FINAL

An Impact Assessment of FRDC Investment in 2016-501: Seafood with ET

Agtrans Research

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FRDC Project No **2016-134**

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2018

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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 Ettingshausen – Director, Escape Productions Group
Peter Horvat - General Manager Communications, Trade and Marketing, FRDC

Abbreviations

ABS	Australian Bureau of Statistics
ET	Andrew Ettingshausen
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
DAF	Department of Agriculture and Fisheries – Queensland
DAWR	Department of Agriculture and Water Resources
DPI NSW	Department of Primary Industries – New South Wales
FRDC	Fisheries Research and Development Corporation
MIRR	Modified Internal Rate of Return
OCS	Office of the Chief Scientist
RD&E	Research, Development and Extension
TV	Television
TACC	Total Allowable Commercial Catch

Executive Summary

What the report is about

This report presents the results of an impact assessment of Fisheries Research and Development Corporation (FRDC) investment in a project to produce a television (TV) series on underutilised wild-catch seafood species. The project was funded by the FRDC over the period October 2016 to February 2017.

Methodology

The investment in the project was analysed qualitatively within a logical framework that included activities/outputs, outcomes, and impacts. Identified impacts were then categorised into a triple bottom line framework. Principal impacts from those identified were then valued. Benefits were estimated for a range of time frames up to 30 years from the year of last investment in the project. Past and future cash flows in 2017/18 $ terms were discounted to the year 2017/18 using a discount rate of 5% to estimate the investment criteria.

Results/key findings

Several impacts of the investment were identified of which two were valued. The impacts valued were the improved social licence of the wild-catch fishing industry to operate and the short-term increase in demand for species presented in the episodes of Seafood Escapes with Andrew Ettingshausen.

Investment Criteria

Total funding from all sources for the project was $0.28 million (present value terms). The value of benefits was estimated at $0.60 million (present value terms). This gave an estimated net present value of $0.32 million, and a benefit-cost ratio of 2.15 to 1.

Conclusions

Overall, the project achieved its objectives of highlighting underutilised seafood species to the Australian public and raising awareness and educating the community on sustainable commercial fishing practices.

The valuation of the two impacts are based on uncertain assumptions. However, the assumptions made in the valuation are conservative, and there may be long-term benefits of the project that are not valued. The impacts not valued along with these conservative assumptions, make it likely that the investment criteria are underestimated.

Keywords

Impact assessment, cost-benefit analysis, ET, Andrew Ettingshausen, Seafood Escapes, social licence, undervalued, consumption

Introduction

The Fisheries Research and Development Corporation (FRDC) required a series of impact assessments to be carried out annually on a number of investments in 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 stakeholders.
- Reporting to the Council of Rural Research and Development Corporations (CRRDC).

The first series of impact assessments, that included 20 randomly selected FRDC investments, was completed in August of 2017. The published reports for the first series of evaluations can be found at: http://frdc.com.au/Research/Benefits-of-research/2017-Portfolio-Assessment

The second series of impact assessments also included 20 randomly selected FRDC investments. The investments were worth a total of approximately $5.62 million (nominal FRDC investment) and were selected from an overall population of 96 FRDC investments worth an estimated $21.32 million (nominal FRDC investment) where a final deliverable had been submitted in the 2016/17 financial year.

The 20 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 26% 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.

Project 2016-501: *Seafood with ET* was selected as one of the 20 projects and was analysed in this report.

General Method

The impact assessments followed general evaluation guidelines that are now well entrenched within the Australian primary industry research sector including Research and Development Corporations (RDCs), Cooperative Research Centres (CRCs), State Departments of Agriculture, and some Universities. The approach includes both qualitative and quantitative descriptions that are in accord with the impact assessment guidelines of the CRRDC (CRRDC, 2014).

The evaluation process involved identifying and briefly describing project objectives, activities and outputs, outcomes, and impacts. The principal economic, environmental and social impacts were then summarised in a triple bottom line framework.

