



**FRDC**

FISHERIES RESEARCH &  
DEVELOPMENT CORPORATION

FINAL REPORT

# **An Impact Assessment of Investment in FRDC Project 2017-145:**

**Pilot – Development of Seafood Nutritional Panels**

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## **An Impact Assessment of Investment in FRDC Project 2017-145: Pilot – Development of Seafood Nutritional Panels FRDC Project 2016-134**

2022

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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- Andrew Forrest, Senior Seafood Scientist, Agri-Science Queensland, Department of Agriculture and Fisheries

# Abbreviations

CBA	Cost-Benefit Analysis
CRRDC	Council of Rural Research and Development Corporations
DAF	Queensland Department of Agriculture and Fisheries
DAQ	Department of Agriculture Queensland
DAWR	Department of Agriculture and Water Resources
FRDC	Fisheries Research and Development Corporation
OCS	Office of the Chief Scientist
PCB	polychlorinated biphenyl
R&D	Research and Development
RD&E	Research, Development and Extension

# Executive Summary

Fisheries Research and Development (FRDC) Project 2017-145 was based on a need for additional nutritional information on a range of fish species; the rationale was that such additional information would assist seafood producers to meet the needs of consumers and improve the labelling of food to address the concerns of both consumers and regulators. FRDC had funded earlier projects that addressed oil analyses for over more than 250 Australian fish species. There was perceived a need to broaden these earlier analyses to include other nutritional elements.

A general consensus at the time was that eating one or two servings of fatty fish a week would reduce the chances of dying from heart disease and reduce the risk of stroke, depression and some other conditions. On the negative side, some fish species are known to be associated with potential risk factors including mercury, polychlorinated biphenyls (PCBs), dioxins and pesticide residues.

Selected commercially significant fish species were assembled from suppliers and samples (edible portions of each species) processed at the Department of Agriculture and Fisheries Queensland (DAF) laboratories. Data on each species were compiled.

Outputs from the project included:

- The development of a protocol that could be used to undertake the testing of species from across Australia.
- Nutritional profiles were delivered for 25 finfish species and 3 crustacean species.
- The additional profiling, along with existing data sets, meant that comprehensive profiles are now available for 41 wild-catch fish species.
- The report recommended that at least a further 80 species be profiled.

Outcomes from the project investment included:

- An increase in information was made available on which to base promotion of health benefits of seafood consumption.
- Additional information was then available to potentially offset/refute some negative media claims regarding fish, as well as assisting to overcome some technical market challenges; the nutritional information compiled provided transparency and clarity for the newly profiled species.
- The project contributed to product innovation and an increased utilisation of some wild-caught fish species; the availability of this information has potentially allowed a greater number of value-added products to be developed.
- Despite interest from DAF personnel, it is understood that no further progress has been made to date on a recommendation to undertake further species profiling.

Impacts of the project included:

- A potential contribution to increased consumer demand for fish due to an increased understanding of the health benefits of eating fish, a rebuttal of some negative claims in the media, and a potential increased utilisation of previously underutilised fish species; however, it was cautioned that the realisation of the identified impacts above will require a significant communication effort.
- A reasonable generalisation arising from the project is that all seafood is healthy food. All of the species assessed in the project are eligible for general level health claims on most nutrients determined in the analysis.

Total funding for the investment over the period 2018 to 2019 totalled \$345,115 in present value terms. The FRDC investment costs over the same period were \$214,157 in present value terms. Given the generalised outcomes and impacts from the project, no attempt was made to value any impacts from the investment such as the potential increase in consumer demand.

# Introduction

The Fisheries Research and Development Corporation (FRDC) required an annual series of impact assessments to be carried out on a sample of completed investments from the FRDC research, development, and extension (RD&E) portfolio. The assessments were required to meet the following FRDC evaluation reporting requirements:

- Reporting against the FRDC 2015-2020 RD&E Plan and the Evaluation Framework associated with FRDC's Statutory Funding Agreement with the Commonwealth Government.
- Annual Reporting to FRDC funding partners and other stakeholders.
- Reporting to the Council of Rural Research and Development Corporations (CRRDC).
- Reporting RD&E impact and performance to FRDC levy payers and other fisheries and aquaculture stakeholders as well as the broader Australian community.

