop was organized in which stakeholders were both provided with presentations on emerging findings and discussed these findings as well as their views on implications of the emerging findings for future carp control action. This report documents the workshop discussion and key messages emerging from it.

PROJECT REPORTS

This project includes several areas of investigations. These are being produced as separate reports and as chapters of reports for the overall project, in the following form:

- Getting the National Carp Control Plan right: Ensuring the Plan addresses community and stakeholder needs, interests and concerns (stand-alone report, also included as appendix to the Final Report for FRDC Project 'Carp Control: Understanding community and stakeholder attitudes and assessing social effects')
- Ensuring carp control is socially acceptable: Understanding key factors likely to influence social acceptability of carp control measures (journal paper prepared, with

key findings also summarised in Final Report for FRDC Project 'Carp Control: Understanding community and stakeholder attitudes and assessing social effects')

- Stakeholder engagement recommendations for the National Carp Control Plan. Rather than being published as a separate report, this work was integrated directly into the Plan's stakeholder engagement and communications strategies over time (A summary of the work conducted is included in the Final Report for FRDC Project 'Carp Control: Understanding community and stakeholder attitudes and assessing social effects')
- Socio-economic impact assessment: potential impacts and negative impact mitigation strategies for (a) commercial/contract carp fishers, (b) tourism-dependent businesses, (c) native fish breeders and hatcheries, (d) the koi industry and, (e) recreational fishing sector (these have been produced as stand-alone reports, with earlier versions of the first four also included as Appendixes to the Final Report for FRDC Project 'Carp Control: Understanding community and stakeholder attitudes and assessing social effects', and the final versions of all five included as Appendixes to the Final Report for FRDC Project 'NCCP: Socio-economic impact assessment and stakeholder engagement').
- Engaging with the National Carp Control Plan: summary of a stakeholder workshop (stand-alone report, also included as Appendix to the Final Report for FRDC Project 'NCCP: Socio-economic impact assessment and stakeholder engagement')
- Monitoring socio-economic impacts and community attitudes: A framework for ongoing monitoring of the National Carp Control Plan (included in the Final Report for FRDC Project 'Carp Control: Understanding community and stakeholder attitudes and assessing social effects').
- Discussion Paper: Understanding potential social and economic impacts of carp control. This was produced as a stand-alone paper, and summarises key findings across all the work regarding potential socio-economic impacts of reducing carp using release of the carp virus.

THIS REPORT

This report examines the potential socio-economic impacts of proposed carp control for tourism-dependent businesses operating in carp affected areas of Australia, with a particular focus on those whose business is reliant on waterways. There are a large number of tourism businesses operating across carp-affected areas of Australia, many of which derive their revenue either from activities taking place directly on waterways (e.g. houseboats on the Murray River) or from being located adjacent to water-based areas with high amenity (e.g. accommodation businesses and restaurants based overlooking rivers or lakes). Tourism businesses operating in areas invaded by carp will be directly affected – in both positive and negative ways - by any actions put in place to control carp.

As discussed earlier, this report is one of five examining potential impacts of the Plan for different stakeholder groups. Each of the five reports uses a similar approach, and some text about impact assessment is repeated in each report so each can be read as a 'stand-alone' document.

This report was prepared while the Plan was engaged in ongoing research evaluating feasibility of use of the carp virus, and before decisions had been made about optimal approaches to future carp control. This means that the exact actions to be implemented in future to reduce carp numbers were not yet known. Given this, the focus of this report is on identifying *potential* impacts, the circumstances under which they could occur (and which they would not occur under), and the types of actions that could be implemented as part of future carp control strategies in order to increase potential for positive impacts and reduce risk of negative impacts. The intent is to identify potential impacts so they can be considered and addressed as part of the design of the Plan with the goal of preventing or mitigating negative impacts and providing opportunities for positive impacts where possible. Thus, the impacts identified in this report should not be assumed to be 'likely' to happen as whether they occur, and to what extent, will depend on the nature and type of actions ultimately implemented as part of future carp control actions.

This approach to early assessment of potential impacts follows best practice approaches to socio-economic impact assessment (SEIA), which recommends conducting SEIA as an ongoing process that starts before a decision is made so that initial SEIA can inform decisions made about the types of actions to proceed with (Esteves et al. 2012, Schirmer 2017). This is different to traditional impact assessment, which is often undertaken after a proposed set of actions have been finalised - a point at which it is more difficult to make meaningful changes that can prevent or mitigate impacts (Esteves et al. 2012). It addresses concerns such as those raised by Momtaz and Gladstone (2008), who found that negative impacts experienced by fishers from estuarine management introduced by the NSW government could have been reduced if improved impact assessment and consultation processes had occurred during the process of developing the management actions.

A first edition of this report was produced based on initial interviews with those in the tourism sector. This was followed by further work assessing further the capacity of tourism businesses to cope with change (using a survey of tourism businesses) and likelihood of changes in visitation using a public survey, as well as a multi-stakeholder workshop held in June 2019. This second edition includes this additional work and makes more detailed recommendations than the first report regarding actions to implement to reduce risk of negative impacts and increase potential for positive impacts.

This report should therefore be read as an early impact assessment produced to inform Plan development. It includes key questions and identifies important areas of assessment that are needed as the Plan is developed. As it is intended to inform development of the Plan, it is not an assessment of the impacts of the Plan: once the specific actions to be included in

the Plan are finalised, a formal assessment of their potential impacts should be undertaken. As the specific actions to be recommended in the Plan, and ultimate decisions made by government about carp control, were not known at the time of preparation, this report does not attempt to quantitatively estimate potential impacts in terms of changes in numbers of jobs or economic activity. Instead the overall size of the tourism sector is described as far as is possible together with its likely trajectory in the near future based on recent trends. This provides baseline information relevant to enabling assessment of impacts of future actions once they have been determined.

The report first briefly explains the key areas examined. This is followed by a description of assessment methods applied. Findings are then presented, focusing on understanding (i) current status, constraints and opportunities in the absence of carp control, (ii) impacts of the announcement of the NCCP, (iii) potential impacts of carp control, and (iv) recommendations for actions to reduce potential for negative impacts and increase potential for positive impacts.

3. SOCIO-ECONOMIC IMPACT ASSESSMENT

Impact assessment can mean different things to different people. This section explains the approach taken in this report, and why this approach was used.

As noted earlier, best-practice in impact assessment involves assessment prior to decisions have been made about a course of action. This increases the scope of proponents to design their proposed action in ways that prevent or mitigate negative impacts and provide opportunities for positive impacts (Vanclay and Esteves 2011; Arce-Gomez et al. 2015). In addition, commencing impact assessment prior to final decisions allows it to form a central part of the decision-making process. When being undertaken along-side the decision-making process, participatory approaches should be used where the people or groups who are potentially impacted have opportunities to contribute to assessment of feasibility of the proposed actions, their potential impacts and to identify prevention and mitigation measures (Vanclay and Esteves 2011; Arce-Gomez et al. 2015).

This report examines four key areas important to early impact assessment that can then inform development of proposed actions:

- Current status, conditions, constraints and opportunities for the inland tourism industry
- Impacts of the development phase of the Plan on the industry
- Potential impacts of implementation of carp control, and
- Recommendations for actions to reduce negative and increase positive impacts as part of future carp control actions.

ASSESSING EXISTING CONDITIONS

Existing conditions, constraints and opportunities experienced are an important starting point for impact assessment as they influence how a policy, program or project can impact people and businesses (Schirmer 2011, Loxton et al. 2013). This part of assessment is important for two key reasons.

First, understanding the current size and nature of an industry's activities enables identification of the extent to which impacts on an industry have potential to flow-on to have broader impacts for the communities in which that industry operates.

Second, the influence of existing conditions on the ability of people, businesses and communities to adapt successfully to change is well recognised in literature across a range of contexts including climate change adaptation (e.g. Loxton et al. 2013). For example, a farmer experiencing drought may be less able to cope with reforms to water access, compared to one who is experiencing normal rainfall conditions (e.g. Schirmer 2017). This principle is applicable to assessment of the potential effects of the National Carp Control Plan. For example, if businesses are experiencing a change in markets, or expanding or contracting prior to implementation of the Plan, there may be less capacity to adapt to any new conditions that may arise.

ASSESSING IMPACTS OF DEVELOPING THE PLAN – 'ANTICIPATORY IMPACTS'

Many policies, programs and projects can have relatively long development phases which can, themselves, have important 'anticipatory' social and economic impacts. During the development phase of a program, even though it is not known exactly how the proposed action will impact, it is known there is potential for impacts to occur (see Loxton et al. 2012, 2013, 2014; Schirmer 2017).

A person anticipating a change they feel is likely to affect them negatively may experience a range of associated impacts which can include mental health impacts such as anxiety and stress-related health problems. These can result from uncertainty about the future, and the related challenges with making decisions under uncertainty. Major life decisions such as getting married, having a child, or purchasing a house or car may be delayed as a result of uncertainty about the future. Those who manage businesses can find it harder to obtain finance or maintain loans if financial institutions are aware a proposed action may have potential negative impacts on the business in the future. They may also experience changes in their markets as customers switch to other providers in anticipation of the action being proposed (Loxton et al. 2012, 2013, 2014).

'Anticipatory' impacts can be significant and create long-lasting impacts for households and businesses. It is therefore critical to understand how the announcement that the Plan would be developed has affected people and businesses involved in the freshwater recreational

fishing sector, and to identify any actions that can be implemented to reduce potential negative impacts during the development of the Plan.

POTENTIAL IMPACTS OF CARP CONTROL

As noted earlier, implementing actions to control carp has potential to cause social and economic impacts – positive and negative – for different tourism businesses. This report identifies potential impacts with a focus on understanding the conditions under which they could occur and actions that could increase likelihood of positive impact and reduce likelihood of negative impact.

BROADER INDUSTRY CONCERNS ABOUT POTENTIAL IMPACT AND PLAN DEVELOPMENT

Many people interviewed from the tourism sector raised questions about carp control more generally that were not specifically related to impacts on their sector. These questions and concerns are issues this group would need answered to be able to support future carp control actions. This is important for understanding willingness to accept negative impacts: past studies have documented that many groups are willing to accept some level of negative impact (usually temporary and not threatening their overall household or business viability) if they believe the actions being taken are 'worth it' – in other words, that they will achieve longer-term positive outcomes than justify the shorter-term negative impacts (see for example Gross 2008, 2011). This section examines these broader concerns and question to examine these aspects of willingness to accept impact in more depth.

RECOMMENDATIONS

This section summarises key recommendations for reducing risk of negative impact, ensuring any negative impacts are 'worth it' in the form of long-term positive outcomes for either the native fish aquaculture or freshwater and estuary health more generally, and increasing potential for positive impacts.

4. METHODS

This second edition of the report is based on

- qualitative data from interviews with tourist operators and representatives of the tourism industry
- data from an online survey of tourism business and tourism industry organisations operating in carp affected areas of Australia, in which a broad selection of tourism businesses and organisations participated
- A survey of community attitudes conducted in 2019 that included questions assessing potential change in visitation of carp-affected areas related to carp control actions, and
- A multi-stakeholder workshop held in June 2019.

INTERVIEWS

SAMPLE

Phone interviews were conducted with businesses and representatives involved in tourism conducted between March and May 2018. Participants included people who met one or more of the following characteristics:

- Likely to be directly impacted by the implementation of carp control measures (i.e. tourist business owners and managers reliant on freshwater areas affected by carp)
- Involved directly in supporting tourism and regional economic development in areas affected by carp (i.e. tourist industry organisations and associations, and local councils)

The aim in initial assessment was to ensure a diversity of representatives across the tourism sector were interviewed, with the objective of identifying the full range of potential impacts of concern to different members of the industry. To achieve this, we interviewed people who operated tourism businesses, as well as people from tourism representative groups and peak bodies.

We aimed to engage with the following types of tourism business operators:

- Accommodation (caravan parks, hotels, motels, holiday house accommodation)
- River boating (houseboats, river cruise, marinas)
- Recreational fishing
- Festivals and events
- Adventure/nature-based tourism
- Food and wine
- Water sports, and
- Golf clubs.

We also aimed to engage with multiple types of tourism sector representative groups and peak bodies, including:

- Local government tourism and economic development representatives from local government areas in carp affected areas
- Representatives of houseboat industry organisations
- Regional tourism organisations (RTOs) supporting the tourism sector in areas likely to be directly affected by the implementation of carp control measures
- State-level tourist industry councils.

Participants were recruited in one of three ways: i) all tourism-based representatives that could be identified from the NCCP consultation attendance records were invited to

participate; ii) 'snow balling' based on referrals from interviewees we spoke to; iii) Google searches targeted to fill gaps in representation across area of types of tourism business.

For those who had attended an NCCP consultation event an initial invitation was sent via email. Weekly follow up emails were sent to those who had not responded to the initial email invite, and we also followed up with phone calls if we did not receive an email response after two follow-up emails. In the case of 'snow ball' referrals and contacts identified via Google searches, we made initial contact via phone and followed up with an email invite. We followed the same process of sending follow-up emails to those who did not respond to email as well as follow-up phone calls.

The interviewee representation across states was as follows: ACT (1), NSW (2), VIC (7), SA (12). Given the small sample size, to protect the anonymity of participants we have not identified the state or territory in which interviewees lived in Table 1.

Table 1 Interview sample

Type of interest	Code used for results	Number of people interviewed across roles [a]	Total number invited
Tourist businesses			
Accommodation	Operator	3	14
River boating – chartered cruises	Operator	2	3
River boating – houseboats	Operator	4	5
River boating – marinas	Operator	1	2
Adventure/nature-based	Operator	1	6
Recreational fishing	Operator	1	2
Wineries	Operator	2	4
Festivals and events	n/a	0	1
History and heritage	n/a	0	1
Golf clubs	n/a	0	1
Number of businesses interviewed		**14**	**37**
Industry representatives			
Industry peak body - Houseboating	Peak	2	2
Industry peak body - Wine industry	Peak	1	1
Industry peak body - Recreational fishing	Peak	1	1
Industry peak body - Recreational fishing	Peak	1	1
Tourism and economic development representative from local government	LGA	3	9
Regional tourism organisation	RTO	4	4
State tourism organisation	STO	1	1
Number of representatives interviewed		**13**	**18**

[a] Some tourism businesses operators interviewed also had a role as an industry representative. Therefore, total number of people interviewed as representing a business or industry (27) is greater than the number of people interviewed (23).

INTERVIEW QUESTIONS

A semi-structured open-ended question format was used in interviews. The following set of questions was provided to attendees prior to the phone interview:

1. Could you tell me a bit about your business or organisation?
2. Has the announcement of the National Carp Control Plan had any effects on your business or organisation (and on you) or on the tourism industry in your region more generally?
3. Does the presence of carp currently have any negative or positive impacts on your business or organisation? Why or why not?
4. Do you think the proposal to release the carp virus is a good idea? Why or why not?
5. What are your views about the methods that should be used to control carp?
6. If the carp virus is released, what are the potential impacts on your business or organisation or for tourism in your region more generally? You don't have to be certain they will happen – we'd like to hear about the impacts you worry might happen, and any positive impacts you think might be possible.
7. If the carp virus is released, we want to ask your views on whether things could be done to help reduce any negative impacts, or to increase the chances of positive outcomes, for your business/organisation, and for tourism in your region more generally?
8. Are there specific locations, or specific times of year (for example when key events are held or there are large numbers of visitors) important to the tourism industry in the region, which need to be specifically considered in plans for carp control?
9. Next we would like to ask if you have you experienced any challenges or opportunities specifically related to changes in water quality (e.g. blue-green algae outbreaks, black water, fish deaths, turbidity)? If so, what have these impacts been, how did you respond, what support was available, what was most helpful or not helpful?
10. As a final question, we would like to ask if there are other businesses or organisations we should be talking to in your region who are likely to want to share their views about carp control and the tourism industry?
11. Is there anything else you'd like to discuss?

These questions were used as a general guide for the discussion. This provided the flexibility for participants to raise topics and questions important to their own circumstances and experience, while also ensuring key topics were included in the discussion. As participants had opportunity to review the topics prior to the interview, the topics for discussion were often pre-empted by the participants themselves rather than being prompted by the

facilitator. The interviewer asked follow-up questions to gain further insight into different areas raised by participants.

DATA ANALYSIS

All interviewees provided permission for interviews to be recorded. The recordings were then transcribed. The transcripts were reviewed and thematically coded with a focus on identifying different socio-economic impacts and the circumstances under which they arise, and other factors affecting the extent to which socio-economic impacts would occur.

TOURISM INDUSTRY SURVEY

SURVEY DESIGN

Businesses who chose to participate were asked to complete the survey online. An online survey was identified as an appropriate and cost-effective option given tourism businesses have good internet connections due to their high use of online booking tools and websites. In addition to reduced survey delivery costs of an online survey platform, the ability to immediately download electronic survey responses also provided reduced data entry and cleaning time (and hence costs) compared to paper or phone-based survey delivery platforms. The survey was designed and hosted using Qualtrics® online survey software.

Development of survey questions was informed by analysis of the qualitative data from phone interviews conducted for the first edition of this report. An intial set of survey questions was drafted and then revised based on feedback provided from three tourism industry experts based in South Australia, Victoria and New South Wales.

Most survey questions were close-ended (the respondent was asked to selected responses from a number of pre-set options for response), with a small number of open-ended questions also included to seek input on topics where appropriate. For example, businesses were asked to describe what had helped or hindered them in coping and recovering from past water-related events such as blue-green algae outbreaks using their own words, to help identify the full range of actions that may assist tourism businesses.

