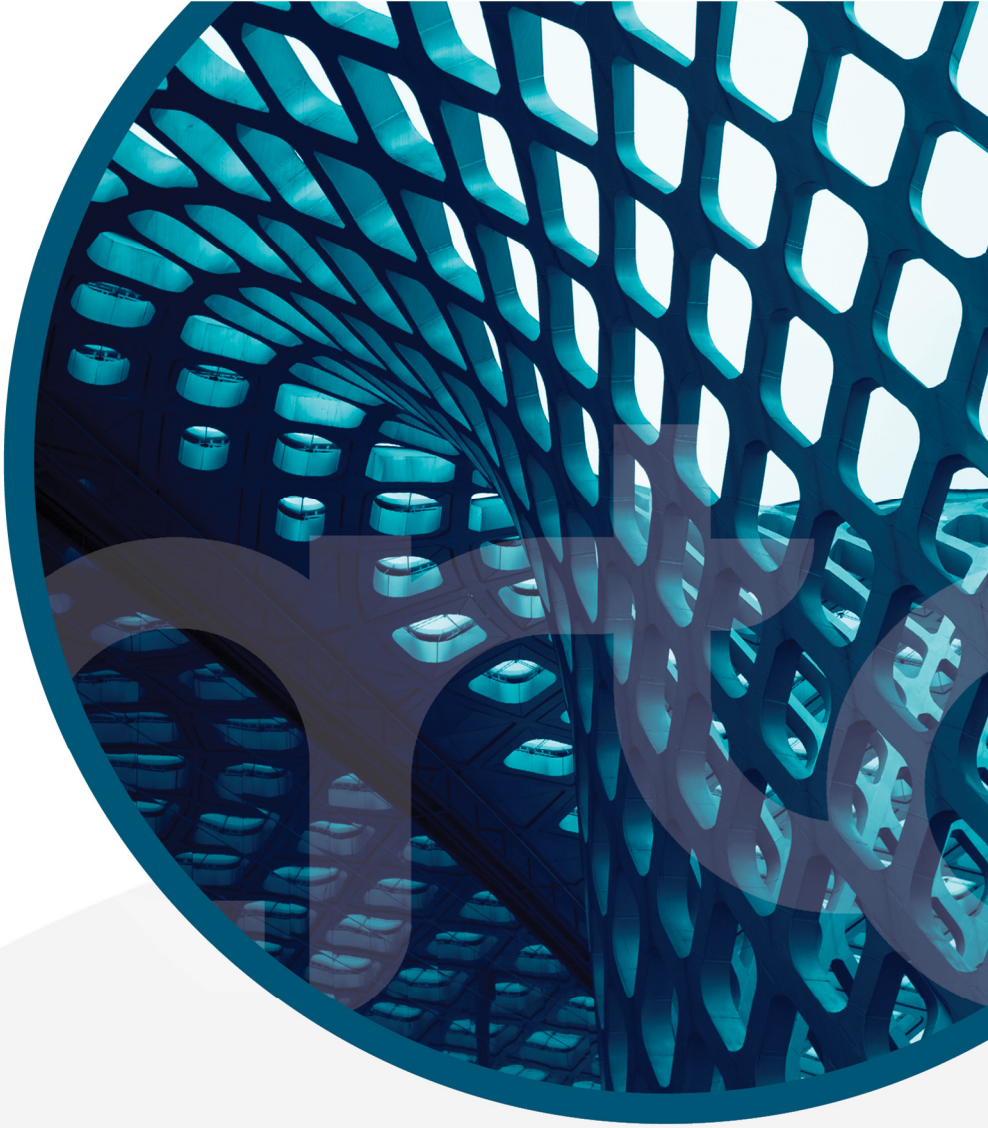

LITTLE ANGLER KITS ECONOMIC EVALUATION

VICTORIAN FISHERIES AUTHORITY

FINAL REPORT

2ND APRIL 2024

www.artd.com.au

ACKNOWLEDGMENTS

This work was completed with the assistance of Chris S Padovani from the Victorian Fisheries Authority. We would also like to thank Lachlan Jones for facilitating the engagement.

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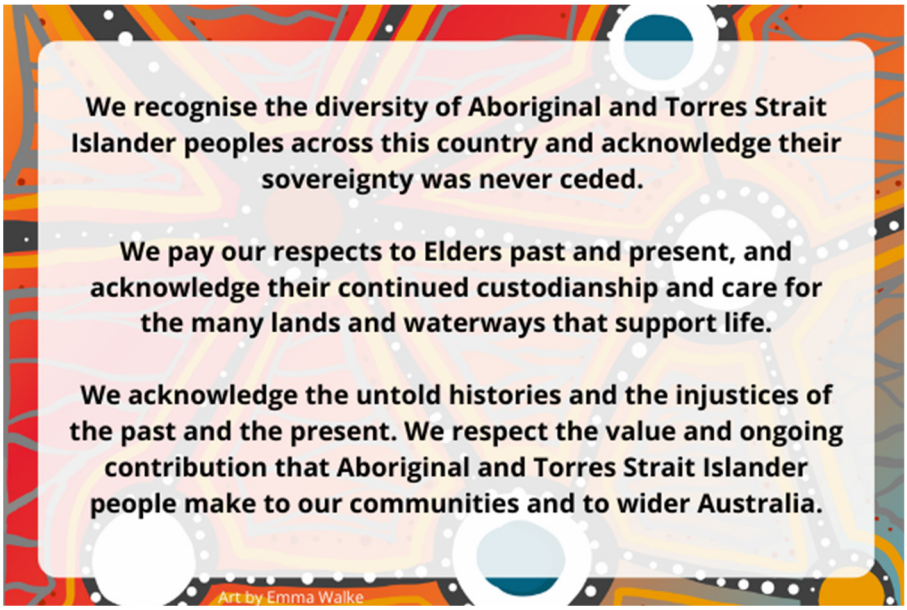

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EXECUTIVE SUMMARY

The Little Angler Kits initiative was designed to introduce primary school-aged children in Victoria to recreational fishing. It offered Grade 5 students—across government, Catholic, independent, language, and specialist schools, including those who are homeschooled—the chance to receive a free fishing kit. The overarching goal of the initiative was to increase recreational fishing participation among children, offering them an activity that connects them with marine life and the natural environment, while also addressing cost of living concerns by providing an enjoyable activity for families.