In April 2017, FRDC commissioned Agtrans Pty Ltd (Agtrans) to undertake the annual impact assessments for RD&E projects funded under the FRDC 2015-2020 RD&E Plan and completed in the years ended 30 June 2016 to 2020 (FRDC Project 2016-134). Between 2016/17 and 2020/21, four series of annual impact assessments were completed. Each of the four series of assessments included a set of 20 randomly selected FRDC RD&E investments as well as an aggregate analysis across all 20 investments evaluated in each year. Published reports for the annual FRDC evaluations can be found at: <https://www.frdc.com.au/frdc-project-impact-assessments-benefits-research>.

The fifth and final series of impact assessments under Project 2016-134 was for a set of FRDC RD&E investments completed in the year ended 30 June 2020, the final year of the FRDC 2015-2020 RD&E Plan. As in previous years, the fifth series of impact assessments included 20 randomly selected FRDC RD&E investments. The 20 investments had a total value of approximately \$5.30 million (nominal FRDC investment) and were selected from an overall population of 81 FRDC investments worth an estimated \$17.66 million (nominal FRDC investment) where a final deliverable had been submitted in the 2019/20 financial year.

The 20 RD&E investments were selected through a stratified, random sampling process such that investments chosen spanned all five FRDC Programs (Environment, Industry, Communities, People and Adoption), represented approximately 30.0% of the total FRDC RD&E investment in the overall population (in nominal terms), and included a selection of small, medium, and large FRDC investments (total nominal FRDC investment of  $\leq$  \$50,000, \$50,001 to \$250,000, and  $>$  \$250,000 respectively).

Project 2017-145: *Pilot - Development of Seafood Nutritional Panels* was randomly selected as one of the 20 RD&E investments completed in 2019/20 for evaluation in the fifth series of annual impact assessments (2019/20 sample). The current report presents the Project 2017-145 analysis and findings.

# Method

The annual impact assessments of FRDC RD&E investments followed general evaluation guidelines that are now well entrenched within the Australian primary industry research sector including Research and Development Corporations, Cooperative Research Centres, State Departments of Agriculture, and some universities. The approach includes both qualitative and quantitative assessment components that are in accord with the current [guidelines for impact assessment](#) published by the CRRDC (CRRDC, 2018).

The evaluation process utilised an input to impact continuum RD&E project inputs (costs), objectives, activities, and outputs were briefly described and documented. Actual and expected outcomes, and any actual and/or potential future impacts (positive and/or negative) associated with project outcomes then were identified and described. The principal economic, environmental, and social impacts were then summarised in a triple bottom line framework and validated through consultation with expert personnel and review of published literature.

Once impacts were identified and validated, an assessment then was made about whether to quantify/value any of the impacts in monetary terms as part of the project-level analysis. The decision to value an impact identified was based on:

- Data availability and information necessary to form credible valuation assumptions,
- The complexity of the relevant valuation methods applicable given project resources,
- The likely magnitude of the impact and/or the expected relative value of the impact compared to other impacts identified, and
- The strength of the linkages between the RD&E investment and the impact identified.

Where one or more of the identified impacts were selected for valuation, the impact assessment used cost-benefit analysis (CBA) as a principal tool. The impacts valued therefore were deemed to represent the principal benefits delivered by the project investment. However, as not all impacts were valued (based on the selection criteria), the investment criteria estimated for the project investment evaluated are likely to represent an underestimate of the true performance of the FRDC project. No impacts were valued for Project 2017-145.

The qualitative and quantitative analysis processes, data sources, assumptions, specific valuation frameworks (where applicable), and evaluation results were clearly documented and then integrated into a written report.



# Project Background

## Background

FRDC had funded earlier projects that addressed oil analyses for over more than 250 Australian fish species. There was perceived a need to broaden these earlier analyses to include other nutritional elements.

A general consensus at the time was that eating one or two servings of fatty fish a week, reduces the chances of dying from heart disease; reduces the risk of stroke, depression and some other conditions. On the other hand, some fish species are known to be associated with potential risk factors including mercury, polychlorinated biphenyls (PCBs), dioxins and pesticide residues.