The survey included questions across the following topics:

1. Background to the business or organisation
    - Tourism services provided
    - Location of operations and administration
    - Current business operational and financial circumstances
2. Background of respondents
    - Demographics
    - Experience in the tourism sector
3. Tourism activity

- Peak, shoulder and off-peak tourist visitation periods
- Importance of peak periods for annual business revenue
- Prevalence of advance bookings and proportion of bookings made over different time periods

4. Current impact of carp on the business or organisation
    - Overall current impact of carp on the business or operation (structured and open-ended questions)
5. Awareness of and engagement with the National Carp Control Plan
    - Awareness of the NCCP prior to the survey
    - Access to information about the NCCP and engagement with Plan development
6. Anticipatory impacts arising from announcement of Plan development
    - Experience of any changes to tourism activity, business operations, promotion and management
7. Potential impacts under a projected scenario of carp virus release
    - Potential short-term impacts
    - Potential long-term impacts
    - Assessment of potential benefits from a set of defined long-term outcomes of successful carp control was achieved
8. Lessons from past experience with water-related events and what has helped or hindered in coping with and recovering from these events
    - Low-water events
    - High-water events
    - Blackwater events
    - Blue-green algae events
9. Business response under revenue reduction scenarios during spring
    - Reduction of 20% in business revenue in spring
    - Reduction of 50% in business revenue in spring

RECRUITMENT OF PARTICIPANTS

The survey was distributed email using a generic link to the survey so that it could be forwarded on and re-distributed by anyone. The survey link was emailed to the 37 tourist businesses who participated or were invited to participate in the stakeholder phone interviews. The survey link was also emailed to 30 further tourist operators identified through a web-based search in carp affected regions of Queensland, New South Wales, Victoria, South Australia and the Australian Capital Territory.

The survey was also promoted and the link to the online survey distributed by peak tourism industry bodies, regional tourist organisations, state tourist organisations, and local councils across carp affected areas of Australia.

SURVEY RESPONSE AND RESPONDENTS

There were 77 recorded responses to the survey, of which eight were removed as 'invalid' responses as there were an insufficient number of questions answered to contribute to the analysis. Therefore, a total of 69 valid responses were included in the analysis represented in this report.

Benchmark data are not available on the demographic composition of tourism industry business owners or business types for inland areas experiencing carp invasion. Given this, it was not possible to fully assess how representative survey respondents were of the broader tourism industry operating in these areas. Key characteristics of the survey sample are summarised below, and Appendix 1 provides a more detailed summary of characteristics of tourism business operators who participated in the survey:

- Gender: 67% of survey respondents were male and 33% female.
- Age: All respondents were aged 30 years or older, reflecting that the survey focused on business owners and operators rather than employees working in tourism businesses. Most respondents were between the age of 50 – 59 years (36%) and 60-69 years (23%), with the other 41% spread across younger and older age groups.
- Business role: 64% were owners of a tourism business, while the remainder were business managers (10%), operations managers (16%) or had administration, finance or marketing roles (15%).
- Time in industry: 65% had 10 or more years experience in the industry, and of these 44% had 20 years or more experience in the industry.
- Type of business: Respondents represented the full range of types of tourism businesses operating in inland areas. Many businesses reporting providing two or more types of tourism services, with the most common being accommodation provision (42%), tour guide services (36%), house boats (24%0, special attractions (24%), special events (22%), equipment hire or retail (21%), food and wine (19%), chartered boat tours (16%), visitor services e.g. bookings (9%) and others including arts/heritage, transport and golf.
- Businesses mostly operated in South Australia (46%), New South Wales (36%) and Victoria (35%), with smaller numbers operating in the Australian Capital Territory, Queensland, Northern Territory and Tasmania. Most businesses operated in one only location, with 16% operating in more than one.

The sample represented the range of different types of tourism businesses that operate in areas affected by carp invasion and most of the geographic range, with a focus on businesses located in areas with higher densities of carp. It therefore provides a useful understanding of a range of tourism businesses. As it is a relatively small sample, and there are no benchmark data available to use to identify how representative respondents were of all tourism businesses operating in regions affected by carp invasion, it is not possible to make claims about all tourism businesses in these areas based on the survey. Instead, the survey provides a descriptive picture of a smaller sample of businesses that is likely to indicate key areas of importance (for example, if almost all of the 69 businesses experienced particular conditions it is highly likely this is very common across tourism businesses in carp-affected regions more generally), but which cannot be used to quantify specific impacts across the entire tourism industry. Given this, data analysis focused on simple descriptive analysis of findings. The survey data were analysed using Microsoft Excel and STATA.

COMMUNITY ATTITUDE SURVEY

In May 2019, an online survey was conducted to track community perceptions about carp control, with 4,428 valid respondents. As part of this survey, a small number of questions were asked which tested potential changes in visitation to carp-affected areas if carp numbers were reduced via release of the carp virus. Rather than ask questions directly about the carp virus, something which could trigger negative responses due to high 'anticipatory impacts', the survey asked about likely changes in behaviour in response to existing scenarios that have occurred in inland waterways involving loss of water quality or fish diseases. This ensured that responses reflected responses to the types of water quality events that have some potential to occur in the short-term in some areas after release of the virus, as well as to diseases in general being known to be present, rather than specifically the carp virus.

The survey sample was recruited via the Qualtrics online survey panel provider service. The survey sample was stratified by state and territory, and within each state (but not territories) was stratified again based on whether the resident lived in a capital city or elsewhere in the state. The survey questions are described when results are presented.

Community survey data were analysed using Microsoft Excel and IBM SPSS (Statistical Package for Social Sciences).

ETHICS

Data collection via interviews and the workshop was approved by the University of Canberra Human Research Ethics Committee, protocol number HREC 17-152.

5. INLAND TOURISM INDUSTRY: CURRENT CONDITIONS, OPPORTUNITIES AND CONSTRAINTS

As noted earlier, the existing conditions being experienced by a person or business will impact on their ability to successfully adapt to or cope with a change. Business conditions in the tourism industry vary substantially depending on the part of it being examined. This section examines:

- The current size and nature of the tourism industry in carp-affected areas, with a focus on the extent of dependence of local economies on the tourism industry
- Current conditions experienced by the industry, including opportunities and constraints identified in interviews and the industry survey, with a particular focus on:
    - Current impacts of carp invasion on the tourism industry
    - Impacts of past stresses related to water flow and quality on tourism businesses, to better understand capacity of businesses to cope with these events.

OVERVIEW OF THE TOURISM INDUSTRY IN AREAS CURRENTLY EXPERIENCING CARP INVASION

In Australia, in 2017-18 the tourism industry was estimated to generate $131.4 billion of spending annually across both domestic and international visitors, and to directly employ 598,200 people across 288,614 businesses nationwide. These figures include all tourism activity, whether it occurs in major cities or regional areas. The focus of this report is on tourism in regional communities. This is because much (although not all) carp invasion has occurred in regional areas, and in regional areas tourism businesses are more likely to depend on environmental assets such as local waterways and waterbodies, meaning that actions to control carp (as well as the presence of carp currently) are more likely to affect regional tourism businesses compared to those located in capital cities. While carp invasion also affects waterways and waterbodies in some major cities, such as Melbourne, in these areas the tourism industry is much less likely to be dependent on water areas.

While a large proportion of the national spending and employment in the tourism industry is generated in Australia's major cities, one-third of tourism businesses and around half the tourism workforce are located in regional communities. In 2017-18, an estimated 44% of tourism spending occurred in regional areas, generating $51 billion in spending in those communities (Tourism Research Australia 2019b). Overall, an estimated 4% of economic activity and 8% of employment in Australia's regional areas depends on the tourism industry (Tourism Research Australia 2019b).

Tourism in regional areas is driven predominantly by Australian, rather than international, tourists:

> Two-thirds of Australians live in a capital city, but 52% of domestic overnight spend and 56% of day trip spend is in the regions. By contrast, 97% of international visitors arrive in a capital city, but only 10% of international spend is in regional Australia. (Tourism Research Australia 2019b)

Much of the international tourism spend in regional areas is focused on a small number of areas, most in coastal locations or adjacent to capital cities, and only 34% of international visitors visit a regional area during their stay. Visits by international tourists to regional areas of Australia has been declining in recent years while visits by domestic tourists have grown in regional areas (Tourism Research Australia 2019b).

Supporting tourism in regional communities has been identified as a key priority for the Australian tourism industry:

> The greater dispersal of tourists beyond the major cities is critical in ensuring the benefits of tourism are spread more evenly across the country, diversifying the economic base of regional communities, while reducing the burden on tourism infrastructure in our gateway cities. (Tourism Research Australia 2019b)

However, there are noted challenges to growing the tourism industry in many regional areas, with relatively less investment in significant tourism projects in regional areas compared to cities, and regional investments in expanding tourism being more likely to require government support. Attracting private sector tourism investment in regional areas has been found to be challenging due to a perception amongst investors of regional areas as being higher risk investments compared to capital cities for new tourism activities (Tourism Research Australia 2019b).

Carp invasion has occurred in many parts of Australia, including in many inland regional areas, areas of major cities such as Melbourne, and some estuary areas. In some areas – particularly Western Australia and Tasmania – carp invasion is limited and, in the case of Tasmania, carp have been almost eradicated in the lakes in which they had occurred.

Data on employment in tourism from Tourism Research Australia (Tourism Research Australia 2019a) and from the 2016 Census of Population and Housing (ABS 2016) were overlaid with spatial data on carp invasion from the 2016 State of the Environment Report (see Argent 2016). This was used to broadly identify the number of regional tourism jobs based in areas in which carp invasion has occurred. Employment generated by tourism in major cities such as Melbourne was excluded, even if carp invasion was occurring, as it was considered unlikely a significant proportion of tourism activity in these areas was highly reliant on freshwater areas. However, there are likely to still be individual tourism businesses with potential to be impacted by carp control located in these major city areas.

The analysis is also limited by the data used on carp populations. Carp populations fluctuate over time and the data on carp density used as an indicator of presence of carp, from the 2016 State of the Environment Report (Argent 2016), are a broad indicator of carp presence

and density. As the spatial extent and density of carp in given locations change over time, the 2016 data represents a snapshot based on information available at that time.

Despite these limitations, the data give some insight into the scope and scale of tourism employment in regions experiencing carp invasion. In regional areas identified as having a moderate to high density of carp in 2016, excluding those where tourism is known to depend largely on saltwater or non-freshwater related attractions, an estimated 78,000 people were employed in tourism[1] across 58 regional local government areas (LGAs). A significant proportion of these jobs will depend directly on tourism in freshwater areas. This also excludes the many people employed in tourism who work in areas in which low densities of carp were identified, and excludes some smaller LGAs for which tourism employment statistics are not reported. It is therefore an underestimate of total tourism employment in carp affected areas, but indicates likely magnitude of employment in those areas with higher densities of carp located outside major cities.

To better understand the dependence of different regional economies on tourism, the proportion of employment dependent on tourism in those 58 local government areas was identified[2]. Across Australia, an estimated 8% of jobs depend directly on tourism. However, as noted earlier, employment generated in regional areas is disproportionately higher than that in cities. The findings suggest that areas experiencing moderate to high levels of carp invasion often have higher than average dependence on tourism employment. Of the 58 LGAs:

- Only six had less than 10% of employment dependent on tourism (Mitchell, Queanbeyan-Palerang, Mid Murray, Yass Valley, Strathbogie and Baw Baw)
- Ten had between 10% to 11% of employment dependent on tourism (Murray Bridge, Wodonga, South Gippsland, Mount Barker, Gunnedah, Macedon Ranges, Ararat, Warrumbungle Shire, Barossa and Wangaratta)
- Eight had very high dependence on tourism, of 17% or higher (Hepburn, Federation, Tamworth, East Gippsland, Snowy Monaro Regional, Mansfield,

[1] This estimate is based on identifying total tourism employment in local government areas (LGAs) with moderate to high carp densities reported in carp density spatial data sets available as part of the 2016 State of the Environment report. This is not a precise estimate, as available data on tourism employment by LGA, from Tourism Research Australia's Local Government Area Profiles, identifies numbers of tourism businesses in different LGAs by employment size ranges. An estimate of employment was generated by taking the mid-point of each range as the estimated average employment of businesses in that range (e.g. for businesses reported as employing between 5 and 19 people, it was assumed average employment was 12 people per business).

[2] Proportion of employment dependent on tourism was estimated by taking the total tourism employment estimate, calculated using the method described in the previous footnote, and dividing it by the total number of employed people reported for that LGA in the 2016 Census of Population and Housing using data from ABS (2016).

Alpine and Hay). Of these, some have strong dependence on snow season tourism (e.g. Alpine) or saltwater activities (East Gippsland), however the same LGAs also have strong tourism related to activities such as freshwater fishing.

- The remaining 35 had between 12% and 16% of jobs dependent on tourism, and as such had higher than average dependence on tourism for local jobs compared to the national average. These were The Coorong, Wagga Wagga, Narrabri, Moira, Loxton Waikerie, Yankalilla, Murrindindi, Wellington, Indigo, Hilltops, Swan Hill, Benalla, Scenic Rim, Mount Alexander, Central Goldfields, Bathurst, Berrigan, Northern Grampians, Greater Shepparton, Murray River, Cowra, Edward River, Mildura, Berri and Barmera, Moree Plains, Griffith, Campaspe, Horsham, Albury, Snowy Valleys, Renmark Paringa, Goondiwindi, Tenterfield and Inverell.

There are therefore multiple LGAs in areas affected by carp invasion in which a relatively high proportion of jobs depend on the tourism industry. While not all of these tourism jobs rely on activities related to freshwater or estuaries, many are LGAs in which a high proportion of tourism focuses on activities occurring on or near major rivers and dams. For example, the houseboat industry and associated river activities such as fishing are important drivers of tourism in LGAs along the Murray River and its mouth including The Coorong, Mid Murray, Renmark Paringa, Loxton Waikerie, Berri Barmera, Mildura, Swan Hill, Edward River, Murray River and Federation LGAs.

The types of tourism businesses that can depend on freshwater are diverse in these regions. They include (but are not limited to):

- Those directly using freshwater and estuary areas, such as houseboats, kayak/canoeing hire and guide businesses, recreational fishing related businesses, water skiing, and many nature tourism businesses
- Those reliant on areas adjacent to freshwater and estuary areas, such as accommodation located on riverbanks and lakes (caravan parks, camping areas, hotels/motels, apartments, etc); restaurants, cafes and takeaway food shops; and some hire and retail shops.

To get a better understanding of typical peak seasons and seasonal fluctuation in tourism activity, businesses participating in the industry survey were asked what times of year were peak, shoulder and off-peak seasons for their particular business. Understanding these patterns is important to identifying potential impacts of carp control, as the extent of impacts will depend on part on whether impacts of carp control affect businesses during their peak, shoulder or off-peak seasons. As expected, December and January are peak months for most businesses (76% in December and 83% in January), with only three businesses (out of the sample of 69) not indicating these as peak times. Most autumn and spring months, and February, are peak or shoulder seasons for the large majority of

businesses. The winter months are off-peak for around half of businesses, but are peak times for some (9% to 16%) and shoulder for others (18% to 25%), indicating that even during winter, some businesses have their busiest times, albeit a relatively small proportion.

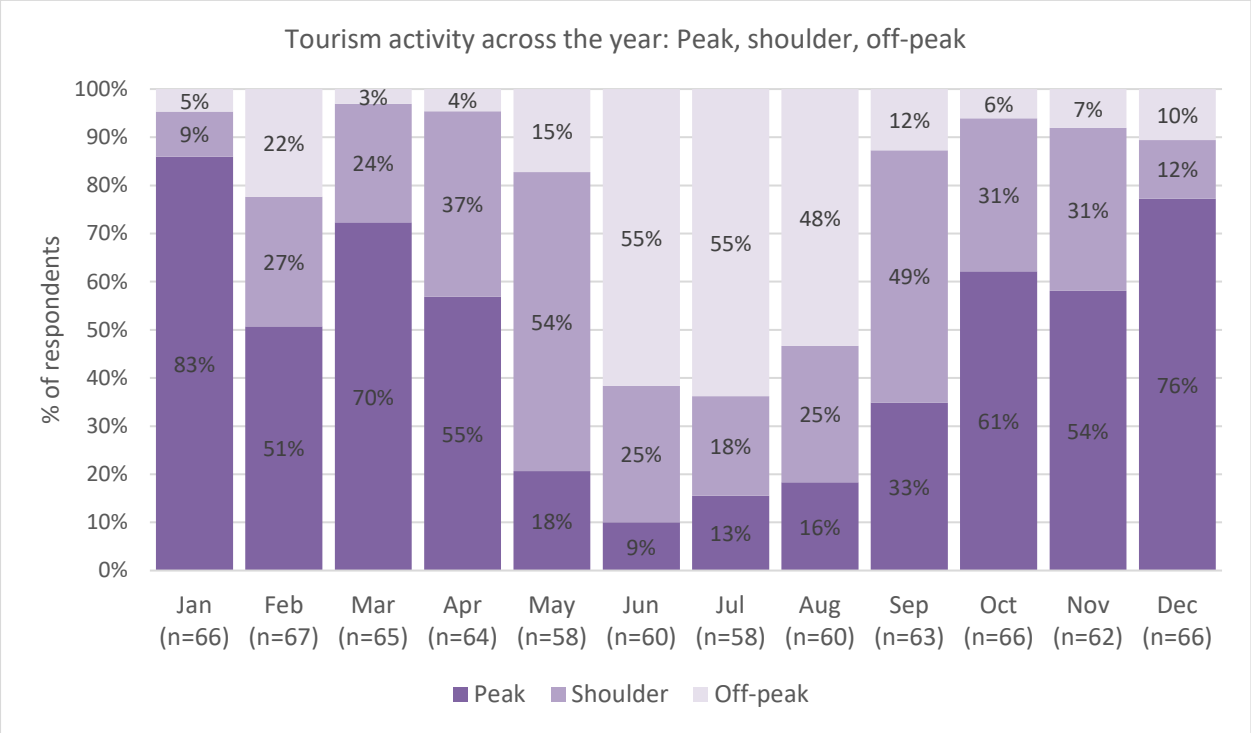

Figure 1: Tourism activity across the year - peak, shoulder, off-peak periods (n=68)

Peak seasons are important: most tourism businesses (74%) earned half or more of their total annual revenue during their peak months, and 28% earned three-quarters or more of their revenue during peak season (Figure 2). This suggests that for a large proportion of tourism businesses, disruption to peak season visitation has substantial effects business revenue.