The Victorian Fisheries Authority (VFA) seeks to understand the economic benefit of this initiative. Various modelling options were considered, and a decision was made to estimate the economic contribution using an input output (IO) modelling approach. VFA has historically utilised this approach to estimate the economic contribution of recreational fishing and boating to Victoria. The consistency in methodology ensures results from this study are comparable with other assessments conducted by the VFA.

The IO model, a quantitative economic tool, maps the interdependencies between different economic sectors, showing how spending in one area can amplify output, value added, and employment across the economy. These effects are quantified through multipliers derived from IO tables, which detail industry interconnections. The measures of economic contribution—output, value added, and employment—indicate the initiative's effects on sales, Gross State Product (GSP), and job creation, respectively.

Our modelling finds that the initiative is projected to increase total output by $8.162 million, boost Victoria's GSP by $3.907 million, and create 30 new jobs. This means additional economic activity that is 5.44 times the initial expenditure of $1.5 million. The analysis is based on assumptions regarding kit distribution, uptake rate, fishing trip expenditures, demand elasticity, and adjustments for family configurations and inflation. A detailed account of the assumptions made can be found in the report in Appendix 2. Beyond economic metrics, the initiative has the potential to enhance children's nature engagement, social skills, and environmental consciousness. Feedback from stakeholders corroborates literature on recreational fishing's benefits, signalling positive impacts on health, well-being, and educational experiences.

The main takeaways from this report are as follows:

- The Little Angler Kits initiative has the potential to significantly benefit Victoria's economy.
- It may offer social advantages, including improvements in physical and mental health, promotion of environmental stewardship, community bonding, and social inclusion.
- Ex-post analysis is needed to validate the projections relating to economic contributions.
- This evaluation does not contrast the effectiveness of the Little Angler Kits with other recreational fishing promotion methods. Decisions on scaling should consider the broader impact and alternative investment opportunities within the recreational fishing sector.

1. CONTEXT AND INTRODUCTION

This report presents the economic evaluation of the Little Anglers Kits initiative of the Victorian Government. Under this initiative, the Victorian Government invested $1.5 million from the Recreational Fishing Licence Trust Fund to provide 95,000 Little Angler Kits to primary school aged children in Victoria.[1]

The initiative was designed to introduce primary school-aged children in Victoria to recreational fishing during school holidays. It offered Grade 5 students—across government, Catholic, independent, language, and specialist schools, including those who are homeschooled—the chance to receive a free fishing kit. The selection of Grade 5 students aligned with the Victorian Curriculum's emphasis on movement, motor development, and safety. The initiative was a collaborative effort between the Victorian Fisheries Authority (VFA) and the Department of Education, ensuring a broad and inclusive distribution of the kits, which began rolling out in late 2023 and concluded in early February 2024. Each kit contained a fishing rod, reel with line, tackle tray, some tackle, and instructional material on fishing techniques.

Additionally, the VFA developed an online Little Angler hub, providing further resources, instructional videos, and information on fishing locations, supplemented by resources from Fishcare and new content specific to the initiative. The overarching goal of the initiative was to increase recreational fishing participation among children, offering them an engaging activity that connects them with marine life and the natural environment, while also addressing cost of living concerns by providing a free, enjoyable activity for families.

This report presents the results of an ex-ante economic model that predicts how the distribution of free fishing kits to Grade 5 students across Victoria is likely to influence the state's economy. It uses three main economic indicators:

- Output (a measure of turnover or economic activity)
- Value added, the net economic value after deducting input costs (Gross State Product)
- Employment (the number of jobs created).

The analysis was performed through desktop research and is complemented by evidence from a rapid literature review.

[1] As advised by VFA.

The rest of the report is organised as follows.

Section 2 presents the results of our economic model, which demonstrates the contribution of this initiative towards increase in economic activity, value added and jobs. The section offers information on the efficacy of this initiative as a demand stimulus.

- The methodology applied in the economic evaluation and the assumptions underpinning the analysis are presented in Appendices 1 and 2 of the report, respectively.

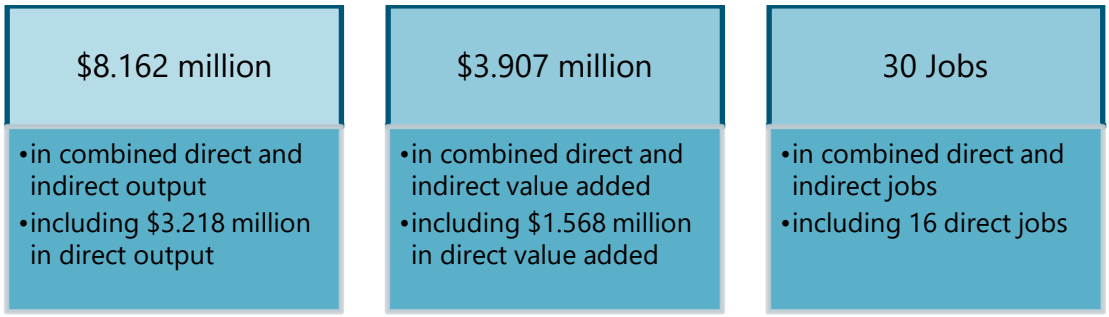
Section 3 presents the qualitative benefits of recreational fishing.

Section 4 concludes the report, summarising the main findings from the economic evaluation and qualitative analysis.

2. ECONOMIC CONTRIBUTION ANALYSIS

The Little Anglers Kits initiative has the potential to generate an economic contribution to the Victorian economy. Our ex-ante model predicts that the initiative could generate additional expenditure of $8.162 million over the next 12 months, which is 5.44 times the initial $1.5 million expenditure. This implies a $3.907 million boost to Victoria's Gross State Product and an addition of 30 jobs, factoring in supply-chain and consumption effects. Our model also finds that the Little Anglers Kits initiative will likely generate economic contributions that are greater in magnitude relative to an average tourism initiative involving the same level of initial expenditure.