Some, but not all, of the impacts identified were then valued in monetary terms. Where impact valuation was exercised, the impact assessment uses Cost-Benefit Analysis (CBA) as its principal tool. The decision not to value certain impacts was due either to a shortage of necessary evidence/data, a high degree of uncertainty surrounding the potential impact, or the likely low relative significance of the impact compared to those that were valued. The impacts valued are therefore deemed to represent the principal benefits delivered by the project. However, as not all impacts were valued, the investment criteria reported for individual investments potentially represent an underestimate of the performance of that investment.

Background and Rationale

There is a need for communicating with the general Australian public that wild caught Australian fish are both sustainably caught, are fresh, and good to eat. This message does not always get through, as there are some sections of the community who view commercial fisheries as unsustainably harvested or do not know where or how fish are caught, or how to prepare fish for consumption.

A need was recognised to showcase wild-caught species that many of which are deemed underutilised by the general public.

The project aim was to highlight the realities of commercial fishing, showing a boat-to-plate process. The television (TV) series (Seafood Escapes with Andrew Ettingshausen) was to demonstrate the sustainable practices of commercial fishers along with advice on food preparation for some underutilised seafood species. The aim of the project was to bring together chefs, fishers, and Andrew Ettingshausen (ET) and to communicate a message on the sustainability of Australia's wild catch commercial fisheries and to highlight the value of increased public knowledge and perception of some underutilised species.

The project addresses National Priority 2 of FRDC's 2015-2020 RD&E Plan, "RD&E that demonstrates how to use underutilised and undervalued species sustainably and more profitably". Using TV as a medium of communication was recognised as a useful tool to inform large parts of the general public regarding underutilised seafood species. By showing a mass audience how to prepare and cook underutilised seafood species and inform potential consumers that the species are fished sustainably, there was an opportunity to raise awareness, and potentially consumption, of underutilised seafood species.

By airing six episodes, there was an opportunity to showcase different commercial seafood species to a broad audience. The project was part of a broader communication message to Australians to eat more seafood.

Project Details

Summary

Project Code: 2016-501

Title: *Seafood with ET*

Research Organisation: Escape Productions Group

Principal Investigator: Andrew Ettingshausen

Period of Funding: October 2016 – February 2017

FRDC Project Allocation: Adoption (50%), Industry (50%)

Objectives

The objectives of the project were:

1. To raise community awareness of six under-appreciated commercial species
2. To raise the profile of and educate the community about, the practices used by commercial fishermen

Logical Framework

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

Table 1: Logical Framework for Project 2016-501

Activities and Outputs	• Six episodes of Seafood Escapes with Andrew Ettingshausen were commissioned for this project, with two episodes filmed in Western Australia, and one each in New South Wales, Victoria, South Australia, and Queensland to show the variety of Australian wild-catch commercial fisheries. The locations and fish were Fremantle Octopus, Queensland Reef Fish, Lake Entrance Eastern School Whiting, Sydney Leather Jacket, Western Australian Mullet, and Hawkesbury River Prawns. • The species and commercial fisheries were selected by FRDC, as they were identified as undervalued (consumer price of between $10-$15 per kg), under caught (catch was below Total Allowable Commercial Catch (TACC)) or under-appreciated by consumers (consumers do not know how to best prepare and cook such species). • The episodes were filmed over 16-18 weeks, with each episode filmed with a chef on a commercial fishing boat catching the fish to be cooked later in the episode. • The first episode aired on Network 10 and Southern Cross (TV channel) at 4:30 pm on Sunday 11th December 2016, with the next five episodes airing each subsequent Sunday at the same time. There were also replays of the episodes on One (TV channel) the next day and repeats of the episodes later in 2017. • While Grey Mullet was the original species to be showcased in the Coral Finfish fishery, as an underutilised species, Red Emperor was showcased instead, presenting the sustainable practices of the Coral Finfish fishers. • The episode structure was ET and the chef boarding the commercial vessel, catching the fish with the commercial fishers, then cooking the fish.