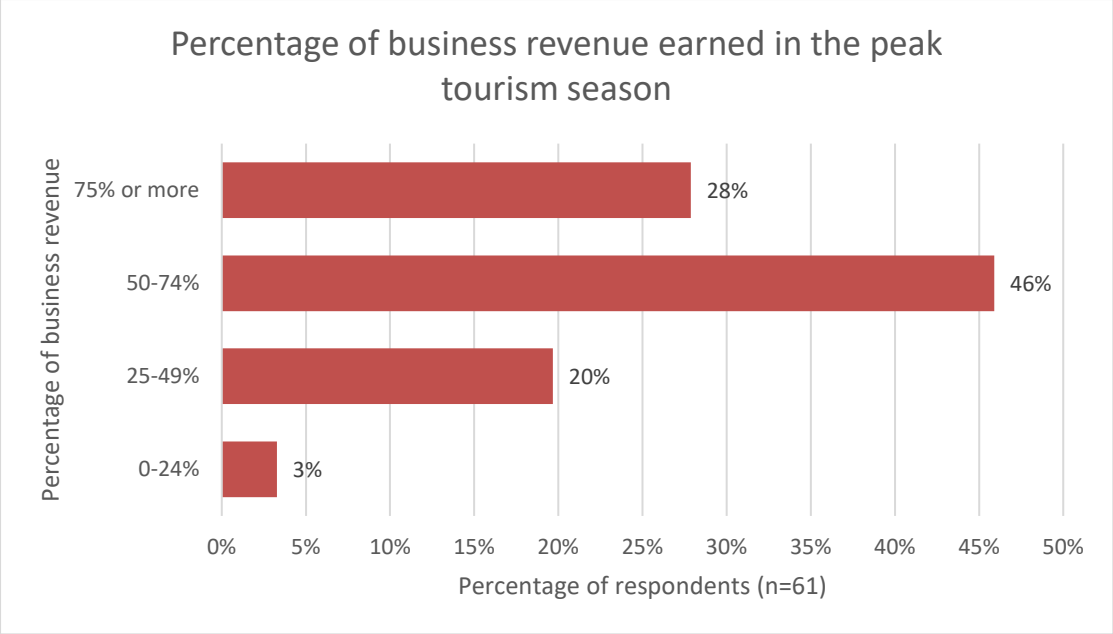

Figure 2: Business revenue earned in peak periods[3]

Advance bookings were common for most businesses surveyed (85% reporting they took bookings in advance, Figure 3). The typical period in which bookings were made in advanced ranged from less than one month to over 12 months in advance, and most businesses reported a range of time for advance bookings (for example some indicated receiving most bookings 1-3 or 4-6 months ahead, others less than one month or 1-3 months ahead).

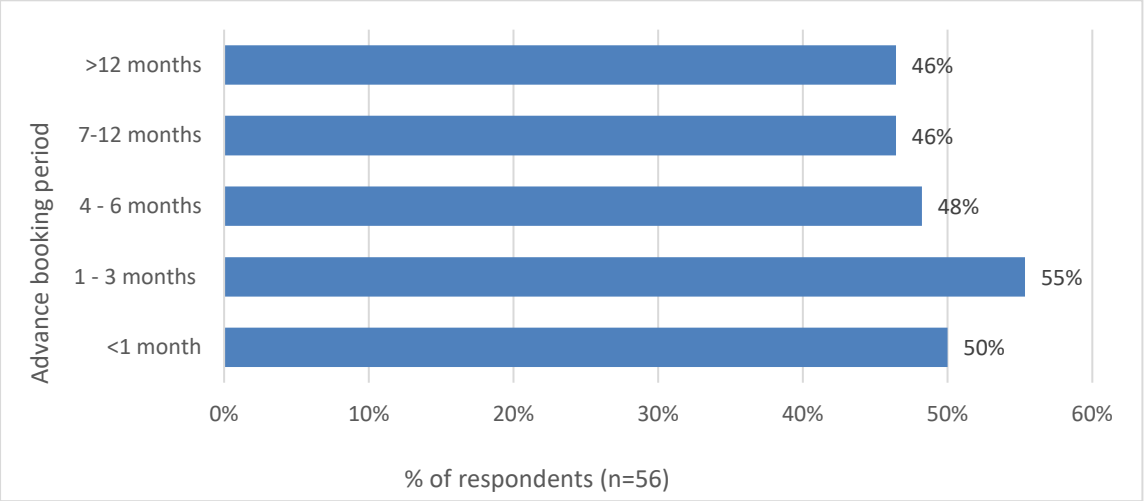

Figure 3: Typical time period for advance bookings

[3] Of the 68 people responded to this question, 9 of which selected 'don't know'. These 'don't know' responses are excluded from Figure 2.

INDUSTRY CONDITIONS, CONSTRAINTS AND OPPORTUNITIES

This section examines current business conditions, and key constraints and opportunities reported by tourism businesses operating in areas affected by carp invasion.

INDUSTRY CONDITIONS IN 2018-19

It is important to understand existing conditions in the tourism industry, as these will affect the capacity of people and businesses operating in the industry to adapt to changes resulting from any implementation of actions to control carp (Schirmer 2011, Loxton et al. 2013). Existing conditions here means going beyond identifying the size and extent of the industry (examined in the previous section) to identify levels of stress, constraints and opportunities being experienced by the industry. These conditions were assessed in 2018 in interviews and late 2018 to early 2019 for industry surveys. This was a period in which drought conditions were intensifying in many inland regions of eastern Australia, and continued intensifying for many regions after the time at which data were collected. The data collected therefore represent a snapshot in time. Industry conditions are likely to change over time. With a period of some time likely before any future carp control actions are implemented, it is recommended that an up-to-date assessment of conditions in the industry at the time of planning and implementing on-ground action be undertaken once the timing of those actions is known. In the interim, this section provides a picture of conditions as of 2018-19 for those businesses who participated in the survey.

As shown in Figure 4, 89% of businesses were confident they would be operating in one year's time, and 85% that they would be operating in five years. Most (77%) felt confident they could adapt to change in the tourism industry, and 66% felt their business revenue was likely to grow in the near future. Just over half were in a better position compared to previous years.

While 42% felt well supported by tourism industry organisations, 27% did not, indicating access to support across the industry is not consistent. Only 36% reported having adequate access to finance, with others either not having adequate finance or being unsure if they did. There were 23% of respondents who reported that their business was under a lot of stress at the time of completing the survey. This included a diverse range of businesses from accommodation services to food providers, house and charter boat, special event and art and heritage-focused businesses. More than half (55%) found it difficult to recruit workers with the right skills for their business, indicating this is a key constraint area for many.

Businesses were also asked if their business revenue in the past 12 months had been lower than, similar to, or higher than their average revenue over the past five years. Only 13% reported lower than average revenue, while 33% reported similar and 55% higher than average revenue.

Businesses were also asked how easy or difficult they found it to service their current business debt. Almost half of businesses (48%) had no debt, and hence the question was not

applicable to them. Of the remainder, 71% reported their debt was neither difficult or easy to services, 19% that it was easy to service, and 10% (two respondents) that it was difficult to service.

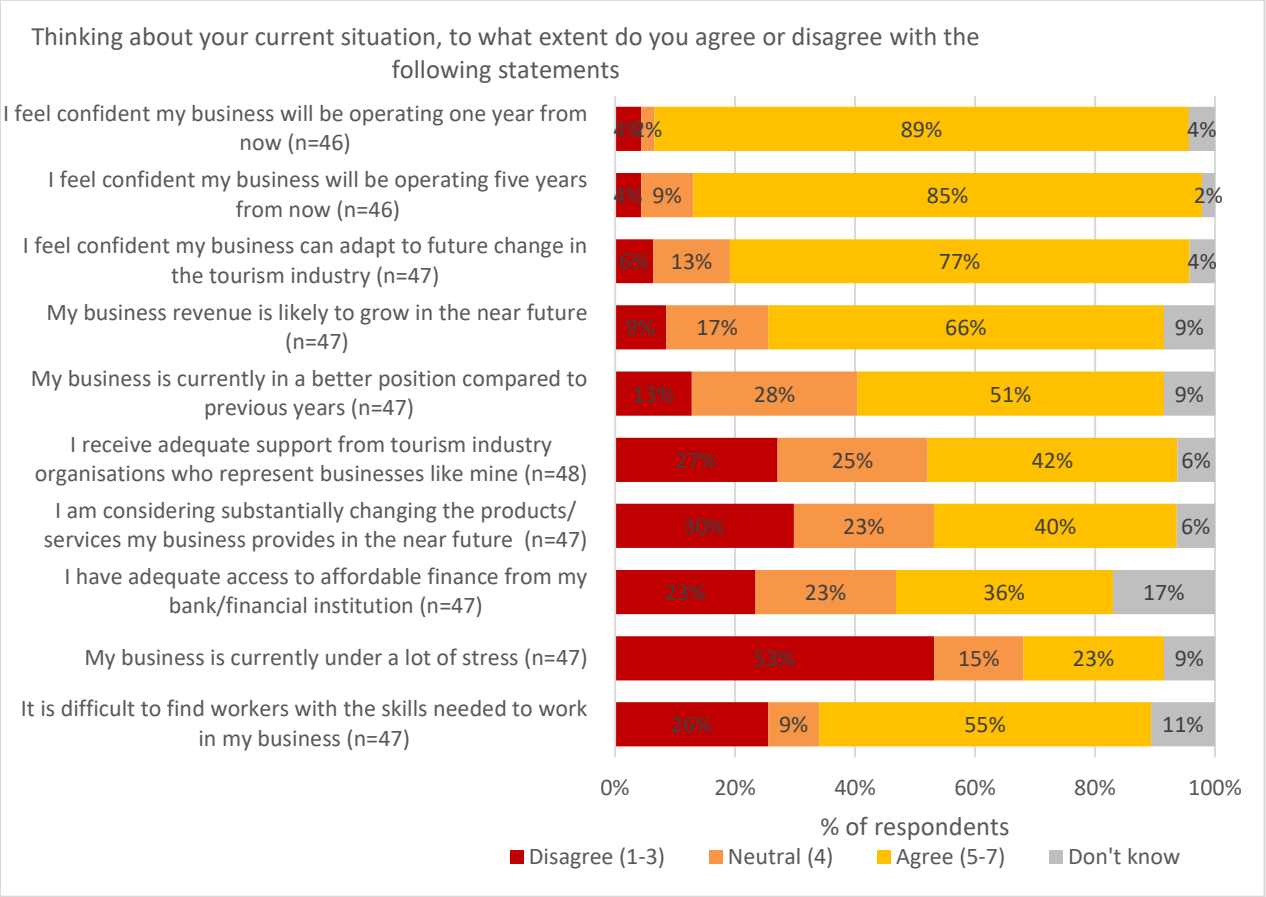

Figure 4: Business operating conditions reported by businesses surveyed, 2018-19

Overall, these results suggest a mostly positive outlook for many businesses, but with some experiencing stress. In interviews, industry representatives reinforced this, reporting that work on improving destination branding and visitor experiences had been successfully growing visitation and the range of activities visitors engaged in at any one destination:

> *Since 2011 … we've seen a significant uplift in that visitation, employment, and economic outcome. …. We're seeing some really strong results in that space, which is really pleasing, and diversifying the experiences on offer. (Peak - 1)*

The principle challenge reported by businesses in interviews, and many in surveys, was changes in visitation associated with specific events such as high or low water flow events or poor water quality, and associated with broader economic and tourism trends. The water-related trends are described further subsequently.

IMPACT OF CURRENT CARP POPULATIONS

Interviewees and industry survey participants were asked whether current levels of carp invasion had impacts on tourism activity. In interviews, most felt that wild carp currently have minimal impact on tourist business operation or viability, or on tourist visitor numbers.

> *They don't affect my day to day operation, my business. They are not providing any sort of detriment to my business, the carp, besides the water quality. I could see if they do kill them all, that the water quality will be even worse. (Operator – 6)*

> *Visitors often ask what's the fishing like and we say there's lots of carp and we encourage you to catch as many of the carp as you can. We know, of course, that they're impacting major fish and we know that. But the general public don't ask and they don't know that. They're happy just to go along and catch them, so there's no negative impact. (Peak – 1)*

While many of those interviewed reported carp had few impacts, most also stated they supported investment in controlling carp, and felt that reducing carp numbers would have benefits both for their business and their region more generally through improving water quality in natural water bodies such as rivers, lakes, and wetlands.

> *… obviously if the water was clearer, that would be lovely … if we wouldn't have as much carp around, that would just be great, because you would be going places where you could actually see a bit into the water, and that would be wonderful, but I don't know if it will ever happen again. (Operator – 10)*

> *Yeah, I would say the colour of the water is less attractive. I think to be able to offer to the tourists a more natural, pristine environment is paramount. And to be able to see into the river, you know? There's a lot of water sports happen down here, doesn't seem to bother the people who come skiing and stuff, but to be honest, I'm not real keen on bringing my kids down here to swim. It's not pretty. It's just not pretty. (Operator - 3)*

In the industry survey, participants were asked to rate the overall impact carp currently had on their business from 'very negative' to 'very positive' on a seven point scale, with a don't know option also provided. They were then asked to describe in their own words i) what negative impacts carp currently had on their business, and ii) what positive impacts carp currently had on their business.

Views about the impacts of carp were mixed: 34% of businesses reported carp had negative impacts on their business, 39% reported neither positive or negative impacts, 11% reported positive impacts, and 16% were unsure whether or how carp affected their business.

When asked to describe negative and positive impacts of carp, more participants described negative than positive impacts. The types of negative impacts carp were described as having on businesses were:

- Reduced water quality and environmental health, which adversely affected amenity of areas and hence visitation, with turbidity of water and poor wetland health most commonly mentioned
- Reduced diversity of native fish species (due to being outcompeted by carp), reducing recreational fishing opportunities and associated expenditure on actions such as hiring boats to go fishing:

  Not only do the Carp affect the water quality and the environment but they have an impact on the numbers of other fish varieties that recreational fisher persons target; less other fish to catch = less fish caught = more dissatisfied fisher people that are less likely to return to the Lake.
- Amenity problems, particularly smell, from dead carp that have not been disposed of properly after being caught by recreational fishers, or dead carp in recreational areas after high water events
- Uncertainty amongst some tourists, with some reporting that many tourists were unsure what to do with carp when they caught them, due to regulations meaning carp cannot be return to water combined with a lack of disposal facilities in many locations (leading to dead carp being left on riverbanks in many cases)

  Tourists told that carp they catch cannot be returned to the water but must be left on the bank to stink the place out tend to be put off going fishing at all.
- Reducing extent of return visits, with some reporting that people who had negative experiences relating to not being able to catch desired fish species, poor water quality, or smell from carp that had not been disposed of properly, were less likely to make return visits to the area

The primary positive impact identified as occurring as a result of carp was fishing opportunities, and tourists being able to feel they were helping address a pest species problem when they caught carp:

> *Children get excited to catch anything so there are some positives out of the carp being present as they are easy to catch.*
>
> *Catching fish is a favourite activity. Feeling they are helping to rid the environment of a menace is good*
>
> *Positive as many people fish for Carp and Carp enable us to make a festival for catching carp with many entrants. A bounty on Carp would also improve our area as a destination to earn money from catching carp.*

Some identified both positive and negative impacts, or that carp had no impacts:

> *Carp continue to have a negative and positive impact on our operations. They create high turbidity in the water. This increases water quality issues which we must control and manage. There is an aesthetic and environmental issue with the lakes are rivers which is difficult to*

quantify. On the other hand, carp to reduce and eliminate the volume of aquatic weeds, resulting in improved recreational activities along the rivers and in the lakes.

There is almost zero impact from carp on my business. The exception would be the colouring of the lake. If the carp were removed the lake would appear 'cleaner' but this is quite an indirect impact.

EXPERIENCE OF WATER QUALITY AND FLOW CHANGES

Changes in water quality and water flow affect visitation numbers to many inland tourism areas. This is particularly so for businesses with close contact with rivers, lakes and wetlands such as houseboat operators, fishing guides, canoeing, and accommodation with water frontage.

Adverse water events that affect visitation include blue-green algae outbreaks, blackwater events (loss of oxygen in water leading to death of aquatic animals such as fish and associated amenity impacts), high-water events (e.g. floods), low-water events (e.g drought), and outbreaks of mosquito borne disease (e.g. Ross River, Murray River Encephalitis). The events can extend for long periods of time and impacts can be compounded if multiple events are experienced close in time.

Adverse water events were one of the main factors reported by interview and industry survey participants to cause changes in visitation and business revenue. One key area focused on in NCCP research is examination of whether and to what extent release of the carp virus could contribute to adverse water quality events, particularly blackwater and blue-green algal events. Community attitude studies indicate that concerns about impacts of dead carp on water quality are common amongst members of the public when they are asked their views about the carp virus (described subsequently in this report). As virus release has potential to impact water quality and amenity, and adverse changes (real or perceived) in water quality and amenity were reported by tourism businesses as a factor commonly impacting visitation, past experiences of adverse water events were explored in more detail. This enabled better understanding of both the types of impacts that occur, and the types of strategies that have been established to cope with these events.

In interviews, all people interviewed had experienced past changes in water quality or water flow that had impacted demand for tourism, and most reported multiple challenges over the last decade related to water flow and quality:

> *…we've been through so many challenges the last few years, I'd say the last 10 years, with high water, low water, blackwater, all those sort of things. (Operator – 1)*

> *We've had ... significant algae outbreaks, and we've also had significant high-river events. We just see the direct impact that that has both on visitation and particularly businesses. Particularly the smaller businesses that rely on peak periods to actually generate the revenue they need to sustain their entire year. I*

think that's certainly something that has a potential to create a lot of angst amongst people. (RTO - 1)

In interviews, a range of impacts were reported from these events. All reported loss of revenue for tourism businesses. The impact of decline in visitation varied depending on the proportion of visitation lost and the amount of time it was lost for: for some businesses, impacts of adverse water events on business financial reserves took many years to recover from:

We're only four years into business and I still don't think we're fully recovered from [the high river event]. Probably three or four years away. Basically it's $40,000 worth of reinvestment that we couldn't do with our business. So what that equates to, could even be 10 years down the track, before we actually spend $40,000 on new engines, new cables, new couches to then charge more for your product because it's a newer and better experience. (Operator – 11)

This can create significant uncertainty and stress for businesses, and through depleting financial reserves, can reduce capacity to cope with subsequent events. Some have been able to invest in preparing for future events, for example through implementing business plans that include an expectation of an adverse water event affecting the businesses every few years. Others have found it difficult to recover between events.