FIGURE 1. RESULTS IN A SNAPSHOT



For the purposes of this report, economic contribution is defined as the gross changes in a region's existing economy that can be attributed to a given industry, event, or policy, in this case to the free Little Angler Kits for Grade 5 students. The results of the economic contribution analysis of the Little Angler Kits initiative are presented below:

TABLE 1. PREDICTED ECONOMIC CONTRIBUTION OF THE LITTLE ANGLER KITS INITIATIVE OVER THE NEXT 12 MONTHS*

Measure	**Direct Effect**	**Supply-Chain Effect**	**Consumption Effect**	**Total Effect**
Output ($M)	$3.218	$2.247	$2.697	$8.162
Value-added ($M)	$1.568	$0.974	$1.366	$3.907
Employment (Jobs)	16	6	8	30

*Detailed assumptions underpinning this analysis are presented in Appendix 2.

- **Direct effects** are the immediate economic activities generated by the initial spending. In the case of the Little Angler Kits initiative, this is reflected in an output increase of $3.218 million, 16 new jobs and an addition of $1.568 million in value to the Gross State Product (GSP) of Victoria. This boost represents the immediate economic activities involved in distributing and a subset of recipients using the angler kits.

- **Supply-chain effects** stem from the additional economic activity generated as the initial suppliers purchase goods and services from other local businesses. This secondary layer of spending contributes further to the economy with an increase in output valued at $2.247 million, creating an additional 6 jobs and enhancing value-added by $0.974 million. These effects highlight the broader economic benefits as the initiative's spending ripples through the supply chain.

- **Consumption effects**, or induced effects, occur when employees in the direct and indirect sectors spend their incomes on goods and services within the local economy. This spending stimulates further economic activity. For the Little Angler Kits initiative, the consumption effect translates into an additional $2.697 million in output, 8 more jobs, and a $1.366 million increase in value-added. This shows how the initiative's economic influence extends to increased consumer spending, further supporting local businesses and services.

Combining these effects, the total economic contribution of the Little Angler Kits initiative on Victoria's economy could be significant: an overall increase in output of $8.162 million, a total of 30 new jobs created, and a boost to the GSP of $3.907 million.

The supply-chain effects detailed in our analysis are quantified through Type 1 economic multipliers, as shown in Table 2 below. These multipliers provide insight into the initial investment's amplification effect on economic output, employment, and value-added.

TABLE 2. TYPE 1 MULTIPLIERS

Measure	Type 1 Multipliers
Output	1.698
Value-added	1.621
Employment	1.375

For every dollar invested in the Little Angler Kits initiative, the resulting supply-chain effects are quantified through Type 1 economic multipliers. The output multiplier of 1.698 demonstrates that each dollar of initial spending yields a $1.698 increase in overall economic output due to supply-chain activities. The employment multiplier of 1.375 means that for every job directly created by the initiative, an additional 0.375 jobs are generated within the supply chain, reflecting the employment opportunities stemming from the initiative's indirect economic activities. Lastly, the value-added multiplier of 1.621 signifies that for every dollar spent, an extra $1.621 in economic value is created in the supply chain. These Type 1

multipliers succinctly show how the initiative boosts the economy, not just through direct investment, but also via the resulting supply-chain interdependencies.

The economic stimulus of any initiative is manifested in direct and indirect effects. These, in turn, lead to more jobs, higher wages and salaries for employees, a portion of which is expected to be spent within the local economy, stimulating further economic activity. These outcomes are captured by the Type 2 economic multipliers (See, table 3), which consider the cumulative effect of direct, indirect (supply-chain), and induced (consumption) effects on the economy.

TABLE 3. TYPE 2 MULTIPLIERS

Measure	Type 2 Multipliers
Output	2.536
Value-added	2.492
Employment	1.875

Type 2 multipliers provide a comprehensive measure of the initiative's economic footprint. An output multiplier of 2.536 indicates that for each dollar invested in the scheme, there is a resultant $2.536 increase in the total economic output. The employment multiplier suggests that every direct job created by the initiative leads to nearly an additional 0.875 jobs elsewhere in the economy due to the induced spending effects. Furthermore, a value-added multiplier of 2.492 shows that each dollar of direct value added by the scheme results in a total of $2.492 in value-added across the broader economy, factoring in the extended economic activities stimulated by the additional wages.

Our model finds that the investment of $1.5 million into the Little Angler Kit Scheme has the potential to generate additional expenditure that is 5.44 times the initial expenditure. This translates to the possibility of 30 additional jobs, and a boot to the GSP to the tune of $3.907 million. This multiplier effect reflects that the initiative can be a source of sizeable economic stimulation.

Note, the methodology applied in the economic evaluation and the assumptions underpinning the analysis are presented in Appendices 1 and 2 of the report, respectively.

3. OTHER BENEFITS OF RECREATIONAL FISHING TO YOUNG CHILDREN

The benefits of recreational fishing for young children are well-documented in scholarly literature. The literature underscores the many advantages, including improved physical health, enhanced psychological well-being, and the development of social skills. Specifically, literature points to recreational fishing as a means to encourage outdoor activity, fostering a connection with nature that is increasingly rare in today's digital age. Moreover, the patience, discipline, and focus required for fishing are shown to contribute positively to a child's emotional and cognitive development. Socially, fishing offers unique opportunities for family bonding and community engagement, vital components in nurturing a child's sense of belonging and cooperation. In this section, we present our findings from a rapid literature review on the benefits of recreational fishing for young children.

Following the rapid review, we present some feedback received from schools, students, and parents in the initiative provided to us by the VFA. The inclusion of this data should not be used to infer that this report provides a mixed methods evaluation of the Little Angler Kits – it serves only to illustrate potential impacts that extend beyond those included in the economic modelling and that are consistent with what might be expected from the rapid literature review. We also present some potential drawbacks of the initiative based on feedback also provided by the VFA that should be considered as topics for any future evaluation.

3.1 RAPID LITERATURE REVIEW FINDINGS

Some of the main findings of the rapid literature review are listed below.

Physical engagement and well-being: Recreational fishing offers varying levels of physical engagement, making it accessible and beneficial to children of all abilities. Contrary to the common perception of fishing as a predominantly sedentary pursuit, the physical act of angling contributes positively to the physical well-being of young participants, fostering the development of healthy, active lifestyles from an early age (Brown, et al., 2012[2]; Moore et al., 2023[3]).