	Sustainability and the importance of sustainability to the fishers is a common theme throughout the various episodes. The process of sorting the seafood on the boats and proper management practices of handling seafood on the vessel were also a theme throughout the episodes, highlighting the responsible practices of commercial fishers. The process of catching and quality control thereafter was highlighted in the episodes. • Episodes showed how fishers are complying with regulations and the importance to the fishers themselves of complying with sustainability regulations. • The TV series highlights where seafood comes from, how it is caught, and features the people involved in the industry. • The recipes from the episodes were uploaded to the 'Seafood Escapes with Andrew Ettingshausen' website, so the general public can attempt to recreate the recipes from the TV series. • The TV series has been recognised in some media publications, such as the St. George and Sutherland Shire Leader, The Daily Telegraph, and the TV series own website.
Outcomes	• The TV series was well received by Network Ten, industry, and viewers. The TV series has been extended for a second season, with a further six episodes being aired on Saturday at 4:30 pm in late 2017 and early 2018. • The TV ratings were high, notwithstanding the episodes were competing against live sport. The ratings averaged 153,000 per episode with a range of 112,000 to 215,000 viewers for the six episodes. The reach was on average 365,000 per episode with a range of 278,000 to 426,000 viewers for the six episodes. Re-runs may have had a viewership of 150,000 per episode (Andrew Ettingshausen pers. comm., 2018). • Due to the first season of the TV series, there is an increased probability that wild catch commercial fisheries are recognised as sustainable by a small increase in the general population. Also, attitudes towards wild catch seafood may have changed for the positive due to the first season of the series. • The TV series exposed the conditions, methods, and practices of commercial fishers to a broader audience that may not have been well-informed of Australian commercial fishing practices. • Due to the species being highlighted on Seafood Escapes with Andrew Ettingshausen, there is an improved acceptability of the underutilised species featured, with a potential increase in consumption and catch of the species featured.
Impacts	• Improved social licence to fish for wild-catch fishers. • Increased consumption of underutilised seafood species. • Potential increased profit to fishers of species featured via increased demand for the species over the longer term. • Maintained regional incomes associated with the wild catch fishing industry.

Project Investment

Nominal Investment

Table 2 shows the nominal annual investment made in Project 2016-501 by FRDC. There were no other funders for the project.

Table 2: Annual Investment in Project 2016-501 (nominal $)

Year ended 30th June	FRDC ($)	OTHER ($)	TOTAL ($)
2016	190,000	0	190,000
2017	30,000	0	30,000
Totals	**220,000**	**0**	**220,000**

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 (1.122). 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, 2013-2017). This multiplier then was applied to the nominal investment by FRDC shown in Table 2.

Real Investment and Extension Costs

For purposes of the investment analysis, the investment costs of all parties were expressed in 2017/18 dollar terms using the Implicit Price Deflator for Gross Domestic Product (ABS, 2018). There are no additional extension costs associated with the project.

Impacts

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

Table 3: Triple Bottom Line Categories of Principal Impacts from the production of the TV series

Economic	• Improved social licence to fish through greater awareness of wild-catch fishing practices • Potential increased profit to fishers of species featured in the TV series via increased demand for the species from the TV series viewers watching the TV show • Increased consumption of some underutilised seafood species
Environmental	• Nil
Social	• Maintained regional incomes

Public versus Private Impacts

The benefits identified in this analysis are mainly private impacts. There is a small public impact of maintained regional incomes from increased incomes to the wild catch sector and their spillover spending in the local communities.

Distribution of Private Impacts

The majority of the private impacts will flow to the Australian wild catch fishing sector, as they will be the main beneficiary of an improved social licence to operate and increase in consumption of wild-catch fish. Three of the four impacts directly relate to the wild-catch fishing sector.

Impacts on other Australian industries

Other Australian industries outside of the wild catch fishing sector are unlikely to be affected by the project. There may be some positive spillovers to fish retailers selling consumers wild-caught fish.

Impacts Overseas

No significant benefits to overseas parties are expected. There is a minor negative impact of decrease in foreign seafood consumption in Australia.

Match with National Priorities

The Australian Government's Science and Research Priorities and Rural RD&E priorities are reproduced in Table 4. The project will contribute primarily to Rural RD&E Priorities 3 and 4 and Science and Research Priorities 1 and 2.