A key factor raised in all interviews was the importance of addressing perceptions that often exacerbate impacts of adverse water events on the tourism sector. Most reported that while an adverse water quality event would impact visitation, often the decline in visitation last substantially longer than the actual water event, or was driven more by negative perceptions rather than actual change in amenity or ability to use areas. For example, many reported that during drought, visitation declined due to the perception of lack of water or fishing opportunities even when there was sufficient water and good fishing available. The key factor most interviewees identified as critical to reducing impacts of adverse water quality events was therefore ensuring media coverage of events did not lead to ongoing decline in visitation due to negative perceptions.

To better understand the risk of impact of adverse water quality events on businesses, and the extent to which they might occur even if virus release did not adversely affect water quality (due to negative consumer perceptions), the industry survey asked businesses about past water quality events. In the last ten years, most businesses had experienced at least two adverse water events affecting their business:

- 73% experienced periods of low water flow, particularly during drought, with most of these reporting this occurring during 2009-2013, but 21% reporting that in 2018 low water flows were affecting them
- 68% experienced high water flow events, usually in either 2016-17 and/or 2009-13

- 47% experienced one or more black water events, of which 77% experienced an event in 2016-17, 9% during 2014-15 and 27% during 2009-13
- 51% experienced one or more blue-green algal outbreaks, of which 79% experienced an event in 2016-15, 54% during 2014-15, 42% during 2009-13 and 17% during 2018, and
- 17% reported experiencing other water-related challenges.

In these past events, most businesses have relied principally on support from friends or family, and two-thirds also reported receiving regular updates on the event (Figure 5). Forty four per cent talked with other businesses experiencing the same events, 35% received support via public communication from the tourist industry, and 35% received other industry assistance with communication, while 27% received advice from tourism professionals on how to cope with the event.

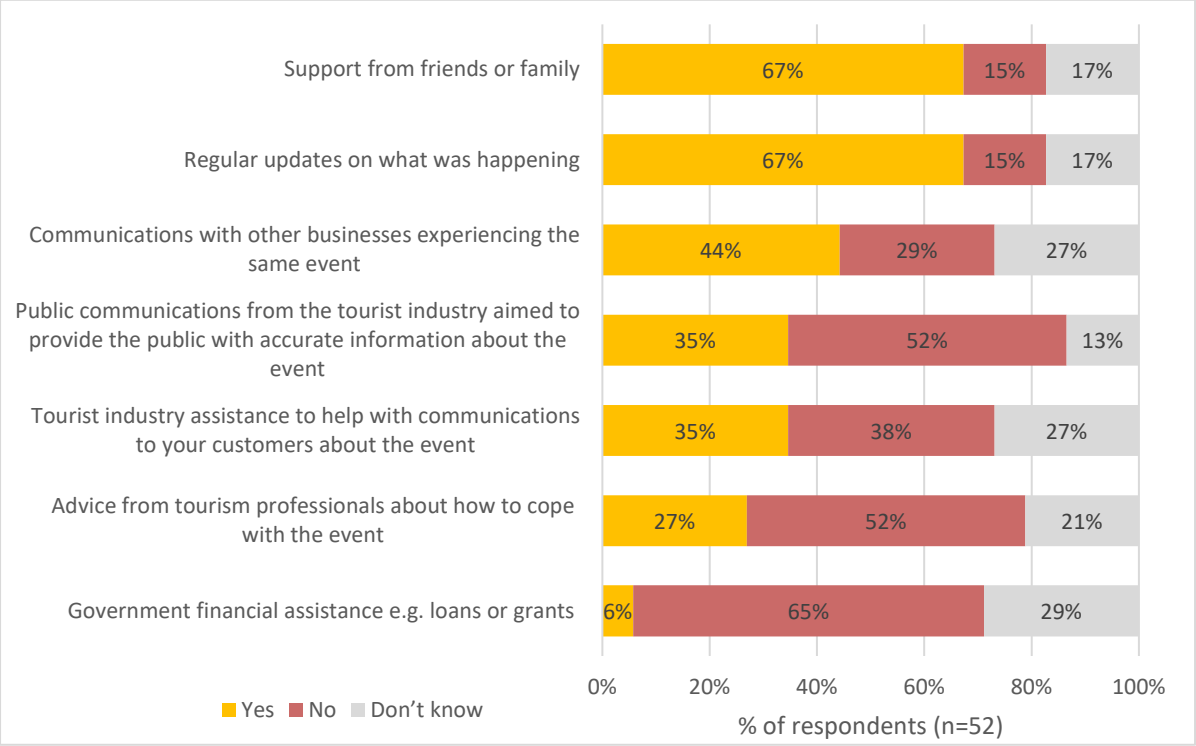

Figure 5 Types of support available when experienced past adverse water events

Those who did receive different types of support were asked to rate how useful it was in assisting them to cope, from not at all useful to very useful. The proportion who found each type of support moderately to highly useful is reported below; this is often based on relatively low numbers of respondents, and hence should be used with caution given the low sample size:

- 80% found public communication from the tourist industry aimed to provide the public with accurate information about the event moderately to highly useful (n=15)

- 77% found communications with other businesses experiencing the same event useful (n=22)
- 74% found receiving regular updates on what was happening useful (n=35)
- 64% found tourism industry assistance to help with communications with their customers about the event useful (n=11)
- 58% found advice from tourism professionals about how to cope with the event useful (n=12), and
- 51% found support from family and friends useful, with many responding 'unsure' to this question (n=35).

Of the three respondents who had received government support, two found it useful.

Those who had experienced different types of adverse water events were then asked to identify the types of ways each impacted their business, length of time impacts were experienced, factors that contributed to decline in customers during the event, and how the event impacted things such as their own workload, employment in their business, stress and their household finances.

When asked about the impacts of **low water events**, the 28 businesses who had experienced these reported the following effects:

- Business costs compared to similar periods in previous years: Costs increased for 25% of businesses, decreased for 14%, and the remainder reported no change or being unsure.
- Business revenue compared to similar periods in previous years declined for 68% of businesses, stayed the same for 25%, and the remainder were unsure
- Number of customers compared to similar periods in previous years declined for 57% of businesses, stayed the same for 32%, and 11% were unsure
- The period of time businesses experienced increased costs, decline in revenue and decline in customers varied: increases in costs were typically experienced for a year or less (5 of 7 businesses), while revenue decline typically lasted more than six months (11 of 19 businesses), as did decline in customers (11 of 16 businesses)
- When asked whether any of five factors contributed to decline in customers during the low water event (for those who had experienced it):
    - 88% said that 'even though we could still operate as usual, customers thought we couldn't and this reduced business
    - 67% said that 'we were not able to offer the same tourist experience to customers due to reduced recreational amenity'
    - 60% said that 'we were not able to offer the same tourist experience to customers due to safety concerns'

    - 31% said that ‘we couldn’t use water from rivers/lakes which meant business activities had to be reduced or suspended’.

When asked about the impacts of **high water events**, the 24 businesses who had experienced these reported the following effects:

- Business costs compared to similar periods in previous years: Costs increased for 29% of businesses, decreased for 13%, and the remainder reported no change or being unsure.
- Business revenue compared to similar periods in previous years declined for 48% of businesses, stayed the same for 35%, and the remainder were unsure
- Number of customers compared to similar periods in previous years declined for 58% of businesses, stayed the same for 25%, increased for 4%, and the remainder were unsure
- The period of time businesses experienced increased costs, decline in revenue and decline in customers varied was most commonly 6 months or less (for more than 50% of businesses), and less than one year for all with the exception of one business that reported increased costs lasting more than one year
- When asked whether any of five factors contributed to decline in customers during the low water event (for those who had experienced it):
    - 79% said that ‘even though we could still operate as usual, customers thought we couldn’t and this reduced business
    - 79% said that ‘we were not able to offer the same tourist experience to customers due to reduced recreational amenity’
    - 71% said that ‘we were not able to offer the same tourist experience to customers due to safety concerns’
    - 43% said that ‘we couldn’t use water from rivers/lakes which meant business activities had to be reduced or suspended’.

When asked about the impacts of **black water events**, 13 businesses reported the following effects:

- Business costs compared to similar periods in previous years: Costs increased for two businesses, and the remainder reported no change or being unsure.
- Business revenue compared to similar periods in previous years declined for five businesses, stayed the same for five, increased for one, and others were unsure
- Number of customers compared to similar periods in previous years declined for six businesses, stayed the same for four, increased for two, and the other business was unsure
- The period of time businesses experienced increased costs, decline in revenue and decline in customers varied was 12 months or less

- When asked whether any of five factors contributed to decline in customers during the low water event (for those who had experienced it):
    - All said that 'even though we could still operate as usual, customers thought we couldn't and this reduced business
    - Two-thirds said that 'we were not able to offer the same tourist experience to customers due to reduced recreational amenity'
    - Two-thirds said that 'we were not able to offer the same tourist experience to customers due to safety concerns'
    - Half said that 'we couldn't use water from rivers/lakes which meant business activities had to be reduced or suspended'.

When asked about the impacts of **blue-green algal outbreaks**, 24 businesses these reported the following effects:

- Business costs compared to similar periods in previous years: Costs increased for 17% and the remainder reported no change or being unsure.
- Business revenue compared to similar periods in previous years declined for 48% of businesses
- Number of customers compared to similar periods in previous years declined for 50% of businesses
- The period of time businesses experienced increased costs, decline in revenue and decline in customers ranged widely from less than six months to more than 12 months
- When asked whether any of five factors contributed to decline in customers during the low water event (for those who had experienced it):
    - 83% said that 'even though we could still operate as usual, customers thought we couldn't and this reduced business
    - 83% said that 'we were not able to offer the same tourist experience to customers due to reduced recreational amenity'
    - Two-thirds said that 'we were not able to offer the same tourist experience to customers due to safety concerns'
    - 58% said that 'we couldn't use water from rivers/lakes which meant business activities had to be reduced or suspended'.

When asked about the impacts of these events on their business, household and personal stress, impacts varied:

- Relatively few reported impacts on staff retention, with different types of adverse water events reducing staff retention for between 14% and 26% of businesses
- 26% to 33% said it reduced their desire to stay in tourism

- 26% to 40% reported it reduced ability to cover household expenses
- 33% to 48% reported reduced ability to invest in their tourism business
- 39% to 52% reported reduced household income
- 33% to 65% felt it reduced viability of local business in their community
- 42% to 68% reported increased personal workloads
- 42% to 64% reported increased personal stress levels.

When asked what had been most helpful in assisting their business during past event, businesses reported the following:

- Advertising about ability to visit the area, e.g. 'communicating that we're open for business and here to assist', 'good marketing campaigns', and achieving positive media coverage more broadly were the most commonly mentioned
- Up to date advice on current status of the water event and information from tourism bodies
- Diversifying the business to enable a focus on other activities while the water event was occurring, and being able to promote these other opportunities to tourists
- Flexibility of business to use different water areas when one was affected by an adverse event, or to identify alternative tourism activities visitors could engage in
- Capable staff

Overall, the following comment from one respondent summarised what was most often identified as helpful:

> *We tried extremely hard to keep local businesses informed with the correct information and to be positive. We worked hard to ensuring that everyone understood how to explain blue green algae and causes to customers who asked. We also created an 'activities and experiences' brochure during blue green algae. This was distributed electronically to all our accommodation members and business members and all friends of tourism and available for visitors as a hand out.*

When asked what most hindered their ability to cope with past water events, survey participants reported the following:

- By far the most common factor that worsened impacts was negative media reports that were not accurate. This was reported by almost all businesses who responded to this question e.g. 'uninformed media reports', 'negative media coverage', 'biased media campaigns', 'media hype', 'ill-informed and inaccurate media coverage', 'press who were after the story rather than the facts because they couldn't find the facts easily', 'bad publicity', 'sensationalised and uninformed news reports', 'media wanting to look at the worst cases and not appreciate there was still great opportunity for people to enjoy this environment'

- Having a lack of information about the water event
- Lack of rapid action and recognition by government of impacts
- Being financially constrained in ability to respond, e.g. business lacking financial resources to implement strategies that could have otherwise assisted
- Lack of government assistance and funding

When asked was additional support would have reduced negative impacts and contributed to recovery of tourism activities, suggestions identified were:

- More accurate, informed and positive media coverage was most commonly identified, making up the majority of suggestions, e.g. 'accurate reporting', 'better publicity focusing on positives', 'positive media to get the right message out there'
- Supporting accurate media coverage with 'media releases that keep media properly informed and alert them to the previous damage done to entire regions by sensationalised and inaccurate reporting'
- Additional financial support, including short-term emergency assistance and longer-term grants to enable businesses to invest in diversifying activities and preparing for these types of events
- Increased investment in preparation for these events, including to ensure rapid recovery e.g. through clean-up actions
- Daily updates on the water event

These experiences of past adverse water events suggest that if the carp virus is released, there is a reasonably high risk of a short-term decline in visitation to areas due to a perception that virus release has or will reduce amenity of areas through causing fish kills or water quality problems. This decline in visitation would likely occur irrespective of the actual impacts of virus release on amenity and water quality, as a result of negative perceptions – in other words, even if virus release had caused no loss of amenity in a particular area, there is a high risk of reduced visitation due to public perceptions that amenity has been reduced or is likely to be. Reducing risk of negative impacts requires proactive investment in communication strategies that reduce inaccurate negative perceptions, and this investment would be needed in all areas in which virus release was perceived to have occurred, irrespective of whether it has occurred, and of whether it has led to any negative impacts on amenity and water quality.

6. IMPACTS OF DEVELOPING THE PLAN

This section examines whether and how the development of the National Carp Control Plan has affected tourism businesses. As noted earlier, the period in which a proposed action is being developed, but when its exact nature is not yet known, is often associated with social and economic impacts for those who have potential to be impacted by the proposed action.

The Australian Government announced in May 2016 that funding had been committed to development of the National Carp Control Plan. At the time of writing this report (September 2019), there had been a three-year period in which those involved in the tourism sector were aware a carp control plan was being developed, but in which the exact nature of the actions to be included in that Plan, and the ways those actions would affect the sector, was not yet known. This represented an extended period of uncertainty about the future, particularly uncertainty about how businesses would be affected by the recommendations included in the Plan, and about the likely timeframe of decision making and action after the Plan was delivered to the government for consideration.

In phone interviews, tourism business operators and tourist industry representatives were asked how this period of uncertainty had impacted them directly, and the industry more broadly. Key impacts identified were the following, each of which is described in more detail in subsequent sections:

- Direct impacts from increased market uncertainty
- Uncertainty about the future
- Optimism about potential action to reduce carp and possible positive impacts of this for tourism businesses.

Of industry survey participants, 79% had heard about the NCCP prior to doing the survey. The most common ways they heard about or discussed the NCCP were through friends, family and word of mouth (38%), by accessing the NCCP website (32%), through newspapers, radio and TV (30%), by attending an NCCP consultation session (30%), through local NRM groups (21%), through local tourism organisations (19%), through their local government (19%), and through recreational fishing groups (17%). Of the respondents, 74% reported it was important to them to keep up to date with the development of the NCCP, 71% felt familiar with it, and 61% knew how to access information about it. Just under half – 47% - were confident the Plan was being developed appropriately, while 24% were not confident and the remainder were neutral or unsure. Only 44% felt they knew how to communicate their views about the NCCP if they wanted to, while 27% did not and 29% were neutral or unsure.

The sample of industry survey participants was likely biased towards tourism businesses with higher awareness of the NCCP, particularly as tourism businesses that had attended NCCP consultation sessions were invited to take part. The findings suggest that there was

reasonably high uncertainty about the Plan even amongst those reasonably familiar with it, with many being uncertain about the process of Plan development or how to communicate their views to the NCCP.

Industry survey participants were asked if their business had experienced any impacts related to the NCCP since its announcement. Positive impacts were most commonly reported, with 38% reporting they had a more positive outlook about their long-term future due to the announcement of development of a carp control plan, while 28% reported having greater confidence in planning for future business development or investment (Figure 6).

Relatively few reported experiencing any negative impacts, with the most common being uncertainty about business development and investment decisions reported by 25%, and increased uncertainty about promoting their business by 22%, while 17% reported an increase in stress and 17% an increase in customer uncertainty. This indicates limited negative anticipatory impacts on businesses, although some have experienced impacts.