## Rationale for Project 2017-145

Project 2017-145 was based on a need for additional nutritional information on various seafood species to:

- a) Assist seafood producers to meet the needs of consumers
- b) Improve the labelling of food to address the concerns of both consumers and regulators

Some of the shortcomings of existing information that needed to be addressed included:

- a lack of information on the public health benefits of seafood,
- a lack of available information for countering negative media claims,
- addressing existing and anticipated future market challenge, and
- forming early responses to market access threats.

# Project Details

## Summary

Project Code: 2017-145
Title: <i>Pilot - Development of Seafood Nutritional Panels</i>
Research Organisation: Department of Agriculture and Fisheries Queensland (DAF)
Principal Investigator: Andrew Forrest, Department of Agriculture and Fisheries, Queensland
Period of Funding: February 2018 to April 2019
FRDC Program Allocation: Industry 100%

## Objectives

The project had a single objective:

1. Create nutritional panels for a minimum of 25 seafood species where none currently exist.

## Logical Framework

Table 1 provides a description of the project in a logical framework developed for the evaluation.

Table 1: Logical Framework for FRDC Project 2017-145

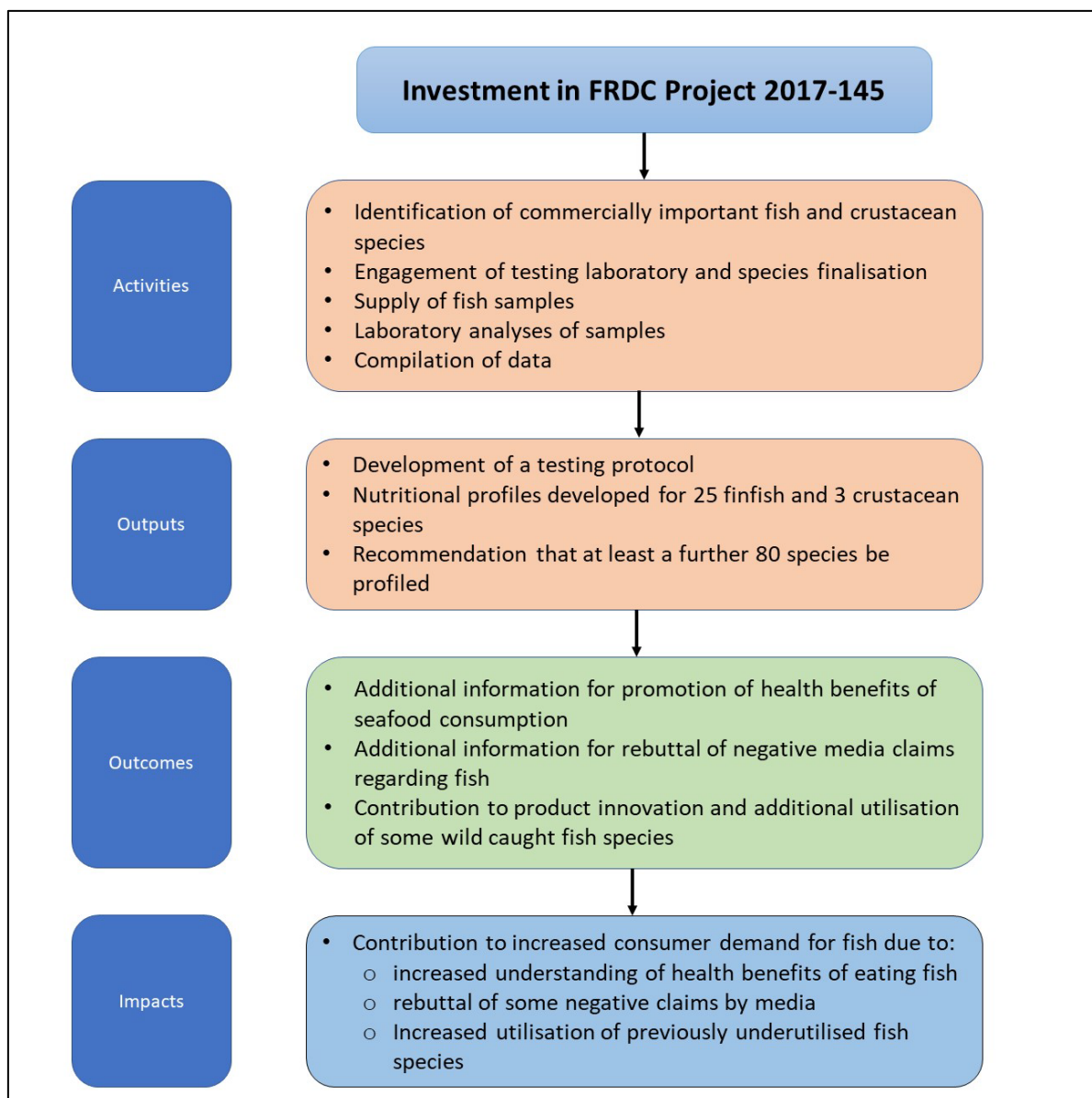
Activities	<p><i>Identification of commercial important fish and crustacean species</i></p> <ul style="list-style-type: none"> <li>• A minimum of 25 commercially significant fish species were included in the analysis.</li> </ul> <p><i>Engagement of the testing laboratory and finalisation of species to be analysed.</i></p> <ul style="list-style-type: none"> <li>• DAF Laboratories were engaged to carry out the testing.</li> <li>• A priority list of species for analyses was finalised</li> </ul> <p><i>Supply of fish samples</i></p> <ul style="list-style-type: none"> <li>• Individual fish samples were sourced from suppliers of each nominated species.</li> <li>• Fish samples were purchased whole.</li> <li>• Samples were to be of 'edible' portions of each species.</li> </ul> <p><i>Laboratory analyses of fish samples</i></p> <ul style="list-style-type: none"> <li>• Samples were processed at the nominated laboratory.</li> <li>• Data on each species were compiled.</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• The development of a protocol that could be used to undertake the testing of fish species from across Australia.</li> <li>• Nutritional profiles were delivered for 25 finfish species and 3 crustacean species.</li> <li>• The additional profiling, along with currently available data sets, means that comprehensive profiles are now available for 41 wild-catch fish species.</li> </ul> <p><u>Recommendation</u></p> <ul style="list-style-type: none"> <li>• The report recommended that at least a further 80 fish species be profiled.</li> </ul>