Table 4: Australian Government Research Priorities

Australian Government	
Rural RD&E Priorities (est. 2015)	**Science and Research Priorities (est. 2015)**
1. Advanced technology 2. Biosecurity 3. Soil, water and managing natural resources 4. Adoption of R&D	1. Food 2. Soil and Water 3. Transport 4. Cybersecurity 5. Energy and Resources 6. Manufacturing 7. Environmental Change 8. Health

Sources: (DAWR, 2015) and (OCS, 2015)

Valuation of Impacts

Impacts Valued

Analyses were undertaken for total benefits that included future expected benefits. A degree of conservatism was used when finalising assumptions, particularly when some uncertainty was involved.

Two impacts were valued; the improved social licence of commercial fishers and the increase in short-term sales of seafood species presented in the six episodes of the first season of Seafood Escapes with Andrew Ettingshausen.

Impacts not Valued

Not all impacts identified in Table 3 could be valued in the assessment.

There may be longer-term purchase changes, but such an outcome is highly speculative and reasonable probabilities, and purchase frequency cannot be reasonably assumed. The longer-term consumption trends due to viewing of the TV series was not valued due to the uncertainty around the impact and difficulty in developing reasonable assumptions to the impact.

The regional income impact was difficult to value due to a lack of baseline data and resources to undertake an accurate valuation.

Valuation of Impact 1: Improved social licence to operate

As season one of Seafood Escapes with Andrew Ettingshausen present the commercial fisheries featured accurately, there would be increased knowledge imparted to viewers that the commercial fisheries shown were fished sustainably and responsibly, and that the fishers themselves cared about the sustainability of the commercial fisheries in which they operate.

The viewership of the first season of the TV series was viewed by an average of 153,000 people per episode, with a reach of 365,500 people per episode. It is likely that the viewers of the episodes already had an interest in seafood, either through fishing, consuming seafood, or concern about the sustainability of fish stocks.

The inputs of the general public are a factor in setting TACC and fishing methods (DPI NSW, n.d.). The first season of the TV series is assumed to improve the reputation of Australian wild catch fishing. The airing of the show is assumed to improve the social licence for wild-catch fishing, with less opposition to fishing methods used and negate the perception of wild catch fishers not caring about the environment. The six episodes, showing a diverse range of fisher operations, is assumed to reduce the opposition to commercial fishery practices and use of fisheries for commercial use.

As the series covered six commercial fisheries and a variety of species, it is assumed that the average viewer would perceive the sustainable practices exhibited in the episodes as being consistent throughout other Australian commercial fisheries. The impact of the first season is assumed to have an effect for four years, with the first year of impact being in the 2018/19 fishing season. There is an impact in the following years but at a reduced level of only 75%, 50% and 25% for each year after the first year of the impact as the effects of the first season of the TV series diminishes. The last year of impact assumed is 2021-22.

The commercial catch from Australian wild-catch commercial fisheries had a gross value of $1.745 billion for 2015/16 (ABARES, 2017). The gross value is assumed to be constant into the future for

purposes of this analysis. The profitability of fishing is assumed to be 10% of the gross value of the catch.

The social licence under threat is assumed to apply to 25% of the total catch from Australian wild-catch commercial fisheries. It is assumed that there is a 10% probability that the this 25% of the catch may be lost. With the improved recognition by the general public that fishing practices are sustainable because of the TV series, the probability the assumed loss of the catch may fall from 10% to 9.5%.

Specific assumptions for valuing the impact are provided in Table 6.

Valuation of Impact 2 – Increased sales of species featured

The first season of the TV series presented seven main seafood species. The main seafood species highlighted were in the order of episode from season one:

- Fremantle Octopus
- Queensland Reef Fish (Red Emperor)
- Lake Entrance East School Whiting
- Sydney Leatherjackets and Flathead
- Western Australian Sea Mullet
- Hawkesbury River Prawns

The viewership numbers suggest that there may be an increase in seafood consumption of these species due to the TV series. It is assumed there might be a probability that the six species exhibited in the series may have experienced increased sales after the airing, due to increased awareness of the species and an increase in knowledge of how to successfully prepare and cook some of the species. Unfortunately, there were no pre- and post- sales data for these species available to confirm this assumption.