Mental and emotional well-being: Engaging in recreational fishing activities provides a serene escape from daily stresses, offering children a unique opportunity to connect with nature, practice mindfulness, and experience moments of tranquillity. This connection to the natural environment fosters a sense of peace and contentment, contributing significantly to emotional health. Participation in recreational fishing has been shown to reduce symptoms of anxiety and depression among children. The positive emotional states induced through

[2] Brown, A., Djohari, N., & Stolk, P. (2012). Angling and young people. In Fishing for Answers: Final Report of the Social and Community Benefits of Angling Project (Section 6). Substance. Retrieved from http://www.resources.anglingresearch.org.uk.

[3] Moore, A, Schirmer, J, Magnusson, A, Keller, K, Hinten, G, Galeano, D, Woodhams, J, Wright, D, Maloney, L, FRDC, ABARES, UC, 2023, National Social and Economic Survey of Recreational Fishers 2018-2021, February. CC BY 3.0

successful catches or even the act of fishing itself can boost self-esteem and confidence, providing a sense of accomplishment and pride (Brown et al., 2012; Moore et al., 2023).

Social inclusion: Recreational fishing as a group activity encourages social interaction and fosters a sense of belonging and community among participants. This social aspect of angling contributes to children's emotional well-being by creating opportunities for meaningful connections, shared experiences, and the development of friendships and supportive relationships. The camaraderie experienced during fishing trips can help combat feelings of isolation and loneliness, promoting a healthier and more inclusive social environment (Brown et al., 2012; McManus et al., 2011; Moore et al., 2023).

Developmental advantages: The social interactions and experiences inherent in fishing expeditions contribute significantly to the development of emotional intelligence. Children learn to navigate a range of emotions, from the excitement of a catch to the disappointment of an unsuccessful attempt, teaching them emotional resilience and the ability to cope with varying outcomes. Collaborating with peers and sharing fishing experiences also cultivate empathy, understanding, and respect for others' feelings and perspectives (Brown et al., 2012; Moore et al., 2023). Recreational fishing can provide skill development and knowledge of the natural environment, which can contribute positively to emotional health (National Angling Strategy 2019-2024, UK[4]).

Environmental stewardship: The act of fishing also offers children a unique perspective on the interdependence of ecosystems, encouraging the development of empathy towards living creatures and a deeper appreciation for the environment. This awareness can lead to a sense of responsibility for nature's welfare, promoting environmental stewardship from a young age. Children learn to respect wildlife and understand the significance of conservation, embedding these values as part of their emotional development (Brown et al., 2012; McManus et al., 2011; Moore et al., 2023).

Long-term effects - fostering a lifetime of healthy habits: Recreational fishing serves as an early life intervention that profoundly influences their future lifestyle choices. By engaging young minds in the art of fishing, the initiative introduces them to the benefits of outdoor physical activity, mindfulness, and environmental conservation. These experiences cultivate a deep-rooted appreciation for nature and personal well-being, encouraging a proactive approach to health, a commitment to environmental stewardship, and an enduring curiosity about the natural world. As these children grow, the habits and values instilled through recreational fishing are likely to guide their choices, ensuring they lead balanced, active, and environmentally conscious lives (Brown et al., 2012; Moore et al., 2023).

3.2 PRELIMINARY FEEDBACK ON THE ANGLER KIT INITIATIVE FROM SCHOOLS, STUDENTS, AND PARENTS

Some of these findings of the rapid literature review are echoed in the feedback VFA has received from schools, students, and parents and provided to us. A sample of the feedback comments is presented below, organised within distinct themes. These comments have been

[4] https://canalrivertrust.org.uk/media/original/40363-angling-for-good-national-angling-strategy-2019.pdf?v=f8c011

chosen to illustrate the diverse ways in which participants have benefitted from the Little Angler Kits initiative. These anecdotes are not exhaustive, nor do they constitute a rigorous qualitative assessment. Instead, they are upfront examples that bring to life the tangible impacts observed in the community.

Enhanced family and community engagement:

Many respondents shared stories of families embarking on fishing trips together, indicating the kits facilitated quality family time and stronger community bonds. This theme underscores the initiative's success in not just promoting recreational fishing but in strengthening family and community ties.

> *Just wanted to share this fabulous photo with you of one of our students who received his Little Angler Kit on Friday. He had his dad up at 5:30am on Sunday and they headed off to Mordialloc Pier. He was so excited to land this little snapper which he very happily released!*
>
> *We have had such a positive response from students and our families, all very excited to go fishing over the school holidays. This is a great initiative!*

Increased access to outdoor activities:

Feedback from schools and parents frequently mentioned the initiative's role in providing children, especially from low socio-economic backgrounds, with the means to engage in outdoor activities. Schools appreciated the initiative for offering students, who may not have had access to fishing equipment, the opportunity to explore fishing as a recreational activity. This theme highlights the initiative's effect on democratising access to nature and outdoor experiences.

> *On behalf of our Grade 6 students, we wanted to say a huge thank you for the wonderful Little Angler Kits. We have ecstatic Grade 6 students who are excited to head to the beach for a fish this weekend. With so many low socio-economic families, your generous gifts have bought a smile to many faces with many students stating that they do not have a fishing rod and can't wait to get out and fish! So once again, thank you so much. We really appreciate this initiative.*
>
> *Thank you so much for our recent shipment of Littler Angler Kits. These are a fantastic opportunity for our families of grade 5 students. Please keep us in mind for any further incentives as we see the difference it really does make at ground level, especially to engage families in outdoor activities.*

Educational, therapeutic benefits, and inclusivity:

Several responses highlighted the educational opportunities and therapeutic advantages offered by the initiative, especially for children with disabilities or those engaged in home education. Parents and schools noted the joy and learning outcomes derived from fishing activities, citing examples of students with learning differences expressing gratitude for the kits and the excitement of exploring fishing. This feedback emphasises the initiative's role not only in entertainment but also in contributing to educational and therapeutic experiences for children facing various challenges. Moreover, the initiative's inclusivity stands out as a

significant theme, with schools and parents appreciating the effort to make recreational fishing accessible to all children, regardless of their physical or learning abilities. The provision of fishing kits to a wide range of students, including those from low socio-economic backgrounds and children with disabilities, showcases the initiative's commitment to inclusivity. It highlights the VFA's and the government's dedication to supporting all children's development and engagement with nature.