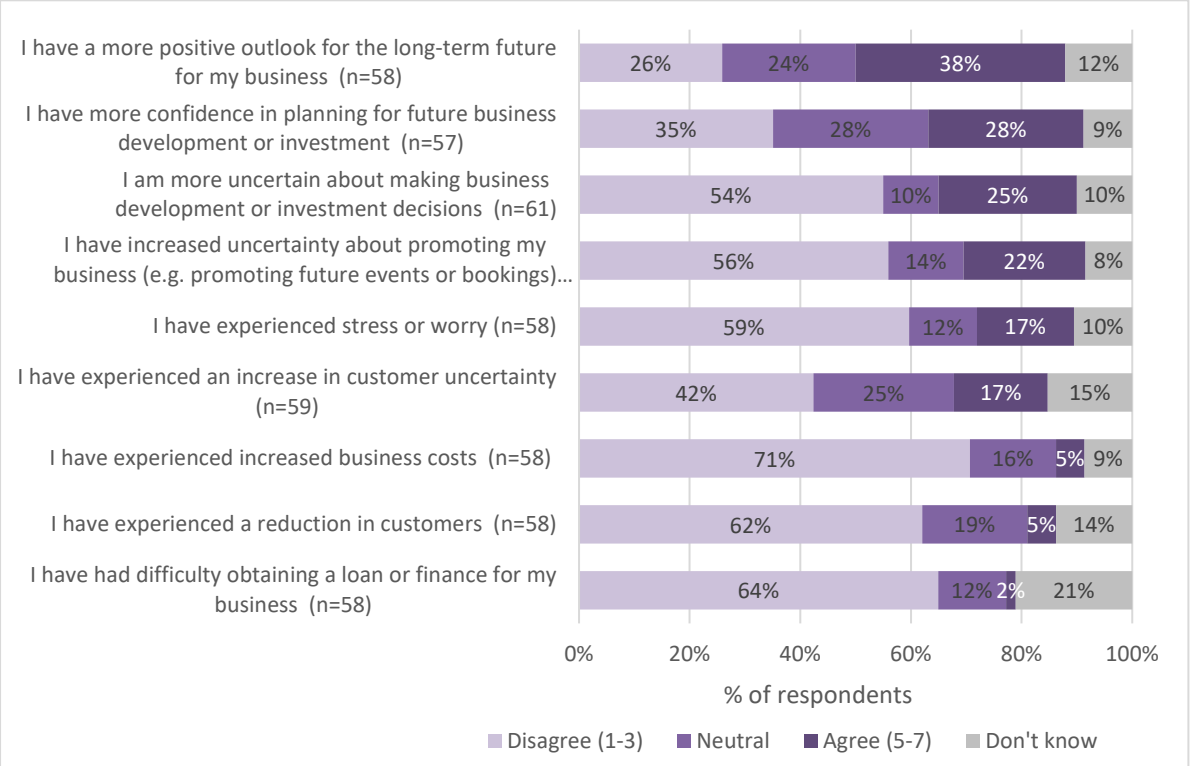

Figure 6: Anticipatory impacts following announcement a National Carp Control Plan would be developed

The overall outlook across businesses was therefore primarily one of cautious optimism about the potential for carp control to improve amenity and hence have longer term positive impacts for the tourism industry, despite a minority of businesses experiencing some uncertainty about the future. Views of interviewees about four aspects of anticipatory impact are described in more detail below, focusing on market uncertainty, uncertainty about the future, tourism planning, and positive outlook and market opportunities.

MARKET UNCERTAINTY

Most tourism industry members had not experienced any impacts on their markets as a result of the announcement of the Plan, with bookings and visitation unaffected. However, they reported high interest from customers in the Plan:

> *Certainly, all my customers have talked about the carp control Plan. They all have one view on it or another, and they all engage with me and ask me what my views are. (Operator – 11)*

> *[T]he announcement has probably generated interest but not at significant levels at this point because I guess the actual implementation is some time away. So it's been mentioned but I haven't had operators on the phone ringing me up going my god, you need to do something about this, which is normally a sign of fear or panic within the industry. (RTO – 3)*

One operator reported that the announcement has potentially had some impact on advance bookings:

> *A few people that are planning weddings for 12-18 months time, and they're saying, "Are we going to have dead carp floating past our wedding venue? Are we better to go somewhere else?" That's happening, that's been happening probably the last six months. It surprised me a little I suppose on the amount of awareness there is out there, that this is going to happen. (Operator – 1)*

UNCERTAINTY ABOUT THE FUTURE

The main anticipatory impact identified by tourism industry members and representatives was uncertainty about the future. Uncertainty took multiple forms, including uncertainty around the details of the Plan (what specific actions it might include) and uncertainty about how businesses would adapt and cope with potential impacts of virus release:

> *It generated a bit of excitement initially, but then that sort of turned to concern when the environmental impacts sort of came to the fore. So, it was sort of excitement then a bit of concern, and I guess now it's confusion: Is it a good thing? Is it a bad thing? And will we be consulted on its release? (LGA – 3)*

> *Just from the announcement … there's quite a lot of concern about the implications. But I don't know that there's any impact necessarily on the tourism numbers. But it's just the gossip and innuendo around what could happen, and that's just sort of ruffled some feathers. It's of significant interest to everyone, what the outcome of this whole process is. (Peak – 2)*

The degree of uncertainty about the future, and degree of resulting concern or stress, varied across the interviews, with some people experiencing no stress and others higher levels of concern. The level of concern resulting from uncertainty generally fell into one of three categories:

- **Low concern:** For some there was keen interest in the Plan, how it is developing and what it will involve, and low-level concern in terms of potential impacts to their business. Those with low concern tended to have trust in those developing the Plan and in the processes that would be put in place. They also had a positive outlook in terms of the outcomes of the carp control, and high confidence in their capacity to successfully adapt their business and manage impacts to mitigate significant impact to financial security.
- **Active interest and concern:** In the majority of interviews there was keen interest in the Plan mixed with an active 'wait-and-see' position in which the interviewees felt concerns about potential financial impacts to their own business and regional economy, but were unsure whether these concerns would eventuate. In some cases, respondents indicated their concerns were reduced after participation in an NCCP consultation event. Some also felt that the interviews conducted for this study increased the likelihood their concerns would be taken into account in the development of the Plan. Overall, for this group their concerns about the future remained active because of the perceived complexity of the proposed release of the carp virus, clean-up requirements, and communication challenges to counter media coverage and the impact on visitor perceptions.
- **High concern:** A small number reported experiencing high-level concern in relation to the Plan, and associated high levels of stress about the potential impact to their business and to both their livelihood and that of their staff. This group typically described the Plan as something being imposed on them, and viewed it as potentially highly damaging for their business. People in this group often had low trust that they could have any power to influence decisions, and raised concerns about whether any support would be provided to those negatively impacted if the virus was released.

Irrespective of whether levels of concern were high or low, many reported feeling 'in limbo' in terms of being able to make decisions related to future business investment, operations and marketing, and some frustration at the time required to develop the Plan. This was the key anticipatory impact experienced by many:

> *The only major concern, people were saying, "Come on, let's do it. Let's get it happening." There's always a bit of frustration that it's taking so long. (Operator – 2)*

> *…do we build a brand new boat and put it in our fleet if in two years time, when we're half way through paying that boat off, and this is rolled up and we have to tie it up, we will go broke. It's those uncertainties that we probably need to know the answer to before I'd say, yes I am supporting it or no I'm not supporting it. (Operator – 7)*

In most cases, stress in the anticipatory impact stages was related to how people felt they would be impacted in future, rather than to impacts occurring during the anticipatory stage. These concerns are discussed in more detail in the section 'Potential impacts of carp control via release of the carp virus', and included the following:

- Concern that clean-up will be insurmountable and will lead to a period of operational shut-down, severely damage short-term revenue and long-term business viability
- Concern that water bodies critical to business operations won't be prioritised in the clean-up
- Concern that negative media coverage of dead carp will impact visitation in the short and long term and that there will be a long period before tourism activity recovers after this
- Concern that the Plan won't include adequate resourcing for high quality, proactive and well-coordinated communication to the public (particularly tourists)
- Concern that impacts on tourism businesses and regional towns and communities won't be adequately considered in the Plan
- Concern that businesses will need to 'wear' the brunt of any financial impacts they experience because of the Plan, and
- Concern that resources to support business adaptation and recovery from a down-turn won't be considered or made available.

Most of these concerns related to a desire to know the outcomes of assessments being conducted as part of the NCCP, which is investigating many of the topics above, and a desire to ensure sufficient investment in actions such as prioritising clean-up in areas important to tourism and communication strategies to reduce risk of negative perceptions causing a downturn in visitation.

TOURISM PLANNING

The announcement of the carp control plan has had some impacts for those involved in local and regional tourism planning. In the initial period after the announcement of the Plan, many industry representatives felt they were on the 'back foot' with very limited knowledge about the Plan and how it was being developed. Many were being asked questions about potential impacts by members of the tourism industry. Several reported having invested additional time and resources to respond to the announcement of the Plan, particularly to investigate likely impacts for their region or sector of the industry, and to begin planning the responses likely to be needed to the Plan once it is developed:

> *… it is something we have spent quite a bit of resources just trying to understand because we do need to be that leading organisation for the region. Certainly I know it's created a range of issues … it's going to be quite a large process for us, because we will need to significantly focus on this, if what we believe from what*

we've learned so far is to occur, then it has fundamental challenges….[We] know this is a very significant, game changing program, and will consume an enormous amount of resources from our perspective, apart from just the initial response. (RTO- 1)

Representatives reported a need for ongoing commitment of resources to preparing for implementation of the Plan and ensuring a coordinated response by the tourism industry bodies to support the sector during the period in which the Plan is announced, implemented and beyond.

POSITIVE OUTLOOK AND MARKET OPPORTUNITIES

The announcement of the Plan was viewed positively by many interviewees, and 38% of industry survey participants reported it contributed to a more positive outlook for their business. There is a level of hopefulness around the potential carp control offers for marketing and promotions of tourism in terms of improved visitor experience:

I think everyone in business was actually quite excited about it. We all know that the carp is a terrible pest. And you hear stories from either Indigenous elders or agricultural pioneers in the region, about how the health of the river used to be so different, and how the water wasn't so turbid and that you could catch cod and other fish. It just seems like it was a different river back then…. I know that the various environmental agencies have done their best to catch or control carp, and I guess the excitement came from the solution; it appeared to be the solution that we were looking for. (LGA – 3)

The positive outlook also included identification of potential opportunities for the food and wine sector if carp control is successful:

…it would seem to me that if we're able to eliminate carp, we would see a rebounding of other species. And that in turn would introduce more opportunities for business and leisure. I'm sure we'd have a lot more of the native fish surviving, growing and providing opportunities for food. In this region alone, since we've had a ban on drum-nets the population of cod has improved enormously to the point now where it's reasonably common to find these dishes in some of the better hotels or restaurants. There's a strong local push towards using more of our native food product and ingredients, and that in turn is part of attracting more tourism. (Peak – 2)

Additionally, some identified potential local economic development opportunities from the implementation of the Plan and felt initially positive about that potential future impact:

I guess part of the initial excitement as well was for potential industries that could be created around the removal of dead carp, whether there's any biofuel or anything that could be generated, fertilizer and that sort of thing. So there was a bit of excitement around that, as well and still is. (LGA – 3)

Most of the positive outlook generated during the development of the NCCP was based on the assumption that reduction in carp populations would result in improvement environmental health in local regions. This is important, as positive impacts were described not as resulting simply from reduction in carp population, but from the effects this was hoped to have on clarity of water, aquatic vegetation and native fish populations in particular. If these improvements in environmental health did not occur, positive outcomes in the form of increase visitation would be unlikely to occur.

7. POTENTIAL IMPACTS OF CARP CONTROL VIA RELEASE OF THE CARP VIRUS

This section examines the potential socio-economic impacts of the reducing carp numbers on the tourism industry, with a specific focus on potential impacts of releasing the carp virus. The focus is on identifying the types of impacts that have potential to occur, and the conditions under which they might occur. First, an overview of the types of impacts tourism businesses believe have potential to occur is given. This is followed by examining the conditions and factors that would contribute to these impacts occurring and affect their extent. Finally, the potential size of impact is examined further, through identifying tipping points at which impacts could cause change in tourism businesses, and considering potential for flow-on impacts to communities.

POTENTIAL IMPACTS OF VIRUS RELEASE ON VISITATION

The principle way in which tourism businesses would be affected by virus release or other carp control measures is through any impacts carp control actions have on visitation. Visitation levels, in turn are largely driven by the extent to which there are either actual and/or perceived changes (negative or positive) in the amenity of an area – which depends on the extent to which virus release causes short-term and long-term negative amenity impacts in the form of dead carp or water quality problems (real or perceived), and results in long-term amenity improvement. Reduced visitation was considered more likely to occur if implementation of carp control combined with other events that also impacted visitation:

> *It's compounding, so we've had high river, low river, algae all in a row, and then we had operators saying, "Well, that's it. We've now got people who are not coming back because it was just too uncertain." It's not just the one trigger, it's a combination of multiple events that then creates the issue. (RTO-1)*

Many interviewees were concerned virus release would lead to large volumes of dead carp, blackwater events, blue-green algal outbreaks or other water quality problems. Water quality problems can have a range of impacts on tourism businesses, ranging from affecting the drinking water used by tourism businesses and holiday accommodation, to affecting tourism activities on rivers and lakes, causing smell that affects willingness to visit, and the overall ecological and aesthetic impacts. Reduced amenity resulting from presence of dead carp or reduced water quality could affect tourism businesses in multiple ways. These included loss of access to water sources needed for their business, safety issues reducing ability to use water areas, reduced opportunities for activities like fishing, and disruption to river access more broadly. Houseboat businesses were perhaps most commonly mentioned as potentially impacted, but potential impacts extended well beyond this to multiple types of tourism business:

I suppose my short-term concerns are, yeah, if it does get released what is it going to do to the water? How long is it going to take? If it doesn't go right and if it takes up to two or three years, we've got no water, drinkable water and especially with a lot of the [holiday] properties they draw direct off the river for everything. For showering, for toilets, the whole lot. (Operator – 1)

… millions of tonnes of rotting fish in the river, we have all this problem of anoxia, and algae bloom. I also mention the smell, and … we get our water from the river. So the strain on the water is a big question, how they will address that. (Operator – 9)

…it could be 2,000 kilometres worth of blackwater if it goes wrong. (Operator – 1)

Boats aren't stationary, so they're going to travel through the affected areas. Although if they can gauge what the timeframe is, they could be restricted to traveling in zone a for the meantime, because zone b is impacted. You should do that, if you can control that. … There's all these dead fish, and they're not going to be in one lump. They're going to be in the backwaters, caught in the reeds, they're going to be caught in different areas. Getting them out is going to be a problem. How's it going to impact the water quality? Because our boats pull water out of the river, not to drink, but to shower. The general washing dishes and things like that. We don't drink it. There are people swimming in it all the time. So dead fish, rotten smell. How long are they going to be there. How are they going to get them out? These are the questions that need answers to, so we can address that impact. (Peak – 1)

The houseboats draw water for the shower, the toilet, things like those. … We don't have any alternatives. I don't think anyone would want to be floating around in a sea of dead carp. (Operator – 6)

… if you're on the back of a boat skiing and you hit a large fish lying in the water, well, you're going to be in a lot of trouble. You can get hurt. There's obviously going to be a period where you're probably going to have to close the river to skiing at least. Maybe boating, but at least skiing. Otherwise there would be a risk. (LGA – 4)

… I was told that it would take four years for the native fish to breed back up to their previous population. There's obviously going to be a four year hiatus where the fishing industry is going to suffer and obviously that means the tourism industry is going to suffer. So, it might be fun to catch carp and then throw them up on the bank … and so on. But if you take that away, and then there's no native fish in the river for up to four years, or not many, or breeding up over four years, well then you've got that problem as well. … there has to be some thought around that so at least we can accelerate the opportunity for native fish to breed and reduce that lag time when there's no carp or very few carp and very few native fish. (LGA – 4)

> *…from speaking to a number of caravan park owners who have annual visitors…they're saying, "Well, what happens if they can't use the river and that's what they're coming for?" So that's been an initial discussion that I've had with a number of operators that rely on, I suppose on the river is their asset, and they sit right on it, or a lake as a water body as well. … there are people already questioning "how does this all work, and what's going be the impacts on my business when this occurs"? (RTO-1)*

The Plan research is focused in large part on assessing whether and to what extent release of the virus could result in the types of adverse impacts on water quality and amenity feared by tourism operators. Findings of biophysical research examining this will inform recommendations about whether the virus is considered a feasible carp control method.

In this project, we examined the extent to which perceptions of adverse impacts on water quality and amenity could impact visitation by domestic tourists, using the 2019 community survey. Some caution is needed when attempting to assess consumer reactions to hypothetical future events: there is strong evidence that stated behavioural intentions (such as a statement that a person would stop consuming a product under particular circumstances) do not always eventuate into actual behavioural changes when those circumstances occur. Importantly, while it is well established that many of those with intentions to engage in a particular behaviour do not in fact end up doing that behaviour, multiple studies have found that intention still remains a strong predictor of likelihood of changing behaviour (see for example Hassan et al. 2016). In other words, while not all people who say they are going to change their behaviour do so, a significant proportion of people who say they intend to change behaviour do in fact do so. This suggests that findings showing consumers intend to change behaviour can be interpreted as indicating that (i) some will change behaviour in the way indicated, but (ii) it will likely be a smaller proportion than state an intention to do so. Secondly, in addition to the intention-behaviour gap, it is well established that the nature of communication about an issue will influence how strongly consumers react to it. This means that it is not possible to predict actual consumer responses unless the nature and type of likely communication about a virus release is known. For example, this would require knowing the risk of widespread negative media coverage that (intentionally or unintentionally) influences tourists to reduce visitation to areas in which the virus was released, versus the potential to design positive communication strategies that enable reassurance of tourists about their ability to engage in enjoyable activities when visiting areas in which carp control actions are being implemented.

The initial findings need to be interpreted with an understanding of these limitations: the findings presented below do not indicate the precise change in visitation likely to occur, but do indicate what the direction and possible magnitude of change could be in the absence of either large negative or positive messages being communicated via traditional and social media about virus release.

The level of concern held amongst Australian residents about potential impacts of the carp virus was first assessed. This was done to help understand initial reactions to the idea of a carp virus, and whether these initial reactions could drive a risk-averse response that involved reducing visitation. This was assessed by providing the following information to survey participants:

> In recent decades, concern has grown about increasing numbers of carp (an invasive pest fish species) in many of Australia's rivers, lakes and wetlands. In 2016, it was announced that a National Carp Control Plan would be developed to recommend how best to control carp. In particular, the Plan will recommend whether or not a virus that has killed carp in other countries (the carp herpes virus) should be released in Australia. Any efforts to control carp will use taxpayer money – so it's important to know what Australians think about the idea of investing funds to control carp. **Please answer the next questions even if you don't know much about carp**, as actions to control carp have potential to affect large parts of Australia, including areas visited by large numbers of people. … Current research suggests that release of the virus may result in large amounts of dead fish in some areas in the short-term. Even with clean-up efforts, this would likely cause smell, and in some cases inability to use some waterways for periods of time. Work by the CSIRO and experience in other countries has found the virus is not transmissible to humans or to species other than carp or koi. Given this information, how much do you agree or disagree with the following statements?