The gross value per kilogram for each species shown in the series is provided in Table 6. There was no available price information for Sydney Leather Jacket, but Flathead was featured as the fish cooked, so the gross value of flathead was used. Hawkesbury River Prawns was represented by both tiger and school prawns in the respective episode. The Queensland Reef Fish episode aimed to catch Grey Mackerel but was unsuccessful. Red Emperor was caught and featured instead.

Each episode presented a segment where a professional chef cooked the catch from the episode with recipes uploaded to the Seafood Escapes with Andrew Ettingshausen website. The chefs presented how to prepare and cook the fish caught. Therefore 10% of viewers of each episode are assumed to have purchased at least once, 0.5 kg of the featured seafood species that was viewed. The purchase of seafood species is independent of location, as consumers may not be able to purchase fish from the specific commercial fishery where the episode was filmed. The seafood purchase is assumed to occur only once, with the purchase taking place in 2017.

Table 5 highlights the viewership of each episode at the original airing date between December 2016 and February 2017. The TV series was twice repeated later in 2017. For repeats of the six episodes, 150,000 viewers are assumed to watch each episode repeat (Andrew Ettingshausen, pers. comm., 2018).

Table 5 Average Audience per Episode

Episode (Featured seafood species)	Viewership numbers (persons)
Fremantle Octopus	113,000
Queensland Reef Fish (Red Emperor)	160,000
Lake Entrance East School Whiting	215,000
Sydney Leatherjackets	138,000
Western Australian Sea Mullet	180,000
Hawkesbury River Prawns	112,000

Source: Andrew Ettingshausen pers. comm., 2018

The average audience is used as an indicator of the audience reach, as the average audience more accurately is assumed to reflect the number of people who would have watched enough of the episodes to entice them to try the species.

The species bought is assumed to be fresh fish, caught within Australia. Consumers are assumed to have purchased half a kilogram of fish.

The additional fish purchased because of consumers viewing the episode is assumed to be substituted from fish that would have been imported, as the TV series highlighted the value and quality of Australian wild-caught fish.

Specific assumptions are presented in Table 6.

Counterfactual

If the project had not been funded, it is assumed that this TV series would not have been produced or aired.

Extension

As the TV series was assumed to be an extension activity in itself, there were no additional extension costs included for the investment.

Summary of Assumptions

A summary of the key assumptions made for the valuation of the impacts is shown in Table 6.

Table 6: Summary of Assumptions

Variable	Assumption	Source
Benefit one: Avoided reduction in social licence for commercial wild catch fishing		
Gross value of commercial Australian wild-catch fishing in 2015/16	$1.7496 billion	ABARES, 2017
Percentage of wild-catch commercial fisheries affected	25%	Agtrans Research, 2018
Gross value of wild-catch commercial fisheries affected	$437.4 m p.a.	25% x $1.7496 billion
Probability of risk of loss of gross value without Seafood Escapes with Andrew Ettingshausen	10%	Agtrans Research, 2018
Probability of risk of loss of gross value with Seafood Escapes with Andrew Ettingshausen	9.50%	Agtrans Research, 2018
Gross value lost from commercial fisheries without Seafood Escapes with Andrew Ettingshausen	$43.74 m p.a.	10% x $437.4 m
Gross value lost from commercial fisheries with Seafood Escapes with Andrew Ettingshausen	$42.65 m p.a.	9.50% x $437.4 m
Gross benefit gain for commercial fishing due to improved social licence	$2.19 m p.a.	$43.74 m - $41.55 m
Percentage of profit from gross value	10%	Agtrans Research, 2018
First year of impact	2018/19	Agtrans Research, 2018
Expected maximum profit benefit per annum	$218,700	$2.19 m x 10%
Percentage of year two impact	75%	Agtrans Research, 2018
Value of benefit in 2019-20	$164,025	$0.219 m x 75%
Percentage of year three	50%	Agtrans Research, 2018
Value of benefit in 2020-21	$109,350	$0.219 m x 50%
Percentage of year four impact	25%	Agtrans Research, 2018
Value of benefit in 2021-22	$54,675	$0.219 m x 25%
Benefit two: Increased consumption of seafood species aired		
Value of Fremantle Octopus (Squid WA)	$ 14.21 per kg	$483,000/34 t (ABARES, 2017)
Value of Red Emperor	$9.03 per kg	$298,000/33 t (DAF, n.d.)
Value of Eastern School Whiting	$3.05 per kg	$2.104 m/ 690 t (ABARES, 2017)
Value of Flathead	$6.46 per kg	$24.471 m/3788 t (ABARES, 2017)
Value of Western Australian Sea Mullet	$2.11 per kg	$466,000/218 t (ABARES, 2017)
Value of School Prawns and Tiger Prawns	$12.52 per kg	(($6.74 m/692 t + ($19.87 m/1,299 t))/2 (ABARES, 2017)
Viewership for Fremantle Octopus episode	113,000 persons	Andrew Ettingshausen pers. comm., 2018
Viewership for Red Emperor episode	160,000 persons	Andrew Ettingshausen pers. comm., 2018