> *My son has a disability and we started home educating this year, he has expressed an interest in trying fishing and I'm so thankful that you supplied him with a kit. We live near the river, and this is now a great activity to include in our week. I noticed all the fabulous resources you have on your website about how to use the kits as well that we could use.*

Promotion of recreational fishing among the young:

The initiative has evidently sparked or heightened interest in recreational fishing among young students, as evidenced by their excitement to use the kits and their successful fishing attempts. Stories of first-time fishers catching fish on their initial attempts and students eager to use their kits demonstrate the initiative's effectiveness in promoting recreational fishing among the youth.

> *Thank you for providing the year 5 students with a fishing kit. We live next to the Murray River at Wahgunyah, and I have never fished before, but my son got his kit today so after dinner we were off to give it a go. First cast and bang he had one, how incredible it was. We had no idea what we were doing but had a lot of fun doing it.*

Gratitude for government support:

A recurrent theme in the feedback was gratitude towards the Victorian Government and the VFA for funding and supporting the Little Angler initiative. Schools, parents, and educational associations expressed their appreciation for the initiative, recognising its value in providing recreational opportunities and supporting children's development.

> *I would like to thank the Victorian Government for supporting the Little Angler Kits initiative. All our Year 5 students have taken up the offer of the free fishing rod and tackle kits.*

3.3 CONCERNS ABOUT THE INITIATIVE

While the Little Angler Kit Scheme has been met with enthusiasm and positive feedback overall, some concerns have also been raised.[5] These are discussed below.

Animal welfare concerns: Understandably, concerns about animal welfare are relevant. But recreational fishing is a tradition embedded in Australia's culture for hundreds of years. It offers more than just an outdoor activity—it fosters a deep appreciation for nature and sustains cultural heritage. It is crucial to appreciate that the initiative promotes responsible

[5] As advised by VFA.

fishing practices among the younger generation, instilling respect for aquatic life and environmental stewardship from an early age.

Financial concerns: The suggestion that the cost of the Little Angler kits could be better allocated to other areas like roads or hospitals overlooks the fact that the initiative's funding source is the sale of recreational fishing licenses. This ensures that funds collected from the fishing community are reinvested into projects that directly enhance recreational fishing experiences, including educational and conservation efforts.

Environmental concerns, wastage of angler kits and possibility of junior fishers affecting wildlife: Addressing the concern that Little Angler Kits might contribute to landfill waste, it is essential to consider the program's design. The scheme offers an opt-out option so that kits reach only those families genuinely interested in using them. This approach reduces the potential for these items to become waste. The concern about novice junior fishers potentially harming birds and wildlife due to a lack of training or education is also a reasonable one. Educational materials and resources provided with the kits aim to educate new anglers about sustainable and respectful fishing practices. Such education is important in cultivating a generation of environmentally conscious fishers.

4. SUMMARY AND CONCLUSION

Funded by the Recreational Fishing License Trust Fund, the Victorian Government's Little Angler Kits initiative provided free fishing kits to Grade 5 children and all primary school children in specialist schools, aiming to introduce them to recreational fishing. This report (ex-ante) modelled the initiative's potential influence through an economic contribution analysis and presented some qualitative analysis to provide illustrative examples of the non-quantified effects of the initiative on the targeted population.

Economic contribution: our modelling revealed that the initiative could lead to a total output increase of $8.162 million, effectively boosting Victoria's GSP by $3.907 million and creating 30 new jobs. These estimates demonstrate a substantial return, indicating a resultant economic activity that is 5.44 times the initial funding of $1.5 million.

Other benefits: the initiative also has the potential for significant non-economic impacts, such as improving children's engagement with nature, social skills, and environmental awareness. Evaluation of the ex-post net benefit would require more time and more data on the reach, use and uptake of the kits as well as consideration of a wider range of benefits.

Key implications

1. **Economic effects:** the initiative could have a significant positive effect on the Victorian economy.

2. **Social benefits:** beyond economic gains, the initiative has the potential to enhance participant's physical and mental health, promote environmental stewardship, foster a sense of community, and enable social inclusion.

3. **Future evaluation:** an ex-post analysis of the initiative to confirm modelling estimates and/ or a mixed-methods evaluation that considers a wider range of benefits would provide a more detailed analysis of the value of the initiative.

4. **Comparison with alternatives:** while the model highlights the initiative's potential economic contribution, it does not compare this approach to other methods for promoting recreational fishing, such as events or educational programs. Future considerations for scaling should weigh the initiative's demonstrated impact against other potential investments in the recreational fishing sector.

APPENDIX 1: ECONOMIC CONTRIBUTION ASSESSMENT METHODOLOGY

The methodology[6] applied in this study is designed to provide a comprehensive analysis of the potential economic contribution of distributing free little angler kits to Grade 5 primary school students and all primary aged students at specialist schools in Victoria over the period December 2023 to February 2024. The methodology is summarised in Figure 2 and outlined below.

FIGURE 2. METHODOLOGY

STAGE 1: DEFINING SCOPE AND KEY MEASURES

Scope and Exclusions

This study provides an estimate of the economic contribution of the Little Anglers Kits initiative, which offers free fishing kits to Grade 5 children in Victoria. Distinguished from economic impact studies, this analysis does not venture into counterfactual scenarios—what might have happened in the absence of the initiative. Instead, it focuses squarely on the direct financial inputs and outputs associated with the initiative, capturing all market-related expenditures triggered by distributing the little angler kits.

Economic contribution studies, such as this one, aim to identify the "in-scope expenditures" directly related to the initiative. These encompass immediate spending required for acquiring and distributing the angler kits. The primary objective is to conduct a descriptive analysis that quantifies the initiative's influence in terms of output (or turnover), value added, and employment generation within Victoria. This approach offers a straightforward measure of the initiative's role in stimulating economic activity, without assessing broader economic changes that might be examined in an impact study, such as alternative uses of funds or the long-term growth potential.

To accurately estimate these contributions, we utilise an input-output (IO) modelling approach. An IO model examines the interdependencies within an economy, illustrating how spending in one area (the direct effects of the initiative) generates additional activity across other sectors (indirect and induced effects). It employs IO tables to trace how the initiative's expenditures

[6] The methodology, by design, mirrors the economic contribution analyses undertaken by EY for VFA (see, Ernst & Young (2020), The Economic Value of Recreational Fishing and Boating in Victoria, https://vfa.vic.gov.au/__data/assets/pdf_file/0004/629257/The-economic-value-of-recreational-fishing-in-Victoria-2020-Ernst-and-Young-Report.pdf).

ripple through the economy, affecting output, value added, and employment in a variety of industries.