Outcomes	<ul style="list-style-type: none"> <li>• Improved quantity of information delivered on which to base promotion of the health benefits of seafood consumption; there now exists a far more comprehensive database on commercial fish species in Australia (Andrew Forrest, pers. comm., 2022).</li> <li>• Additional information available to potentially offset/refute some negative media claims regarding consumption of fish, as well as assisting to overcome some technical market challenges; the nutrition information compiled provides transparency and clarity for those species (Andrew Forrest, pers. comm., 2022).</li> <li>• Contribution to product innovation and increased utilisation of some wild-caught fish species; the availability of this information will allow a greater number of value-added products to be developed, without the need for additional research (Andrew Forrest, pers. comm., 2022).</li> <li>• Despite interest from DAF personnel, it is understood that no further progress has been made to date on the recommendation to undertake further species profiling.</li> </ul>
Impacts	<ul style="list-style-type: none"> <li>• Potential impacts of Project 2017-145 are likely to include a contribution to increased consumer demand for fish due to: <ul style="list-style-type: none"> <li>○ increased understanding of health benefits of eating fish,</li> <li>○ rebuttal of some negative media claims, and</li> <li>○ increased utilisation of previously underutilised fish species.</li> </ul> </li> <li>• However, the realisation of the identified impacts above will require a significant communication effort.</li> <li>• It is notable that there are similarities in many of the new nutritional profiles identified; hence, a reasonable generalisation arising from the project is that all seafood is healthy food. All of the species assessed in the project are eligible for general level health claims on most nutrients determined (Andrew Forrest, pers. comm., 2022).</li> </ul>

## Pathway to Impact

A diagram describing the simplified pathways to impact for the investment in Project 2017-145 is provided in Figure 1.

Figure 1: Pathway to Impact for Project 2017-145



## Nominal Investment

Table 2 shows the annual investment made in Project 2017-145 by FRDC and DAF.