The 4,428 survey participants, drawn from across Australia, were then asked the extent to which they agreed or disagreed with several statements about potential impacts of the carp virus. Those relevant to assessing potential impacts on the tourism industry are shown in Figure 7. The responses suggest that despite clear statements that the virus is not transmissible, concern remained high, with 49% concerned 'the virus could be transmissible to humans, despite research finding it is not', and 57% concerned about potential transmissibility to fish or animals other than carp. Concerns about potential water quality problems were high, at 63%. This suggests high potential for rapid formation of negative community perceptions about virus release, which have potential to flow on to choices made about visitation to areas in which the virus is released.

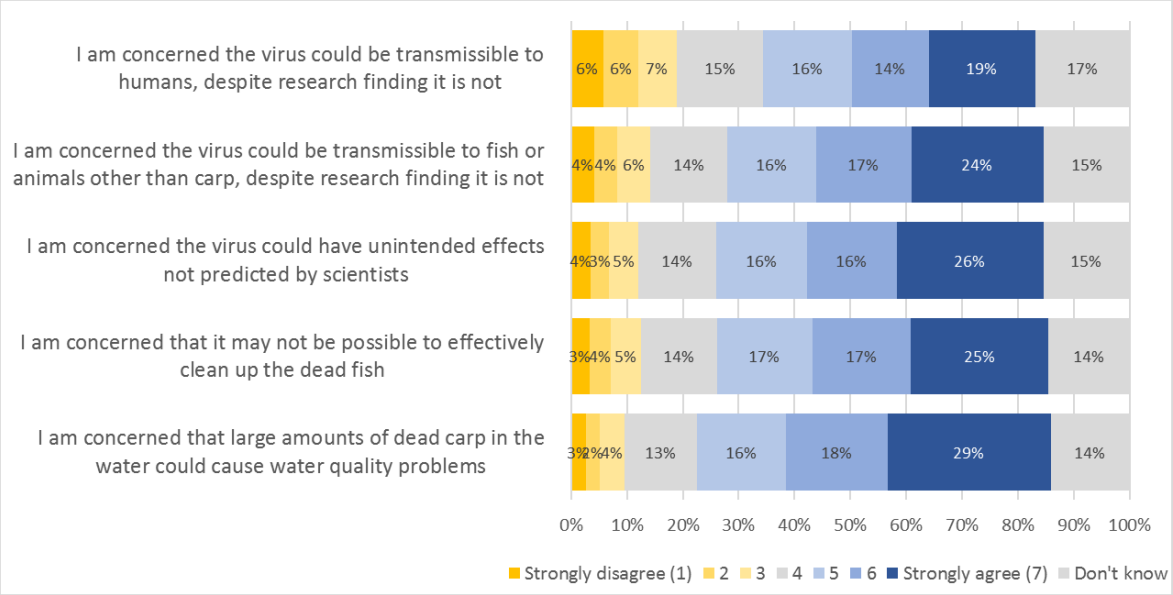

Figure 7 Initial reactions of 4,428 Australians to potential release of the carp virus, after being provided limited information

The 2019 survey also specifically assessed potential consumer responses to virus release. This was done by firstly stating:

> Recent months have seen concern about water quality issues in some of Australia's rivers, lakes and wetlands, and about water flow in those rivers. We are assessing the extent to which issues such as water quality issues affect your activities in and around these areas, and your likelihood of visiting them or of consuming products harvested from them. The next questions ask a bit more about this by asking your views about visiting rivers and lakes or using products harvested from them in three different circumstances.

Survey participants were then asked asking how likely people felt they would be to consume fish from local rivers and lakes under three scenarios:

> Scenario 1: You are planning a trip to an area with rivers and lakes. The water quality in the area you are planning to visit is good, with healthy vegetation, water that is often clear, and good fishing. There is typically enough water flowing to enable activities like swimming or boating. There is a risk of outbreak of blue-green algae or other poor water quality events in warm weather: these occur once every 3-4 years, last anywhere from 2-4 weeks and during this time can stop swimming and cause some fish deaths and smell.
>
> Scenario 2: You are planning a trip to an area with rivers and lakes. The water quality in the area you are planning to visit has been poor, with reports of fish kills and blue-green algae in a river about 50 kilometres from the place you plan to visit. Local authorities say it is still safe to boat but not to fish or swim, but expect to lift those restrictions in the next week so you'll be able to fish and swim by the time you visit.
>
> Scenario 3: You are planning a trip to an area with rivers and lakes. The water quality in the area you are planning to visit is currently good. However, there has been a disease affecting fish in some nearby areas, and there is a possibility it might cause a large amount of fish

deaths in the areas you will be visiting. The disease doesn't affect humans or any animals/birds other than fish. If a fish kill happens while you visit, there will be a lot of smell and poor water quality for a period of time, likely to be around two weeks (possibly longer). The risk of a fish kill happening when you visit is fairly low – around 10% - but no-one is able to tell you whether it will occur when you visit.

The first scenario reflected baseline conditions – meaning the current conditions experienced in many freshwater areas in which carp invasion has occurred. The second scenario reflects a potential outcome of virus release in the form of poor water quality, and tests responses to this by a person planning to visit or consume produce from a place some distance – 50km – from where the poor water quality is occurring. This was selected deliberately as it evaluates the likely behavioural responses to a scenario in which virus release results in some localised poor water quality events (rather than widespread poor water quality), and identifies if these localised events would be likely to produce more general responses that affected other areas not experiencing poor water quality. The third scenario similarly reflects that virus release would involve a reasonably degree of unpredictability in timing of carp kills, and evaluates what responses to a risk of a fish kill would be.

Participants were then asked, amongst other questions, whether they would feel safe eating fish caught or produced from local rivers or lakes under each of the three scenarios. This question was deliberately generic: it did not specify fish produced in aquaculture facilities and those caught as wild catch. This was because initial testing of two separate questions distinguishing aquaculture and wild catch showed there was a lack of distinction made between the two and confusion about the differences amongst them for most consumers, suggesting that consumer responses would be similar for both.

As shown in Figure 8, under current conditions – in which there are sometimes water quality problems – around 45% of Australians feel they would not risk visiting an inland area in case there was a poor water quality event, although many of these did not feel strongly about this, while 45% said they would be likely to visit an area like this in summer, and 46% said that when planning to visit an area like this they would typically book ahead. A total of 52% would feel safe fishing in an area like this as long as authorities said it was safe, while 54% would feel safe to go swimming. This highlights that in many areas experiencing carp invasion, there is already reasonably high reluctance amongst a large group of consumers to consume visit regions. Despite this, domestic tourism in regional areas has been expanding.

Under both Scenarios 2 and 3, the proportion of people who would like likely to visit an area fell by just over one-third, from 45% to 27% to 29%. Not many felt they would no longer book ahead, with those stating they would typically book ahead falling from 46% to around 36%. The proportion who felt they wouldn't risk visiting an area like this rose from 45% to 58% to 59%. The proportion who would feel safe fishing fell from 52% to between 29% and

31%, while the proportion who would feel safe swimming fell from 54% under Scenario 1 to 30% to 32% under Scenarios 2 and 3.

This suggests potential for a decline in visitation associated with the potential risk of an adverse impact on amenity in a region (rather than actual impacts). It is consistent with the reports of people in the industry that negative perceptions often drive reduction in visitation even some distance from locations where an adverse event is happening, or when there is a small risk of an adverse event happening. This highlights the importance of both clear communication about actual risk, but also more broadly building confidence to visit regional areas for tourism. It suggests that long-term improvements in amenity, if they resulted from carp control actions, would have potential to increase visitation, given the high proportion of people who were unlikely to visit areas currently due to water quality concerns.

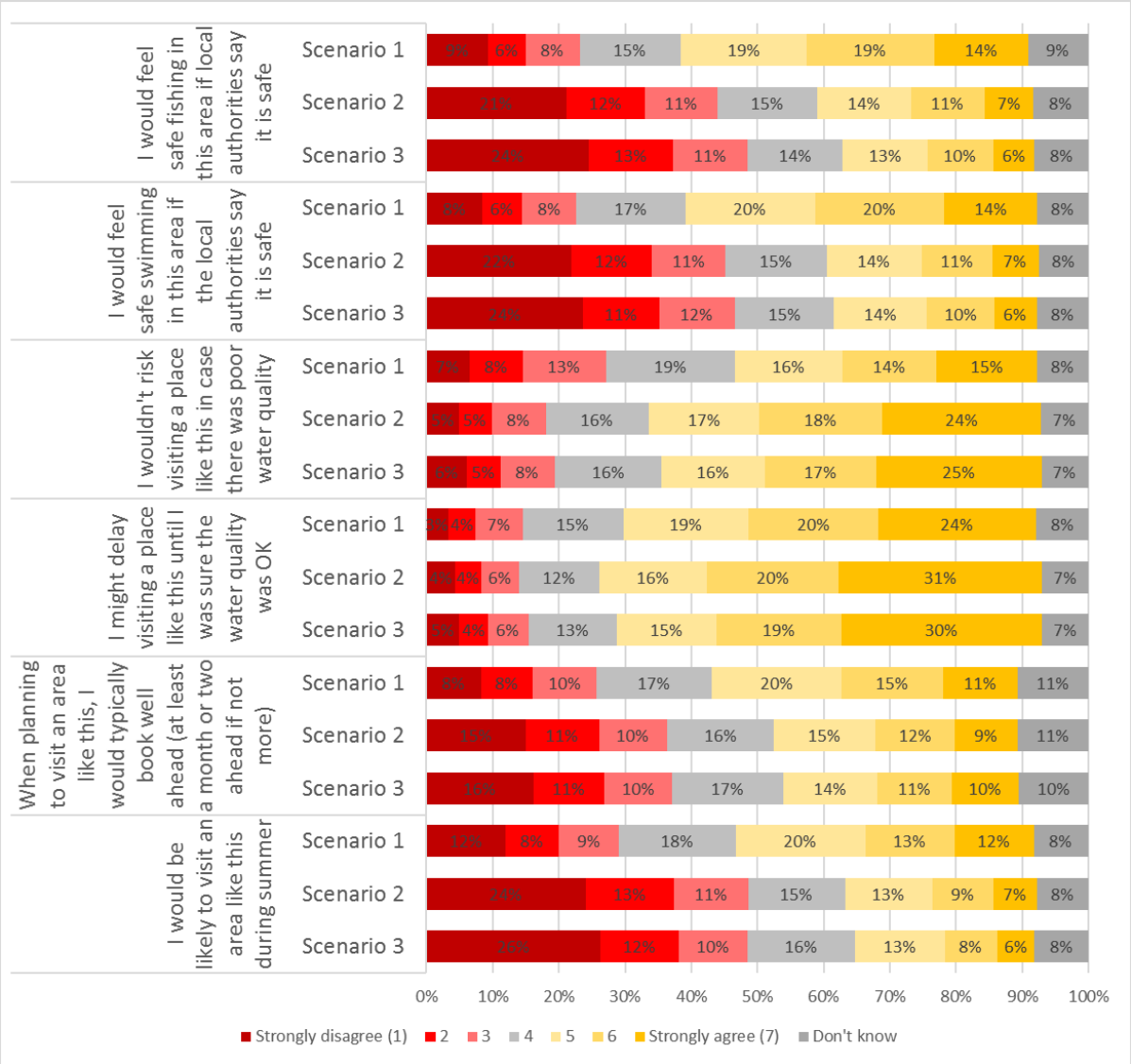

Figure 8 Likely visitation under different scenarios of amenity and water quality

These findings are, as noted earlier, indicative of the likely direction of consumer behaviour only, and likely to be different in reality depending on the extent of the 'intention-behaviour gap' as well as on the extent and effectiveness of communications about virus release and the effect of this on demand for aquaculture products. The findings apply to domestic consumers, and do not provide insight into likely changes in consumer demand in the export markets that are of growing importance to the freshwater native fish aquaculture sector.

VULNERABILITY OF TOURISM BUSINESSES TO VISITATION DOWNTURN

To better understand the vulnerability of tourism businesses to a downturn in visitation, survey participants were asked what consequences different levels of visitation reduction would have for their business. First, they were asked to consider a scenario in which they experienced a 20% reduction in revenue during spring. They were then asked how likely they were to take any of a number of actions in response to this. Most businesses reported they would not take any of the actions asked about, however:

- 44% were likely to keep all staff on but reduce working hours
- 22% were likely to put some staff off
- 19% would be likely to temporarily close their business
- 18% would be likely to reduce their working hours
- 17% would be likely to stop repaying an existing loan
- 13% would be likely to seek a short-term loan to keep the business going
- 3% would be likely to close the business altogether.

If they experienced a 50% reduction in business revenue in spring, meanwhile:

- 45% were likely to keep all staff on but reduce working hours
- 48% were likely to put some staff off
- 19% would be likely to temporarily close their business
- 21% would be likely to reduce their working hours
- 42% would be likely to stop repaying an existing loan
- 26% would be likely to seek a short-term loan to keep the business going
- 6% would be likely to close the business altogether.

These responses suggest that most businesses would be able to cope with a decline in revenue lasting a short period of time, which is not surprising given most have had to cope with this type of event at least once in recent years. However, a long-term decline in visitation would be much more difficult to cope with. The next section considers the potential nature and drivers of shorter term versus longer term impacts.

POTENTIAL SHORT-TERM AND LONG-TERM IMPACTS

In interviews, participants typically differentiated between potential short-term impacts of virus release, and longer-term impacts. This was usually based on interviewees viewing release of the virus as being likely to result in an initial large reduction in numbers of carp, resulting in short-term impacts, following by episodic virus outbreaks over the long-term involving smaller carp kills. Thus, release of the virus was viewed as having impacts over the longer term, rather than being a 'one-off' event in the nature of its impact on tourism businesses.

Industry survey participants were given the following information about the carp virus:

> *To date, much of the public discussion about the development of a National Carp Control Plan has focused on the potential release of a carp virus. If the carp virus is released, this will likely result in large numbers of carp dying in a short period of time in rivers, lakes and wetlands. This would be associated with amenity and water quality changes and need for clean-up activities. The following questions ask for your views about the potential costs and benefits of releasing the carp virus over different time periods, based on your current level of knowledge about the carp virus.*

Survey participants were then asked to rate their level of concern about a number of impacts occurring in the three months following virus release:

- 80% were concerned about 'negative media coverage of outcomes arising from virus release in the region my businesses operates in'
- 77% were concerned about 'water quality decline preventing recreational water-based activities (e.g. swimming) in the region my business operates in
- 75% were concerned about 'water quality decline preventing use of water from waterbodies (i.e. rivers or lakes) for my business operations
- 68% were concerned they would experience a decline in customers
- 61% were concerned about broader decline in recreational amenity in their local region
- 61% were concerned about potential decline in their business revenue
- 60% were concerned there might be a period in which their tourism activities were shut down
- 48% were concerned they may have to reduce staff hours or let staff go
- 42% were concerned about potential increases in business costs.

This suggests that impacts on tourism businesses are, as described earlier, as likely to occur as a result of negative perceptions as they are from actual changes in water quality or amenity.

Survey participants were then asked to rate their level of concern about longer-term impacts occurring more than three months after virus release:

- 62% were concerned there may be a decline in the reputation of the region their business operated in as a tourist destination
- 60% were concerned about potential long-term decline in customers
- 53% were concerned about the capacity of their business to recover from a down-turn related to release of the virus, and 51% about a long-term decline in business viability
- 40% were concerned about their longer-term ability to retain staff.

This suggests that while much of the potential for impact is shorter term, there is risk of longer-term negative impacts under some conditions.

Survey participants were then asked the extent to which their business would benefit from several changes that were possible long-term outcomes of successful carp control:

- 86% felt their business would benefit from clearer water (reduced turbidity) in freshwater rivers, lakes and wetlands
- 83% would benefit from increased native bird life in freshwater rivers, lakes and wetlands
- 82% would benefit from an increase in native fish populations
- 73% would benefit from improved health of wetlands.

These responses highlight the dependence of many tourism businesses on local environmental amenity, with high potential for positive impacts on the tourism industry if reduced carp numbers contribute over the longer term to improved environmental health.

The extent to which tourism businesses experience either short or long-term impacts as a consequence of virus release will depend on a number of factors. In particular, interviews and survey findings suggest they depend on:

- Extent and duration of carp kills and water quality impacts resulting from virus release – something being assessed through biophysical research as part of the NCCP, and not discussed further in this report
- Timing of virus release and how this intersects with tourism activity
- Investment in clean-up and extent to which areas important to tourism are prioritised for clean-up in the short-term and in longer-term episodic outbreaks of the virus
- Level of investment in marketing and communication to counter inaccurate perceptions,
- Investment in other forms of support to reduce negative impacts, and
- Whether reduction in carp numbers is accompanied by improved environmental health in the long term.

These are discussed in the sections below, followed by examination of capacity of businesses to cope with short-term impacts, and potential for broader impacts on communities to flow-on from impacts to the tourism industry.

TIMING OF VIRUS RELEASE

The extent to which the Plan would impact on tourism businesses would depend in part on the timing of virus release, and whether this timing resulted in the presence of dead carp or water quality problems during peak tourism periods. One of the common concerns identified by those interviewed was that virus release might coincide with peak tourism times because of the need to release the virus when water temperatures were most conducive to virus spread. Tourism activity is generally higher during September to early May than during winter. Within this relatively long period, there are tourism peaks in school holidays (particularly December and January), long weekends and around particular events:

> *I guess for me, it's the unknown. The negative side of it the unknown. If it takes two years, or if it takes six months to be cleaned up, that's probably our concern. Especially because they're going to release it over the peak season… it's going to kill our business … It's not like we can head off onto something else. That's my biggest concern. If it's an instant kill and is all cleaned up on three weeks then done, it's still going to have a negative impact on cash income on us. The financial side of it, yeah, I guess it will be there, but long-term I think it'll be an improvement, providing we can get through that short-term. (Operator 1)*

> *Houseboat holiday you can do anytime, but the good time though is through January, February, March, April, May, beginning of June, July, and then August all the houseboat people go on holiday in August. If you're going to do something, do it in August. And get them out of the river in August and we'll all move on. It's not a problem. If you do it in January, which is the peak time and through February, March, April, it's going to cause a major issue. (Peak – 1)*

Questions about timing of virus release also related to staging of release, with some wanting to know whether it was possible to stage release in different areas, and to adaptively manage release in different regions, implementing learnings from previous releases, and better preventing and mitigating impacts along the way:

> *...[I]s there a way that we can put some principles around the final decision, for releasing [the virus]? Can we actually implement some stages, and if those targets or if those outcomes aren't hit, then we have to abandon the program. But I suppose once you release the virus, it's gone. It's happening. (LGA-3)*

> *I doubt that there's a way of controlling the rate at which the virus is released. We tend to get the impression that the virus will be released and then there will be thousands upon thousands of tonnes of dead carp floating up and down the*

river. It would be nice to know how realistic that is, but also the anticipated span of time over which the process would endure. (Peak – 2)

To minimise potential impacts on the tourism industry, future carp control actions should include consultation on timing of virus release in relation to key important periods for tourism. There should also be sufficient investment in communication and marketing to reduce risk of inaccurate negative perceptions that affect visitation during peak time. The goal would be to reduce the risk of tourists cancelling planned visits due to an inaccurate belief that local amenity would be reduced as a result of the carp virus, and to ensure clear information on what specific areas were experiencing amenity impacts at any given point in time.