By detailing these economic interactions, the IO model provides a view of the initiative's immediate economic footprint. It focuses on the direct, indirect, and induced effects stemming from the initial investment in the angler kits, without speculating on what economic activities might have occurred otherwise. This delineation allows us to present a clear view of the initiative's economic contribution, highlighting its immediate benefits to Victoria's economy without delving into counterfactual spending scenarios or broader economic impacts.

The study conservatively models the direct economic contribution of the initiative only for a 12-month period. This timeframe is selected to maintain a reasonable boundary for the analysis, as extending beyond 12 months would introduce too many assumptions and potential variables. This limitation ensures the study remains focused and provides a credible assessment of the initiative's economic contribution within a defined period. But to the extent, the initiative triggers a behavioural change, there would be long-term effects. Some kids, influenced by their initial exposure to fishing, will continue to engage in recreational fishing long-term. As some of these young anglers become regular adult participants in recreational fishing, their continuous investment in the sector through gear purchases, license fees, and fishing-related activities will contribute to the sector's financial health.

The angler kit can also be used by kids to fish on beaches, piers, and other water bodies without being part of a fishing trip. This will also create a small amount of economic stimulus, apart from creating positive social and well-being outcomes. These additional benefits are not included in the economic model.

By delineating the scope in this manner, the study narrows its focus to the tangible, direct economic contributions of the little angler kits initiative, providing a clear and measurable account of its significance within the larger framework of recreational fishing in Victoria. This targeted approach allows for a detailed examination of how distributing little angler kits to Grade 5 children for free influences market-related expenditures, acting as an economic stimulus for the region.

Key Measures

The study utilises three common indicators to assess the size or value of the industry:

1. Output: Represents the market value of goods and services produced, often measured by turnover or revenue. This measure is also referred to as "gross economic contribution.
2. Value added: Reflects the market value of goods and services produced after deducting the cost of goods and services utilised in the production process. For the Victorian regions, this equates to the GSP.
3. Employment: Indicates the number of jobs generated.

Each of these measures offers unique insights—output measures sales, value added assesses GSP contribution, and employment evaluates additional jobs generated by an initiative.

STAGE 2: REGION AND INITIATIVE BOUNDARY

Region

The project brief is to model the economic contribution of the initiative to the state of Victoria. Analysis at the sub-regional level has not been undertaken.

Initiative

VFA distributed Little Angler Kits to all Victorian primary and specialist schools for free unless schools opted out of the program. Grade 5 primary school students and all primary aged students at specialist schools, irrespective of their age, were offered a kit. The primary focus of this study is on assessing the economic contribution arising specifically from additional recreational fishing trips undertaken by children who were distributed these kits. It is crucial to emphasise that the analysis is centred on the incremental economic activities stimulated by the distribution of the Little Angler Kits. Consequently, recreational fishing activities by adults, as well as those by children who do not avail themselves of these kits, are beyond the boundary of this analysis. This delineation ensures that the study's findings accurately reflect the economic contributions directly attributable to the initiative, excluding broader recreational fishing expenditures that do not directly interact with the distribution of the Little Angler Kits.

STAGE 3: DESKTOP RESEARCH

The study was to be undertaken using desktop research. Specifically, this approach involved the integration of estimates or evidence base from various studies into the current analysis through processes such as secondary data analysis and meta-analyses. This method allows for the utilisation of results, such as participation numbers, demand elasticities, expenditures from one or more studies in a similar context to estimate values within the current study's context. This approach is particularly useful when primary data collection is not feasible, too expensive, or time-consuming, offering a viable alternative to generate informed estimates based on existing literature and studies.

In applying this approach, the following studies and data sources were utilised as foundational inputs:

Expenditures on fishing trips: Ernst & Young (2020)[7], Ernst & Young (2015)[8], Aither (2019)[9], National, state and territory-based social and economic survey of recreational fishers reports[10].

[7] Ernst & Young (2020), The economic value of recreational fishing and boating in Victoria https://vfa.vic.gov.au/__data/assets/pdf_file/0004/629257/The-economic-value-of-recreational-fishing-in-Victoria-2020-Ernst-and-Young-Report.pdf

[8] Ernst & Young (2015), Economic study of recreational fishing in Victoria https://media.vrfish.com.au/wp-content/uploads/2017/06/02181758/Economic-Study-of-Recreational-Fishing-in-Victoria_Final_06112015.pdf

[9] Aither (2019), Recreational fishing in the Snowy Monaro region: An assessment of trends, drivers, and economic benefit https://aither.com.au/wp-content/uploads/2019/11/Recreational-fishing-in-the-Snowy-Monaro-region.pdf

[10] https://www.frdc.com.au/about-recreational-fishing/nrfs

Demographic data on recreational fishers: Victorian Fisheries Authority (2017)[11], National, state and territory-based social and economic survey of recreational fishers reports[12]

Demand elasticities: Melstrom (2017)[13], Grilli, Landgraf, Curtis and Hynes (2017)[14], Economic Research Associates (2018)[15]

Effect of tourism related expenses on the rest of the state economy: REMPLAN Economy[16]

Family configurations: Census, Australian Bureau of Statistics[17]

STAGE 4: ECONOMIC MODELLING

In this stage, ARTD developed an economic model to analyse the data collected in Stage 3. The calculation and estimation methods applied in this study are outlined below.

Purpose of the model

The model aims to provide an ex-ante estimation of the economic contribution of distributing free Little Angler Kits to Grade 5 students in Victoria. Economic contribution, in this context, refers to the total market-related expenditures generated by the activity of recreational fishing as stimulated by these kits, and any flow-on effects. The model aims to provide a clear measure of the initiative's size and importance in terms of output, value added, and employment within the Victorian economy.