Table 2: Agreed Annual Investment in Project 2017-145 (nominal \$)

Year ended 30 June	FRDC (\$)	DAF (\$)	TOTAL (\$)
2018	109,480	53,740	163,220
2019	40,000	50,752	90,752
Total	149,480	104,492	253,972

Source: Project proposal and Financial Acquittal documents

## **Program Management Costs**

For the FRDC investment, the cost of managing the FRDC funding was added to the FRDC contribution for the project via a management cost multiplier (x1.179). This multiplier was estimated based on the share of 'employee benefits' and 'supplier' expenses in total FRDC expenditure reported in the FRDC's Cash Flow Statement (FRDC, 2017-2021). This multiplier then was applied to the nominal investment by FRDC shown in Table 2. A multiplier of 1.00 was used for administration and management costs for DAF.

## **Real Investment and Extension Costs**

For purposes of the investment analysis, the investment costs of all parties were expressed in 2020/21 dollar terms using the Implicit Price Deflator for Gross Domestic Product (ABS, 2021). No additional costs of extension were included as the outcomes and impacts were largely driven by project activities including communication carried out within the project.

# Impacts

Table 3 provides a summary of the principal types of impacts expanded from those listed in Table 1 and categorised into economic, environmental and social impacts.

Table 3: Triple Bottom Line Categories of Principal Impacts from Project 2017-145

Economic	<ul style="list-style-type: none"><li>• Increased demand for fish benefiting fishers</li></ul>
Environmental	<ul style="list-style-type: none"><li>• Nil</li></ul>
Social	<ul style="list-style-type: none"><li>• Contribution to increased consumer demand for fish due to<ul style="list-style-type: none"><li>○ increased understanding of health benefits of eating fish,</li><li>○ rebuttal of some media negative claims regarding fish, and</li><li>○ increased utilisation of some underutilised fish species.</li></ul></li></ul>

## Public versus Private Impacts

The impacts identified in this evaluation are directly related to the development of the fish nutritional profiles. Potentially, both public and private impacts have been delivered by the investment in the project. Public health benefits will be captured in the main by fish consumers where consumption of fish may increase due to increased knowledge of the health benefit from eating fish. Private benefits may be captured by fishers and their supply chains due to increased consumer demand and fish market expansion.

## Distribution of Private Impacts

The private impacts to fishers from any market expansion will be captured initially by Australian fishers but will be shared with other businesses in the supply chains with which they interact. Any future benefits will be shared according to associated supply and demand elasticities along each supply chain.

## Impacts on Other Australian Industries

It is expected that there would be negligible impacts on other Australian primary industries.

## Impacts Overseas

Sharing of new species knowledge with other nations where the species analysed are consumed to avoid duplication of effort and support international seafood consumption.

## Match with National Priorities

### Australian Agriculture, Science, and Research Priorities

The Australian Government's National Science and Research Priorities and Agricultural Innovation Priorities are reproduced in Table 4. Project 2017-145 contributed to National Science and Research Priority 1. Further, the RD&E investment is likely to contribute indirectly to Agricultural Innovation Priority 1 through the potential for increased demand for Australian seafood because of improved understanding of the health benefits and improved sustainability through utilisation of underutilised species.

Table 4: Australian R&amp;D Priorities

<b>Australian Government</b>	
<b>National Science and Research Priorities<sup>1</sup></b>	<b>National Agricultural Innovation Priorities<sup>2</sup></b>
<ol style="list-style-type: none"> <li><b>1. Food</b> – optimising food and fibre production and processing; agricultural productivity and supply chains within Australia and global markets.</li> <li><b>2. Soil and Water</b> – improving the use of soils and water resources, both terrestrial and marine.</li> <li><b>3. Transport</b> – boosting Australian transportation: securing capability and capacity to move essential commodities; alternative fuels; lowering emissions.</li> <li><b>4. Cybersecurity</b> – improving cybersecurity for individuals, businesses, government, and national infrastructure.</li> <li><b>5. Energy and Resources</b> – supporting the development of reliable, low cost, sustainable energy supplies and enhancing the long-term viability of Australia’s resources industries.</li> <li><b>6. Manufacturing</b> – supporting the development of high value and innovative manufacturing industries in Australia.</li> <li><b>7. Environmental Change</b> – mitigating, managing, or adapting to changes in the environment.</li> <li><b>8. Health</b> – improving the health outcomes for all Australians.</li> </ol>	<p>On 11 October 2021, the National Agricultural Innovation Policy Statement was released. It highlights four long-term priorities for Australia’s agricultural innovation system to address by 2030. These priorities replace the Australian Government’s Rural Research, Development and Extension Priorities which were published in the 2015 Agricultural Competitiveness White Paper.</p> <ol style="list-style-type: none"> <li><b>1.</b> Australia is a trusted exporter of premium food and agricultural products by 2030.</li> <li><b>2.</b> Australia will champion climate resilience to increase the productivity, profitability, and sustainability of the agricultural sector by 2030.</li> <li><b>3.</b> Australia is a world leader in preventing and rapidly responding to significant incursions of pests and diseases through futureproofing our biosecurity system by 2030.</li> <li><b>4.</b> Australia is a mature adopter, developer, and exporter of digital agriculture by 2030.</li> </ol>