Viewership for Eastern School Whiting episode	215,000 persons	Andrew Ettingshausen pers. comm., 2018
Viewership for Sydney Leatherjacket/Flathead episode	138,000 persons	Andrew Ettingshausen pers. comm., 2018
Viewership for Western Australian Sea Mullet episode	180,000 persons	Andrew Ettingshausen pers. comm., 2018
Viewership for Hawkesbury Bay River Prawns episode	112,000 persons	Andrew Ettingshausen pers. comm., 2018
Repeat viewership for each episode	150,000 persons	Andrew Ettingshausen pers. comm., 2018
Number of repeats per episode	Two	Peter Horvat pers. comm., 2018
Assumed percentage of viewership that purchased species in 2017	10%	Agtrans Research, 2018
Amount of seafood purchased per consumer	0.5 kg	Agtrans Research, 2018
Percentage profit to fishers from gross value	10%	Agtrans Research
Additional profit for Octopus fishers	$18,686	(113,000 + 150,000) *10%*0.5 kg*$14.21*10%
Additional profit for Red Emperor fishers	$13,996	(160,000+ 150,000) *10%*0.5 kg*$9.03*10%
Additional profit from Eastern School Whiting fishers	$5,566	(113,000 + 150,000) *10%*0.5 kg*$14.21*10%
Additional profit for Flathead fishers	$9,302	(138,000 + 150,000) *10%*0.5 kg*$6.46*10%
Additional profit for Western Australian Sea Mullet fishers	$3,482	(180,000 + 150,000) *10%*0.5 kg*$2.11*10%
Additional profit for School and Tiger prawns	$16,401	(112,000 + 150,000) *10%*0.5 kg*$12.52*10%
Year of impact	2017	Agtrans Research, 2018
FRDC Program Allocation – Adoption	50%	FRDC
FRDC Program Allocation – Industry	50%	FRDC

Results

All benefits after 2017/18 were expressed in 2017/18 dollar terms. All costs and benefits were discounted to 2017/18 using a discount rate of 5%. A reinvestment rate of 5% was used for estimating the Modified Internal Rate of Return (MIRR). The base analysis used the best available estimates for each variable, notwithstanding a level of uncertainty for many of the estimates. All analyses ran for the length of the investment period plus 30 years from the last year of investment (2017/18) to the final year of benefits assumed.

Investment Criteria

Tables 7 and 8 show the investment criteria estimated for different periods of benefits for the total investment and FRDC investment respectively. The present value of benefits attributable to the FRDC investment only, shown in Table 8 is the same as the total proportion of investment as FRDC was the only funder of the project.