INVESTMENT IN CLEAN-UP OF DEAD CARP

If the virus is released, the extent and nature of impacts of the Plan on the tourism industry depends initially on the extent to which there are dead carp and they can be cleaned up (discussed in this section) and impacts on water quality (next section).

Most interviewees discussed the process of cleaning up dead carp as a key factor influencing the nature and extent of impacts of the Plan on the industry. For some, there was concern that clean-up would be difficult or impossible:

I really struggle with the logistical side of getting rid of the dead rotting… [carcasses] floating along the Murray or being washed up along the bank. I look at instances where there's… 40 or 50 dead fish and it puts an excellent stench over the whole island. The poor old Loch masters have to clean up the dead fish to make it habitable for our other guests … (Operator – 6)

I just can't fathom how on earth they can clean up dead carp everywhere in such a massive area, in such remote areas, difficult to access areas. I just can't get my head around how they could possibly deal with it. (RTO – 2)

The logistics of clean-up in remote or difficult to access areas was of concern, as these are used by some tourism operators:

But it's those backwaters, that I think are going to be the biggest issue - how they're going to clean that up? And a lot of that is just an area the size of a football field. Some are 50 or 60 or the size of a suburbs I guess. How are they going to guarantee that's going to be able to be cleaned up at the same time? (Operator – 1)

They did say they had thought about it a bit and there are some wetlands and they won't even be even trying to eradicate the carp from. But the really big issue is that there's a lot of carp hang around, tend to hang around in really shallow water. And some of those you can't reach. You certainly can't reach by boat, and you'd have trouble getting to by kayak, you'd have to carry it around through

reeds, because the reeds have taken over pretty much everywhere. It's really difficult. (Operator – 10)

When discussing the specifics of clean-up, the impacts of dead carp on the tourism industry will depend in large part on the amount of time that they are i) actually present for, and ii) perceived to be present for. Longer period of presence of dead carp, or perceived presence, will cause greater negative impacts for visitation. The length of time for clean-up of key sites will therefore be critical in terms of determining extent of impacts experienced by the tourism industry, as will ability to clearly communicate when an area has returned to its usual amenity and to manage longer-term perceptions about risk of fish kills occurring in an area from the virus:

It's just got to be done quickly and effectively. How's everybody going to do that? That's the major issue for everybody. That's what all our members are saying… "How are they going to get them out?"… If the answer to that is going to be quick and effective, people will manage the problem. (Peak – 1)

When I first heard of this thing…we had the impression that it was all going to happen overnight. Bang. Take seven days to work and then we would just have millions and millions of these dead fish and it will be a one-off event. As it's gone along, we start to get the feeling that it mightn't be such a one-off event. It could be seasonal. For many years. And that's a real worry. If it is that it won't be as big each time, but nevertheless if it was repeated year on year that would have an even worse effect on the industry. If it's a one-off, bang, and over, okay. It'd be pretty bad then, but, you know? We could live with that. But if it's ongoing that's a hell of a problem. (Operator – 8)

It's just going to go on for five, six, seven years and the publicity of these dead fish floating down the river, it won't matter where that's happening on the river. I know it's 2,000 kilometres along, it might be happening at the bottom end and we're 500 kilometres away from that, and it could be all beautiful here, but people will think that we've got floating dead fish here. (Operator – 7)

…if the clean-up isn't very effective, that impact of that initial, lots of dead fish stinking up the lake, will last more than one season. It will put people off going fishing for three or four years potentially. (Operator – 11)

Key to addressing concerns about potential impacts of dead carp was ensuring clean up was adequately resourced, and adequately targeted to cleaning up carp in areas important to the industry. Some interviewees felt this required commercial businesses, others suggested use of local contractors:

Having rotting dead fish polluting the water quality and that would have a significant impact, so people need to have confidence that it's going to be managed appropriately and the resources will be there for it. (Operator – 2)

…there could be places where it is feasible to have people going in, a couple of people assigned to a couple wetlands, and they just go out every day with a canoe and a big plastic tub in the storage area in the middle, just keep on picking up fish, going backwards and forwards. It may be too big a job for people to do, two people to do a couple of wetlands, I really don't know. (Operator – 10)

Reducing potential negative impacts therefore requires identifying areas to prioritise for clean-up. Clear criteria should be established for prioritising clean-up areas that include consideration of potential impacts on tourism businesses as a criteria for allocating clean-up resources. This is likely to require consultation with a wide range of tourism businesses in different regions, given that quite different areas can be important at different times of years to different tourism businesses.

MARKETING AND COMMUNICATION

The type of negative impact most commonly predicted by tourism industry members was reduced visitor numbers resulting from perceptions that carp control had caused amenity or other changes across large geographic regions. These perceptions can change visitation in regions experiencing physical change in amenity as well as regions unaffected by the change. This potential impact was identified by all interview participants and almost all industry survey participants. Lessons from past experiences suggested that even relatively localised problems could affect visitation to a much larger area, particularly if communication about those problems was not managed in a coordinated and proactive way by the tourism industry and other relevant agencies:

The whole of the river can be easily tarnished by something that's a localised event. … There's an example recently where there was a small outbreak of blue green algae in [one area and a government agency] came out with this big statement around blue green algae on the Murray River. That was like, oh, here we go again. It worked out to be just before the long weekend… peak period. (RTO-2)

Past experiences also suggested that visitation can often take a long time to recover even after conditions for visiting a region had recovered, as visitors often changed destinations during the period when problems were occurring and took some time to return if at all:

I've got to say that if the clean-up isn't very effective, that impact of that initial, lots of dead fish stinking up the lake, will last more than one season. It will put people off going fishing for three or four years potentially. (Operator – 11)

We know from when there were times of drought for instance in the river, there was a significant shift of people to lakes that still had water. To get them back, they don't just turn around the following year when there was water back in the river and then they come, because then they've changed habitats or they've invested [elsewhere]. (RTO – 1)

> *The time to recover from an event like we have in the past with the drought and the high water, it takes a long time for people to want to go back and visit the river and go on a houseboat. (Peak – 1)*

Long-term impacts on visitation were considered more likely to occur if actions taken to control carp conflicted with existing destination branding:

> *In South Australia, we pride ourselves and our government promotes a clean and green image…We have a strategic goal in our state, that we will promote food and wine from our clean and green environment. Or something like that. And the introduction of a disease seems contrary to that… Even though it's for a good outcome and the outcome… (LGA – 3)*

The concerns raised about both decline in visitation and lags in visitation recovery were also relevant in the context of the international tourist market, where negative perceptions about visiting were considered likely to persist for an extended period and be more difficult to turn around:

> *I think domestically, it would be possible to market or to communicate what's going on, and for Australians to understand the regions that they visit might look off or smell a little bit different for a time period. But it's the international visitation, that we so rely on or are so desperately try to increase that I worry that they won't be as forgiving, if you like. They won't understand it. The State government are really pushing South Australia to China because we've got such wonderful wine and nature-based activities. And then if we are not able to deliver on that experience, it could be devastating to the industry. Whereas like I said, domestically, it'll be in the headlines and people will understand. It will still have a detrimental effect on tourism but at least they would be educated. (LGA – 3)*

More generally, there were concerns about the potential for longer-term damage to the destination tourist branding due to issues such as persistence of perceptions that the region was an unreliable tourist destination due to frequency of water quality events such as blue-green algae, high water, black water events, or fish kills. This was viewed as more likely to occur if there were ongoing episodic carp kills rather than a single large carp kill event.

This highlights the importance of proactive approaches to communications to prevent or counter inaccurate or distorted media coverage. Implementing this type of proactive response had been observed to make a large difference when used to help cope with events such as blackwater, high water flow, and blue-green algal blooms.

This means that marketing and communication have critical roles in reducing the scope of negative impacts in the short-term and long-term, both through reducing inaccurate perceptions of poor amenity and through ensuring businesses are able to prepare for periods of lower visitation. Marketing and communications strategies also have roles in increasing longer-term visitation associated with improved amenity, through increasing

awareness of that improved amenity if it occurs after a reduction in carp populations. Three elements were emphasised in the design of effective marketing and communication that could reduce potential negative impacts, and increase positive impacts:

- Ensuring information is provided as early as possible to tourism businesses, to support forward planning by businesses that can enable prevention or reduction of negative impacts, and development of positive opportunities
- Early positive messages about carp control that clearly explain the objectives of carp control and build support for it that increases willingness to accept some short-term impacts in exchange for longer term benefit
- Well-coordinated communication strategies both within the tourism industry, and between the tourism industry and the various organisations involved in implementing carp control actions, and
- Ongoing management of and response to media coverage and messages.

PROVIDE INFORMATION TO TOURISM BUSINESSES EARLY, UPDATE INFORMATION REGULARLY, AND WORK WITH INDUSTRY TO DEVELOP PLANS

Early communication should begin by ensuring active, formal involvement of representatives of the tourism industry in development of communications aspects of carp control strategies, and more broadly in consultation and engagement processes:

> *…people are always concerned that they're not going to be consulted enough…I think we're quite well set up with … our industry associations. So, I think if the government can promise to formally engage with those industry associations, then I think we'll be fine. But it's the feeling they might be left off. (LGA – 3)*

> *Recently also we had [a] case here…where the government has been putting in place an infrastructure project on the river, and there was a lack of consultation or communication with the local community, and there was an uproar. So it's a thing with any government agency, is that their communication is usually [not great]. … (Operator – 9)*

Communication about the Plan with tourist operators as early as possible was considered a critical determinant in preventing and mitigating impact. This was crucial for supporting businesses to engage in early planning, adaptation and communications. Several felt that frequent and regular updates would be well received across the sector, and would follow practices they had come to expect as they were used in other circumstances such as communicating about river management changes:

> *I think it definitely needs communication as to what is happening. You know if there's changes in what is happening, communication, and just assistance with marketing, in keeping the message out there as to what's going on. (Operator – 5)*

> *If [a particular business] was out of action for three months for instance, or more, they wouldn't survive, whereas if you said to them, "Right, for those two weeks," or whatever it might be, then they might be able to put some other mechanisms in place, or might be able to relocate. (RTO – 1)*

Early communication would also allow tourist operators to better manage advance bookings by being able to provide potential clients with information on what to expect. This is critical for many businesses: for example, bookings for houseboats are commonly made several months in advance, while significant events such as weddings and large family events often involve bookings made 12 to 18 months in advance:

> *As long as we're well informed … we would just make allowances for that, and it may be that we reduce the number of people that we book down [on the river] at that time … I think really we just have to communicate and keep those lines open so everyone's on the same page and we reduce the angst, if you like, if there's any negative feedback we get from the public. We'd need to inform people. (Operator – 3)*

This type of communication can also reduce impacts in and of itself, through improving the extent to which tourist operators feel supported and able to work to address challenges:

> *… just offering some support, somebody ringing up and saying, 'How is it going? Is there anything we can do to help?' Quite often, it can add a lot, give you a lot more confidence than having to battle it on your own. (Operator -5)*

Forward communication to tourism businesses about likely timing of virus release and the range and potential timing of carp kills and any amenity impacts is therefore a first critical step to enabling tourism businesses to reduce potential negative impacts. Being aware well ahead of virus release enables businesses to develop plans for using alternative locations, adapting their business activities in other ways, and marketing appropriately to customers about the forthcoming period. This is particularly important as adapting the business is likely to be a primary method of reducing impact, with insurance cover not likely to be feasible for businesses to use as a way of coping with any reduced visitation:

> *I don't think that we would have adequate insurance cover, for negative impacts. Some [businesses] because they can't get it, some of them because they are too small and they just don't think to invest in that. … So they are very, very susceptible to events like this. (RTO - 2)*

Past experiences of events such as algal blooms also suggest that early work is needed to ensure incomplete or inaccurate information can be avoided, and for communications to be tailored to the business and visitor experience. Examples of communications raised in interviews as useful included workshops for businesses to receive updates on the status of the event, and development of public communication material with a focus on visitor experience, such as identifying experiences that can still be enjoyed. There was also an

emphasis on the need for these communications to be coordinated and delivered using the multiple established channels and relationships between state and regional-level tourism organisations, local government, visitor centres, and other relevant agencies such as emergency services.

In the context of the Plan, key issues that would need to be addressed in these communications include: perceptions that dead carp were affecting every area in a particular region (instead of only some, which members of the industry hoped would be the case), and clearly identifying whether visitors could still engage in a range of activities and have enjoyable experiences. This needed to sit within delivering broader information about how the Plan was being implemented, the actions being undertaken, and their effects. The overall goals of virus release, the potential positive outcomes to be achieved by it, and how it would overall support destination appeal over time, were viewed as key messages:

> *I think the other thing that worked really well [in responding to a blue-green algae outbreak], we went straight on the front foot and actually coordinated workshops across the region with both operators and local government with a range of agencies…[W] e actually did it from a tourism perspective and there were some people turning up from farming, and from all sorts of other backgrounds saying, "Well, no one is doing this for us, so we've come to your workshop to hear about what algae does or what the impacts are." We had the health department, the water authorities, we had the Parks agencies, ourselves leading it, and the [State] Emergency Response people that were dealing with it particularly from a health and safety perspective, as well as from a tourism perspective. … The comms stretches from the start to the end…in terms how to deal with visitors, or get your business ready now. … So there's probably a series of campaigns [around]… this is actually something that's positive that we are going to do [with the virus]. And then there's going to need to be some destination appeal type activation or a significant budget to actually push visitors to continue to visit and/or return. (RTO – 1)*

Overall, early planning work with industry can enable develop of effective communication strategies for different scenarios of impact of virus release, which clearly identify communication pathways and strategies, tools to support businesses to respond, and assessment of any specific actions to help businesses plan for virus release.

EARLY POSITIVE MESSAGES ABOUT CARP CONTROL

In nearly all interviews the need for accurate, detailed, timely and repeated messages was raised as a critical strategy to counter inaccurate messages about any water quality change that is covered in the media. Addressing the potential for damaging media coverage was identified as the most critical element of any response to manage and mitigate potential impact from carp control. As noted earlier, multiple examples were given of media-driven challenges experienced previously during events such as drought, high water flows, blackwater events or blue-green algal blooms:

There were a few operators like houseboat operators who couldn't actually get their boats out because they were stranded [during drought]. So, they moved them downstream, they did all sorts of different things to manage that. But it was the perception. The issue we had was that front page news quite often was, "There's no water in the river." And they would have a photo from another part of the Basin that had been specifically shut off, and there was no water in there. And they would put that up and sort of imply that that was what our section of the Murray looked like, and it just wasn't the case. And we were constantly fighting that. (LGA – 3)

Early positive messages, as noted earlier, were not just about promoting the tourism industry being 'open for business'. Several felt it was essential to educate the public about the need for carp control, and the positive outcomes of actions being taken that could increase willingness to accept shorter-term impacts of those actions (as long as they were short-term). This broader message was one that required leadership from the NCCP and collaboration between the NCCP, relevant government agencies and the tourism sector.

I think a good media campaign about the benefits. And demonstrable benefits post virus release. (Operator – 11)

[In managing a particular site where drainage of an area was used to control carp in a tourism area] I realized the power of communicating about the carp. So it's the way you tell the story. I found that so powerful that I started to build up banners and posters … and each time I go [where they are hung] there's always somebody coming in, "Oh that's great, you are getting rid of the carp!" And I have a graph where I have a record of the Carp tonnage [over time] … you can see that we've reduced the quantity. (Operator 9)

WELL-COORDINATED COMMUNICATION STRATEGIES

Ensuring communication strategies about carp control were coordinated was identified as essential by many tourism industry representatives, as noted earlier. Examples were given by some of how good coordination had worked successfully in the past when responding to events that affected tourism, including the effects of low water, high water, blackwater and blue-green algal blooms.