### FRDC National RD&E Priorities

Through extensive consultation, the FRDC 2015-2020 RD&E Plan identified three national RD&E priorities to focus and direct FRDC investments. The three FRDC national RD&E priorities were:

1. Ensuring that Australian fishing and aquaculture products are sustainable and acknowledged to be so.
2. Improving productivity and profitability of fishing and aquaculture.
3. Developing new and emerging aquaculture growth opportunities.

Project 2017-145 addressed FRDC national RD&E priority 1 because of improved understanding of the health benefits and improved sustainability through utilisation of underutilised species potentially contributing to increased demand for Australian seafood.

<sup>1</sup> Source: 2015 Australian Government *Science and Research Priorities*. <https://www.industry.gov.au/data-and-publications/science-and-research-priorities>.

<sup>2</sup> Source: 2021 National Agriculture Innovation Policy Statement. [https://www.awe.gov.au/agriculture-land/farm-food-drought/innovation/research\\_and\\_development\\_corporations\\_and\\_companies#government-priorities-for-investment](https://www.awe.gov.au/agriculture-land/farm-food-drought/innovation/research_and_development_corporations_and_companies#government-priorities-for-investment).

# Valuation of Impacts

## Impacts Valued

The project did not produce any quantifiable impacts so no quantitative evaluation processes were applied to estimate benefits. The impacts identified in Table 3 were not valued for the following reasons (Table 5):

Table 5: Reasons for Not Valuing Impact

Impact/Potential Impact	Reason why Impact Not Valued
Contribution to increased consumer demand for fish including	
Increased understanding of health benefits of eating fish	It was difficult to assess the extent of the increased understanding and how this may be valued
Rebuttal of some media negative claims regarding fish	The extent and impact of negative media claims regarding fish and the associated rebuttal influence of the project could not be reliably estimated.
Increased utilisation of some fish species	The extent of any increased utilisation of fish species due to the project could not be reliably estimated.



# Results

All past costs were expressed in 2020/21 dollar terms. All costs were discounted to 2021/22 using a discount rate of 5%.

## Investment Criteria

Tables 6 and 7 show the investment criteria estimated for different periods of costs for the total investment and FRDC investment respectively. Note that, as no benefits were valued, the investment criteria reporting is restricted to the Present Value of Costs.

In the interests of consistency with other project analyses and reporting, the Present Value of Costs was reported for the length of the investment period plus for different periods up to 30 years from the last year of investment (2018/19).