Model foundations

The applied model bases its analytical approach on input-output (IO) analysis. The IO analysis, as conceptualised in its theoretical form by Leontief (1985), is a quantitative economic technique that models the relationships between different sectors of an economy. It illustrates how the output from one sector can become an input to another, revealing the complex web of economic activities and their interdependencies. At the core of this methodology are the IO tables, which detail the supply and demand connections between industries within an economy. Multipliers, a pivotal component of the IO analysis, are derived from these tables. They quantify the ripple effects of initial expenditures across the economy, demonstrating how

[11] Victorian Fisheries Authority (2017). Victorian fishing analytics report https://vfa.vic.gov.au/__data/assets/pdf_file/0004/468103/Consolidated-Red-Fox-Report.pdf
[12] https://www.frdc.com.au/about-recreational-fishing/nrfs
[13] Melstrom, R. T. (2017). How do license prices affect participation in recreational fishing? Evidence from Pennsylvania. Human Dimensions of Wildlife, 23(3), 273-283. https://doi.org/10.1080/10871209.2017.1417516
[14] Grilli, G., Landgraf, G., Curtis, J., & Hynes, S. (2018). A travel cost evaluation of the benefits of two destination salmon rivers in Ireland. Journal of Outdoor Recreation and Tourism, 23, 1-7. https://doi.org/10.1016/j.jort.2018.02.004
[15] Economic Research Associates (2018). Economic dimension of recreational Fishing in Western Australia. Research report for the recreational fishing initiatives fund. https://recfishwest.org.au/wp-content/uploads/2019/03/Economic-Dimensions-of-Recreational-Fishing-in-Western-Australia-Report-2.pdf
[16] Information available at: https://www.remplan.com.au/
[17] https://www.abs.gov.au/census

spending in one area can lead to increased output, earnings, and employment in various other sectors.

The IO method has been identified as being relatively reliable[18] for tracing the multiplier effects of initial spending within an economy.[19] This methodology is often preferred over alternatives such as ad-hoc multipliers for its ability to operate within the broader general equilibrium framework and accommodate economic interdependencies between industries and regions.

Model construction

This section outlines the parameters of the economic model and details how the IO analysis was specifically applied to assess the flow-on economic effects of the Little Angler Kits initiative.

The economic model uses the estimates and data collected from various sources (as described in the previous section) to quantify the direct expenditures from the take-up of the free kits, and their subsequent ripple effects across the Victorian economy. The focus of the model is exclusively on transactions triggered by the increase in recreational fishing activities among Grade 5 students who received the free angler kits. This included expenditures related to fishing gear, bait, travel, and other related services that directly benefit sectors within Victoria.

The analysis was confined to the state of Victoria, ensuring that the economic contributions measured were relevant to the local context. A range of industries are incorporated into the model, reflecting the diverse economic interactions associated with recreational fishing. The industries considered in the model include but are not limited to:

- Fishing;
- Accommodation and food services;
- Transport;
- Manufacturing;
- Retail trade; and
- Rental services.

These sectors have been constructed within REMPLAN's IO tables allowing for a valid representation of the recreational fishing industry's economic footprint. Multipliers for this study were derived from the REMPLAN IO modelling software.[20] These multipliers enable the estimation of direct value added, employment, and the flow-on economic effects generated by

[18] See for example, Fletcher, J. E. (1989). Input-output analysis and tourism impact studies, Annals of Tourism Research,16, 514-529.
Fletcher, J.E. (1994). "Input-output analysis" in S.F. Witt & L. Moutinho, eds., Tourism Marketing and Management Handbook, 2nd ed., New York: Prentice Hall, pp. 480-484.
[19] We acknowledge that there are limitations to IO analysis, and these have also been observed by the Victorian Department of Treasury and Finance (DTF).
[20] REMPLAN Economy provides insights into the performance of key sectors in a region's economy. It is underpinned by the latest data from the Australian Bureau of Statistics. REMPLAN Economy delivers estimates of employment, output, wages & salaries, imports, exports and gross regional product for 114 industries. Information available at: https://www.remplan.com.au/

the Little Angler Kits initiative.

Limitations

The IO approach has critical limitations, which calls for a careful interpretation of the results. Some of the important limitations in the context of this study are observed below:

- Generally, when comparing the contribution of industries, it is standard practice (by statistical agencies such as the ABS) to focus solely on direct industry value added (i.e. without multipliers). The direct value added measure enables meaningful comparisons of industry size to be made between industries. While the use of multipliers will provide a wider contribution estimate of an industry, it will not consider substitution effects (i.e. impacts).
- IO analysis often assumes that households across all income levels have similar consumption patterns, which may not accurately reflect the diversity in spending behaviours.
- The approach assumes linear and homogenous production functions across industries, not accommodating potential substitutions among inputs or changes in production technology.
- IO analysis does not typically consider capacity constraints within industries, potentially overestimating the economic contributions of certain activities.
- While focusing on economic contributions, IO analysis might not fully capture the environmental, health, well-being, and cultural impacts of activities, which could be significant in the context of recreational fishing. In this instance, our model may be understating the gains from the initiative.
- Due to the comprehensive nature of the economic interdependency mapping, there's a risk of double counting certain economic activities, especially in sectors with overlapping services or products.

Notwithstanding these limitations, employing IO analysis in this project comes across a reasonable choice, as the VFA has historically utilised a similar approach to estimate the economic contribution of recreational fishing more broadly. The consistency in methodology ensures that the results from this study are comparable and in line with previous assessments conducted by the VFA. This alignment allows for a coherent evaluation of the economic contributions over time, facilitating an understanding of trends and effects within the recreational fishing sector in Victoria. Moreover, using a familiar modelling approach enhances the credibility and reliability of the findings, as it builds on established practices and leverages a methodological base that stakeholders are accustomed to. This comparability is crucial for informing policy decisions, guiding strategic initiatives, and benchmarking the economic significance of recreational fishing, including the specific contributions derived from distributing free Little Angler Kits.

APPENDIX 2: KEY ASSUMPTIONS UNDERPINNING THE EX-ANTE ESTIMATION

This appendix provides a detailed account of the assumptions made to derive the additional expenditure associated with the distribution of free Little Angler Kits to Grade 5 students in Victoria.

1. Demographic data on recreational fishers

- Total number of children participating in fishing: from the Victorian fishing analytics report, an estimated 233,932 children aged 5-12 participated in recreational fishing in 2017. Accounting for population growth in Victoria (9.73% between the 2016 and 2021 census), the number of primary school children participating in recreational fishing is revised upwards to 256,694.