One quote demonstrates the key elements identified as important: having all relevant organisations working together, working early before actions or impacts occur, having effective and regular communication going out to tourist operators and the public, and ensuring consistent messaging:

I guess just thinking of the high river most recently, the key with that was getting on the front early. … we knew it was coming well before it actually arrived. We actually had the benefit of being able to plan. … So we were able to get the key state government agencies around the table as well a number of stakeholders... We were involved from a tourism perspective. … [T]he key was constant interaction with that group. We were dealing with

[agencies], who were sending out updates on a weekly basis and we were crosschecking each other's press releases and things to make sure that messaging was going out that was complementary whilst still adhering to the appropriate safety messaging. It was also just about keeping operators informed so we sent out regular updates. [We] did them as a combined piece across the whole region to operators on a fortnightly basis. Because with that particular issue, there was stuff around boat ramp closures and there were some road closures … and that was just about keeping everyone informed. … it's about working with the industry to get them onboard with this messaging. …Then the industry essentially became an advocate or the overall issue as well in terms of advocating those positive messages, not just coming from people like me in regional tourism roles. (RTO-1)

ONGOING MANAGEMENT OF MEDIA MESSAGING

Managing media messages through effective marketing and communication was key to reducing impacts associated with misperceptions. Media management was considered particularly important, with negative events often highly publicised in the news media and social media and sensationalised in ways that led to public perceptions of larger impacts than actually exist. Negative media message can have dramatic, overnight impacts on visitation. One interviewee reported that inaccurate messaging around a low water period and ferry operations, in which a newspaper reported a ferry had shut down due to low water despite another ferry being operational and no access issues, resulting in loss of one month of bookings by one accommodation operator within 24 hours. In this case there was another operational ferry and so no issue with access, but it was the perception that determined cancellation and booking decisions:

…the biggest issue is really how we deal with the media. Because we just know that the media will, all they want to do, the television media, will just want to send out cameras seeing lots of dead smelly fish. And that just has potential just to decimate tourism industries… it could just destroy a whole year's worth of tourism (Operator – 10)

…[F] rom a comms point of view, this is our vision and we don't know whether it's right or not: Our vision is bank-to-bank carp just floating, you can't see any river. That's the vision that already everyone has, because they're saying the volume in there is enormous. So national media are going to go nuts over that. That'll be the first thing that'll go out, and no one will want to go near any of it. (RTO – 1)

[W]hat we experienced during the millennium drought... People ringing up saying… You don't have any water in the river, how are we going to move our houseboat…. We maintained pool levels here the whole time…But people weren't aware of that because the media perception was that the river's dry, there's not water in the river. Until today, people would say, "I didn't realise there was any water in the river still. I thought it was dead". Yeah and then we had the high river in 2010, 2010/2011, then all of a sudden there was a flood watch on the ABC news for the Murray River. At the end of every single ABC news broadcast there was a flood

watch for the Murray River. Well the Murray River is 2,500 kilometres long. So the impact that had on tourism was massive. (Operator – 7)

Responding effectively to ongoing media coverage requires ongoing resourcing of effective marketing and communication strategies.

BEYOND COMMUNICATION: OTHER ACTIONS TO ADDRESS IMPACTS

While resourcing a comprehensive marketing and communications strategy was the principle action discussed by many, some interview participants also identified other actions that had potential to reduce short-term negative impacts of virus release on tourism businesses. These included:

- Providing business opportunities related to implementation of the Plan, for example opportunities to provide accommodation to those engaged in clean-up, or opportunities for some businesses to directly participate in monitoring or clean-up,
- Providing coordinators who can assist businesses in accessing available forms of support if they experience negative impacts
- Consideration of providing financial support such as low interest loans or grants to support businesses to cope with downturn in visitation over the short-term, particularly if there are unanticipated impacts that cannot be prepared for in advance and result in businesses having to refund tourists for cancelled experiences

When we had prolonged drought conditions, it was probably about 10 years ago now … there was plenty of water in the river for recreation. … you could still have the experience that you'd had before, you just had to be a little bit more careful. So, what our government said, "We understand that there is that negative perception. We're going to invest money in marketing and promotion, that you can still have a good experience, but also we're going to help you with infrastructure and let's consider this time, that's a period of reflection and development, rather than growth." … So there are ways the government can support businesses in a down period. (LGA -3)

I suppose what we're looking at is what sort of compensation do we get for our business and operating under those conditions? There are natural things, like floods and to a certain extent blackwater algae and black water. We have all those things [to] contend with within our business year to year. We don't need more thrown at us. We've had some particularly hard years in the past years with blackwater, flood events with blue green algae here over the summer warmer months, making the water almost unusable. (Operator -6)

The types of support needed depended on the nature of the impacts experienced, and their duration:

… when we've had blue green algae blooms, when we've had black water events … Most of those events would last between one and two weeks. And then things go back to normal. And everyone survived. And, there was nothing special put in place, in relation to tourism or in relation to supporting people who were financially affected by that sort of thing. Because it was only two weeks it wasn't so bad. If this carp control program is able to basically clean the fish out of the weir pool in two weeks, everything will probably be all right. (LGA -4)

OPPORTUNITIES FOR INCREASE IN VISITATION IF AMENITY IMPROVES

Longer term, many in the tourism sector felt that reducing carp control numbers could contribute to improved environmental amenity, which in turn could support growth in visitation to inland freshwater areas, and hence assist in growing the tourism industry. Additionally, some felt that there were positive opportunities in promoting the ability of visitors to observe or actively support recovery of ecosystems over time, through engaging in projects that seek to support environmental recovery after a reduction in carp populations. This was viewed as a potential opportunity for marketing and tourism promotions, particularly around two potential amenity improvements: clearer water, and increases in populations of native fish.

These positive impacts would be realised only if reduced carp numbers contributed to achieving improvements in environmental amenity. Some raised concerns about designing campaigns too early and setting up expectations amongst tourism operators and visitors of greatly increased visitor experiences that may take a long time to eventuate after carp control is implemented. Improvement in environmental health and overall amenity is likely to take many years where it does occur:

I think the river clarity is something that could benefit… so that'll be interesting if we could get a little bit of insight into that. Because if it was clear, I think that could have opportunities to enhance [tourism]. (RTO – 1)

I think it's [i.e. the Plan] fantastic. I think of what the Murray River would be like if we had the fishing that somewhere like Darwin would attract people to without crocodiles. It would be a tourism mecca for fishing and for boating and all of that. (Operator – 7)

From my perspective, this can go in two directions. It can have a really positive impact on recreational fishing and tourism fishing … if it's done well … But if the virus is released and the removal isn't particularly effective, and we don't see the restoration of the river, the health of the river, the health of the native fish, all that we'll be left with...we'll still be left with carp, as we know their numbers are going to come back, based on the current data, perhaps 30, 40 per cent of the current population anyway. (Operator – 11)

In some interviews, questions were asked about whether some aspects of ecological recovery, particularly recovery of native fish species, could be 'sped up' through investments in actions such as stocking with native fingerlings. This was viewed as one way the Plan could be designed to 'bring forward' potential benefits for the tourism industry, as well as to reduce potential for negative outcomes such as emergence of other pest species to 'fill the gap' left by carp. Overall, there was a desire for greater clarity about the likely timeframes in which positive outcomes might be achieved, to better enable forward planning for the tourism industry, and design of any tourism campaigns focused around supporting ecological recovery.

BROADER REGIONAL ECONOMIC IMPACTS

In several interviews, participants identified potential economic impacts of carp control beyond the tourism industry. It was identified that for many regions with high dependence on tourism, any impacts in tourism resulting from the Plan would have potentially large flow-on impacts on regional economies:

> *I think we need to consider the broader impact on the economy, not just tourism. As an example, if visitation drops as a result of the carp virus, if that happens, it's not just the direct impact on the businesses or the tour operators, the houseboat operators, the caravan parks, but it's all of the services within town. All of a sudden, the petrol station's not selling as much ice, and they're not doing the fuel for the boats. The local supermarket, the local pub, the local café. There's a really strong flow-on effect to the whole community, particularly in places…[where] tourism would be their biggest industry… (RTO – 2)*

> *A lot of local businesses serve as providers, pubs and bakeries. They pretty much rely on tourism … a lot of little towns along the river certainly rely on these people buying their bits and pieces and going to the pub and having a meal. As for the mechanics and the service people and the cleaners and all that stuff, it spreads out fairly wide … The potential is quite large that it's going to impact tourism. Not only houseboat owners, but the marina managers, the cleaners, the service people, the local economy. It spreads right the way through. (Peak – 1)*

As noted earlier in this report, many of the 58 regional local government areas with moderate to high carp densities identified have a higher than average proportion of jobs dependent on tourism. There are therefore multiple LGAs in areas affected by carp invasion in which a relatively high proportion of jobs depend on the tourism industry. While not all of these tourism jobs rely on activities related to freshwater or estuaries, in many a high proportion of tourism focuses on activities occurring on or near major rivers and dams. This includes not only the iconic houseboat industry along the Murray River, but also many kayaking, canoeing, fishing and camping based activities in a wider range of areas that typically involve water-based activities or spending time adjacent to freshwater areas.

This does suggest potential for any impact to tourism businesses to have broader impacts on the local economy. This type of flow-on impact affecting the broader community is most likely to occur if either i) longer term negative impacts are experienced, or ii) impacts resulting from carp control occur at a time when other stresses are already affecting the tourism industry, such as drought. To reduce potential for broader impacts on communities, emphasis should be on reducing the severity and length of impacts to visitation, particularly through effective marketing and communication strategies.

8. BROADER QUESTIONS ABOUT THE PLAN

Interviewees raised several broader questions about the Plan and its potential impacts, which did not always specifically relate to the tourism industry

While interview discussions typically focused on potential impacts of virus release, several interviewees specifically emphasised the importance of the Plan including a number of coordinated actions to control carp, rather than relying solely on the virus to control carp. Having multiple complementary strategies was considered essential by many:

> *I fully understand carp are a big problem … I've seen trials like that where the water was actually quite clear after they've got rid of them. I feel there's probably more opportunity commercially with electro-fishing or fish trapping and things like that to try and eliminate [carp] … The sterilization, if that was possible … there needs to be more studies, and a more environmentally friendly way to get rid of them. (Operator – 6)*

Several wanted more information on the likely effectiveness of the virus for reducing carp populations, and likely rate of build up of resistance to the virus amongst remaining carp populations:

> *…I wonder, because the issue is always raised with rabbits, there needs to be other follow up in place, because whenever you release a virus it loses effect over time. I haven't actually heard anything about any other methods being used to back-up the virus. I don't know if there are any practical ones, there just may not be, but I'm just wondering if that's really being considered? I heard there used to be built into every weir or each lock a way of catching carp for the ones that were operating…and they were pulling out a tonne a day. (Operator – 10)*

Some asked questions about ecological response to reduction of the carp population, with concern that carp had become part of the system and their removal could have unexpected and potentially adverse effects:

> *…we have the question of the carp now being part of the system. The carp is also food for waterbirds, predators. When the carp disappear, what will happen [to[all these waterbird populations? We also have also a couple of other invasive species in the river, like the Redfin Perch, which is a predator. And the Redfin feeds on baby carps, so once the carp is gone, what will the Redfin feed on? Probably more on to native fish. So you have all these … domino effects, that the National Carp Control Plan need also to communicate on. (Operator - 9)*

9. FURTHER ASSESSMENT

The first edition of this report identified key needs for further assessment, with a particular focus on addressing impacts being experienced during plan development. Some of the recommended actions were implemented during 2019 as part of the final stages of the NCCP, namely:

- Increased communication of emerging research findings from the Plan, through newsletters from FRDC.
- Opportunity for stakeholders to respond to emerging findings through commenting on discussion papers on the Bang the Table app, and attending the stakeholder workshop in June.
- Survey of tourism businesses to better identify vulnerability to changes in visitation related to negative water events, the results of which were included in this second edition of the report.
- Assessment of consumer perceptions and potential responses to virus release. This was done through the survey of community attitudes described previously, the results of which were included in this second edition of the report.

Other actions recommended in the Stage 1 report are more operational actions, recommended to be implemented once a decision is made about the nature of future carp control actions. These include:

- collaboratively working with the tourism industry to identify resources needed for appropriate communication strategies before, during and after the implementation of carp control actions
- establishing specific criteria for identifying areas to be prioritised for clean-up, which include criteria relating to value for tourism, and
- Identification of potential for tourism businesses to be involved in or benefit from activities such as clean-up.

10. RECOMMENDATIONS

Based on the assessment in this report, the following actions should be considered as part of future carp control strategy development and implementation, in order to reduce potential for negative impacts on the tourism sector, and increasing potential positive impacts:

- Provide clear advice on the likely timelines for future decision making about carp control and timing of implementation of carp control actions. This enables tourism businesses to better plan for the future, including assessing whether they should make business investments they are currently planning. Associated with this, providing regular updates on progress of decision making processes is important to improve levels of certainty and support ability to make business decisions.
- Ensure tourism industry representatives are actively involved in each local area in determining priorities for clean-up to reduce potential impacts on tourism businesses.
- Ensure carp control investment includes sufficient investment in high-quality, proactive and well-coordinated communication to the public, including to tourists, that actively involves the tourism industry. Ensure communications are clear and do not create negative perceptions that reduce visitation to areas not affected by issues such as fish kills or water quality problems.
- Invest in communication to ensure tourists are aware when an area has recovered after an impact on amenity, and to clearly communicate risk of low amenity for a future booking.
- Support tourism industry to develop approaches to building confidence in tourism bookings, such as implementing refund schemes if an area is affected by a fish kill when a visitor planned to visit.
- Invest in citizen involvement in actions to improve environmental health after virus release, with these programs supporting recovery of visitation if a decline occurs related to virus release, and more generally supporting visitation and awareness of the regions as tourism destinations.
- Actively track impacts on tourism visitation and identify areas where short-term impacts from virus release are adding to other existing negative impacts. Consider provision of support in these areas.
- Coordinate carp control actions with investments in environmental recovery being made by others, and ensure appropriate investment in achieving improved environmental health. This is important as positive impacts on the tourism industry are dependent on whether carp control leads to improved environmental health and amenity over the longer term.
- Ensure clean-up activities source accommodation, food and other resources from local businesses where possible to offset some effects of downturn in visitation.

- If long-term reduction in visitation occurs, consider providing active support for affected tourism businesses.

11. REFERENCES

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APPENDIX 1: CHARACTERISTICS OF INDUSTRY SURVEY RESPONDENTS

This Appendix provides further detail on the characteristics of those who participated in the survey of tourism businesses. Table A1.1 summarises key characteristics in terms of gender, age and formal educational attainment of responses, and the revenue reported for their business by those who chose to answer the question on the survey about business gross revenue.

Table A1.1: Survey respondents background

Variable	Categories	Sample size (n)	Total number of respondents	% respondents
Gender	Male	45	30	67%
	Female		15	33%
Age	Aged 18-29	44	-	0%
	Aged 30-39		5	11%
	Aged 40-49		7	16%
	Aged 50-59		16	36%
	Aged 60 - 69		10	23%
	Aged 70 or older		6	14%
Education background	Secondary schooling (year 12)	43	20	47%
	Tertiary diploma or certificate (TAFE)	45	23	51%
	Tertiary degree (University)	45	21	47%
Gross revenue	Nil	33	1	3%
	<50,000		5	15%
	$50,000-$99,999		6	18%
	$100,000-$199,999		4	12%
	$200,000-$299,999		-	0%
	$300,000-$399,999		3	9%
	$400,000-$499,999		-	0%
	$500,000-$749,999		3	9%
	$750,000-$999,999		2	6%
	$1 million to $1.99 million		4	12%
	$2 million or more		5	15%

The respondents to the survey had a range of roles and included tourist business owners (64%) and non-business owners across the roles of business manager (10%), operations manager (16%), administration, finance or marketing roles (15%) and there was one respondent who identified as having a 'volunteer' role in a tourist operation (Table A1.2). The respondents indicated they have extensive experience in the tourist industry (Table A1.2), which 65% having 10 or more years experience in the industry, and of these 44% had 20 years or more experience in the industry. However, there was a few respondents who indicated they have fairly recently entered the industry (7 respondents have 2 or less years experience in the industry).

Table A1.2: Survey respondent roles and tourist industry experience

Variable	Categories	Sample size (n)	Total number of respondents	% respondents
Role of respondents	Business owner	67	43	64%
	Non business owner roles			
	Business manager		7	10%
	Operations manager		11	16%
	Administration, finance or marketing		10	15%
	Other role (volunteer)		1	1%

Years of experience in tourism		67	**Years in tourism sector**		**Years in current role**	
			Number of respondents	% of respondents	Number of respondents	% of respondents
	Less than one year		1	1%	1	1%
	1 - 2 years		6	9%	9	13%
	3 - 4 years		9	13%	14	21%
	5 - 9 years		9	13%	15	22%
	10-14 years		10	15%	9	13%
	15-19 years		4	6%	9	13%
	20-24 years		13	19%	5	7%
	25+ years		17	25%	5	7%

Survey respondents were involved in the delivery of tourism services across each of main tourism services categories included in the survey, many of whom provided more than one of these services (Table A1.3). Three respondents provided other services.

Table A1.3: Tourism services represented

	Number of respondents represented (n=67)	% of respondents
Accommodation	28	42%
Tour Guide	24	36%
House Boats	16	24%
Special Attraction	16	24%
Special Events	15	22%
Equipment hire or retail	14	21%
Food & Wine	13	19%
Chartered boat tours	11	16%
Visitor Services (i.e. bookings)	6	9%
Arts/Heritage	4	6%
Transport	3	4%
Golf	1	1%
Other	3	4%

Just over half of the respondents who provided information about their services (52%) indicated they are involved in a tourist business or organization that provides 2 or more tourism services (Table A1.4).

Table A1.4 Number of tourism services provided

Number of tourism services	Number of respondents represented (n=67)	% of respondents
Single service	32	48%
2 Services	15	22%
3 Services	11	16%
4 Services	4	6%
5 Services	2	3%
6 Services	4	6%
9 Services	1	1%

Most of the respondents were involved in a tourist business or organization that was administered or operated in South Australia (42% and 46%), New South Wales (29% and 36%) or Victoria (26% and 35%) (Table A1.5). There were a small number of respondents involved with businesses or organisations administered or operated in the Australian Capital Territory (4 and 6 respondents), Queensland (1 and 2 respondents), Northern Territory (0 and 2), and Tasmania (0 and 2). There were no businesses or operators for Western Australia. This spatial distribution is consistent with the sampling effort and numbers of tourist operators in areas affected by carp invasion.

Table A1.5: Location of business administration and operations

State location	Main office (n=69)		Operations (n=69)	
	Number of respondents	% of respondents	Number of respondents	% of respondents
South Australia	29	42%	32	46%
New South Wales	20	29%	25	36%
Victoria	18	26%	24	35%
Australian Capital territory	4	6%	6	9%
Queensland	1	1%	2	3%
Tasmania	0	-	2	3%
Northern Territory	0	-	2	3%
Western Australia	0	-	0	-

The majority of respondents (84%) indicated they operated in only one location, but several (11) provided tourism services over multiple locations (Table A1.6).

Table A1.6: Number of locations business operated in

Number of operation locations	Number of respondents (n=69)	% respondents
1 only	58	84%
2 locations	5	7%
3 Locations	4	6%
6 Locations	1	1%
7 Locations	1	1%

NATIONAL CARP CONTROL PLAN

The National Carp Control Plan is managed by the
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