Table 6: Investment Criteria for Total Investment in Project 2017-145

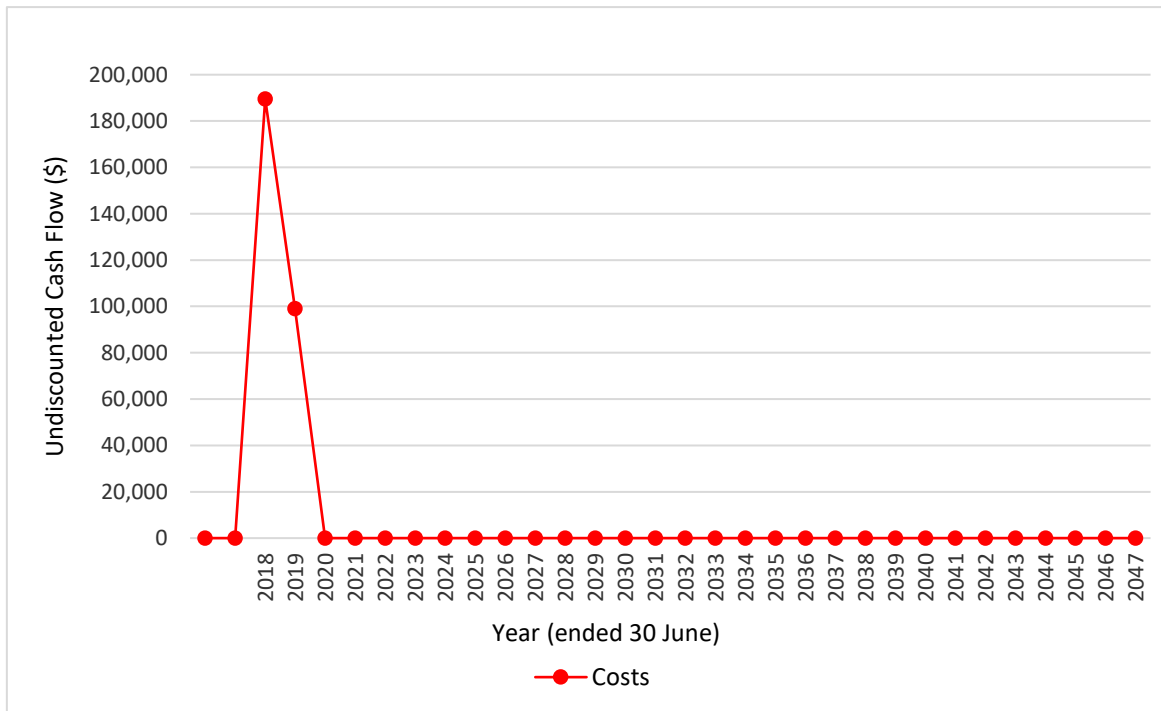
Investment criteria	Number of years from year of last investment						
	0	5	10	15	20	25	30
Present value of costs (\$)	345,115	345,115	345,115	345,115	345,115	345,115	345,115

Table 7: Investment Criteria for FRDC Investment in Project 2017-145

Investment criteria	Number of years from year of last investment						
	0	5	10	15	20	25	30
Present value of costs (\$)	214,517	214,517	214,517	214,517	214,517	214,517	214,517

The annual undiscounted cost cash flows for the total investment for the duration of investment period are shown in Figure 1.

Figure 2: Annual Cash Flow of Undiscounted Total Costs



# Conclusions

Total funding for the investment over the two years totalled \$0.35 million in present value terms. Of this, the FRDC investment costs were \$0.21 million in present value terms.

The investment in FRDC Project 2017-145 is likely to have contributed to increased consumer demand for fish. However, the investment did not produce any impacts that could be quantified with confidence at this stage, so no quantitative evaluation processes were applied to estimate the value of benefits. While the investment did not result in any impacts that could be valued, the process was still useful in building nutritional profiles on an increased number of fish species.

# Glossary of Economic Terms

Cost-benefit analysis:	A conceptual framework for the economic evaluation of projects and programs in the public sector. It differs from a financial appraisal or evaluation in that it considers all gains (benefits) and losses (costs), regardless of to whom they accrue.
Benefit-cost ratio:	The ratio of the present value of investment benefits to the present value of investment costs.
Discounting:	The process of relating the costs and benefits of an investment to a base year using a stated discount rate.
Internal rate of return:	The discount rate at which an investment has a net present value of zero, i.e. where present value of benefits = present value of costs.
Investment criteria:	Measures of the economic worth of an investment such as Net Present Value, Benefit-Cost Ratio, and Internal Rate of Return.
Modified internal rate of return:	The internal rate of return of an investment that is modified so that the cash inflows from an investment are re-invested at the rate of the cost of capital (the re-investment rate).
Net present value:	The discounted value of the benefits of an investment less the discounted value of the costs, i.e. present value of benefits - present value of costs.
Present value of benefits:	The discounted value of benefits.
Present value of costs:	The discounted value of investment costs.

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