- Estimation of Grade 5 participants: based on demographic proportions and school enrolment data, Grade 5 students are estimated to make up 14.54% of the primary school-aged population in Victoria. Given the revised total of 256,694 primary school children participating in recreational fishing (adjusted for population growth), applying the proportion of Grade 5 students (14.54%) results in an estimate of approximately 37,323 Grade 5 students engaging in recreational fishing across the state. This number represents the specific subset of recreational fishers who are in Grade 5 in Victoria.

2. Economic expenditures related to fishing trips

- Average expenditure per fishing trip: drawing from Ernst & Young (2020), we estimated the average expenditure per trip to be $279.53. This includes the following items of expenditure:

TABLE 4. AVERAGE EXPENDITURE PER ADULT FISHER PER TRIP

Expenditure Category	Total Average Expenditure Per Trip ($)
Tackle and equipment	28.26
Bait	19.59
Food & accommodation	62.11
Transport	43.69
Other	14.20
Boat hire	21.55
Fuel for boat	54.11
Clothing for fishing	9.63
Fishing club fees	1.87

Licensing costs	6.13
Camping gear	12.01
Other (annual)	6.38
Boating registration	NA
Boat maintenance	NA
Average expenditure per adult fisher per trip	279.53

- Notably, this is a conservative estimate and is lower than the estimate of expenditure reported in other studies, including Ernst and Young (2015, 2020) and Aither (2019). This means, if anything, the estimated economic contribution will be understated.

- Adjustments for inflation: expenditure figures were updated to $329.83 to reflect inflation adjustments (a factor 1.18 was applied in alignment with Consumer Price Index movements between 2019 and 2023).

3. Expenditure adjustments for family configurations

- Distribution of Grade 5 recreational fishers by family type: as per ABS data, there are 782,321 families of couples with children and 262,040 single-parent families. This means that couple families with children constitute approximately 74.91% of the total families and single-parent families constitute approximately 25.09% of the total families. The 37,323 students who are the population of recreational fishers studying Grade 5 in Victoria are apportioned to couple and single parent families in the 75: 25 ratio. This means that 27,959 students are assumed to belong to two-parent families and 9,364 students are assumed to belong to single parent families.

- Expenditure adjustments: the expenditure on Food & Accommodation and Clothing is adjusted differently for single-parent families versus two-parent families to reflect the varying costs associated with additional people participating in fishing trips.

    i. The total expenditure for a two-parent family on a fishing trip, including additional costs for food, accommodation, and clothing for both parents and two children, was calculated at approximately $510.50. This figure was derived considering the base expenditure of $329.83 for one adult, with additional food for the second adult at $31.06 (half of the food and accommodation cost), and then adding $31.06 for the accommodation and $62.11 for food for the two children. Clothing expenses for the second adult and the two children, at $9.63 each, total to $28.89, adjusted for inflation at 1.18, resulting in an additional $180.67. This additional cost, when added to the base expenditure, brings the total for a two-parent family to $510.50.

    ii. For a single-parent family, under similar considerations for one parent and 2 children, the total expenditure amounts to approximately $462.49. This calculation starts with the same base expenditure for the adult and incorporates the accommodation cost for the two children at $31.06 and their

food cost at $62.11. The clothing expense for the two children, also at $9.63 each, totals $19.26, with these additional costs adjusted for inflation resulting in $132.66. Adding this to the base, the total for a single-parent family reaches $462.49.

iii. Taking a weighted average of these expenditures, with an assumption that 75% of the families are two-parent families and 25% are single-parent families, the average expenditure across all family types is calculated to be approximately $498.50.

4. Elasticity of demand

- Price elasticity: the concept of price elasticity of demand was applied to estimate the percentage increase in fishing trips because of the initiative. An elasticity of -1.33 was assumed based on the findings in a relatively recent Western Australian study.[21] The estimate from this study was chosen as the study modelled the relationship between expenditure and the number of trips, which was our requirement as well. Having said that, comparable elasticities have been reported in other studies as well.[22]

- It is known that price is a constraining factor to undertaking fishing trips. In its 2015 report to VFA, Ernst and Young reported from their surveys that after lack of time, cost was the second most reported factor preventing increased participation in recreational fishing. The NRFS Stage 2 survey (2018-19)[23] also identified cost of fishing gear and equipment as an important barrier for engaging in recreational fishing. These findings support the assumption of greater elasticity of demand.

- Effective discount: the effective discount was calculated based on the cost of the angler kit relative to the total adjusted average expenditure per trip. The effective discount was 6.5%. (Market price of the angler kit, assumed to be $35, as a proportion of average expenditure per trip including the cost of the angler kit).

5. Calculating total additional expenditure

- **Additional trips**: at a price elasticity of -1.33, a 6.5% discount would result in an 8.65% increase in fishing trips. The population of Grade 5 fishers was estimated to be 37,323 students. This means that the population of Grade 5 fishers who would take to recreational fishing would increase to 40,551. This means an additional 3,228 recreational fishers from Grade 5 of Victorian schools. It is known that an average recreational fisher undertakes approximately 6 trips per year in Victoria (Ernst & Young, 2020). Taking a very conservative outlook, we assume that these new fishing families undertake two fishing trips a year. This implies 6,456 additional trips in a 12-month period. This calculation would the also be reasonable if the parent was not new

[21] Economic Research Associates (2018). Economic dimension of recreational Fishing in Western Australia. Research report for the recreational fishing initiatives fund.
[22] See, for examples, Melstrom, R. T. (2017). How do license prices affect participation in recreational fishing? Evidence from Pennsylvania. Human Dimensions of Wildlife, 23(3), 273-283. https://doi.org/10.1080/10871209.2017.1417516 and Grilli, G., Landgraf, G., Curtis, J., & Hynes, S. (2018). A travel cost evaluation of the benefits of two destination salmon rivers in Ireland. Journal of Outdoor Recreation and Tourism, 23, 1-7. https://doi.org/10.1016/j.jort.2018.02.004.
[23] https://www.frdc.com.au/project/2018-161

to the fishing experience and was simply more motivated to go fishing with the family given the primary schooler's enthusiasm of having a new angler kit and the associated peer influence.

- **Additional expenditure**: this is determined by multiplying the number of additional trips by the adjusted average expenditure per trip, yielding the total additional expenditure attributed to the initiative. This is approximately $3,218,316.