Table 7: Investment Criteria for Total Investment in the Project

Investment criteria	**Number of years from year of last investment**						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Present value of benefits ($m)	0.11	0.60	0.60	0.60	0.60	0.60	0.60
Present value of costs ($m)	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Net present value ($m)	-0.17	0.32	0.32	0.32	0.32	0.32	0.32
Benefit-cost ratio	0.38	2.15	2.15	2.15	2.15	2.15	2.15
Internal rate of return (%)	negative	34.9	34.9	34.9	34.9	34.9	34.9
MIRR (%)	256.7	29.4	15.2	11.5	9.7	8.7	8.1

Table 8: Investment Criteria for FRDC Investment in the Project

Investment criteria	**Number of years from year of last investment**						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Present value of benefits ($m)	0.11	0.60	0.60	0.60	0.60	0.60	0.60
Present value of costs ($m)	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Net present value ($m)	-0.17	0.32	0.32	0.32	0.32	0.32	0.32
Benefit-cost ratio	0.38	2.15	2.15	2.15	2.15	2.15	2.15
Internal rate of return (%)	negative	34.9	34.9	34.9	34.9	34.9	34.9
MIRR (%)	256.7	29.4	15.2	11.5	9.7	8.7	8.1

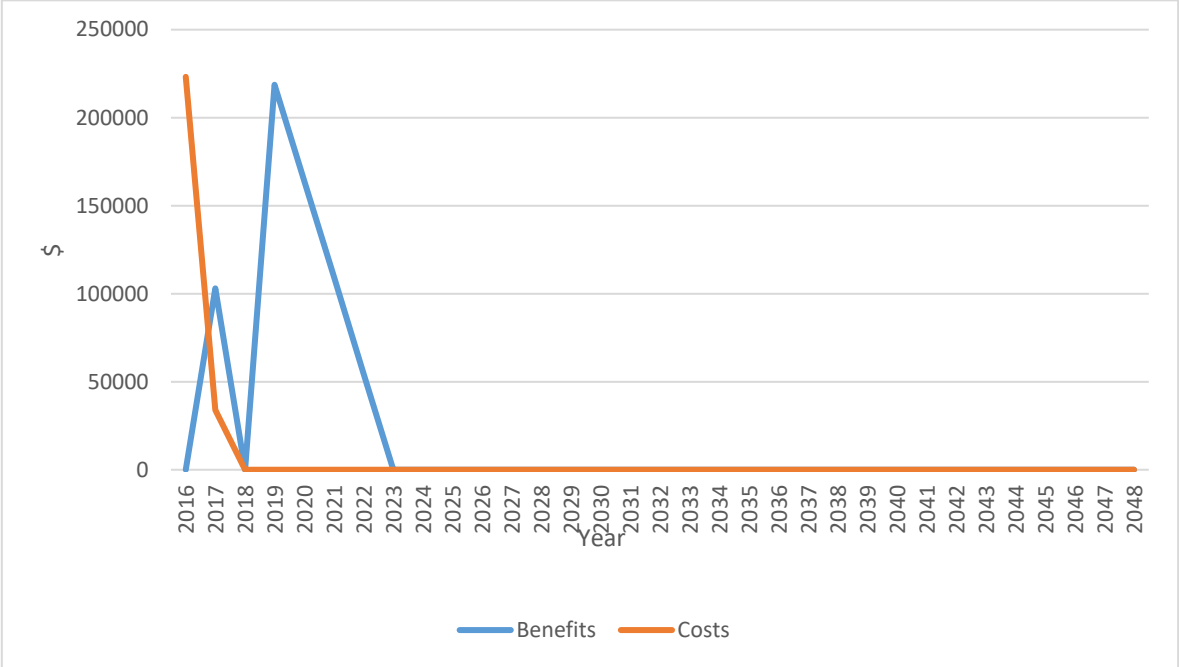
Between the two impacts, impact one had a higher benefit than impact two. The specific results are shown in Table 9.

Table 9: Percentage Split between Benefits

Impact	**Discounted Benefits to 30 years after year of last investment ($)**	**Percentage of benefits (%)**
Impact 1 - Improved social licence to operate for Australian wild-catch commercial fisheries	496,503	82.12
Impact 2 - Increased sales of species featured on the TV series	108,117	17.88
Total	604,621	100.00

The annual undiscounted benefit and cost cash flows for the total investment for the duration of the investment period plus 30 years from the last year of investment are shown in Figure 1.

Figure 1: Annual Cash Flow of Undiscounted Total Benefits and Total Costs



Sensitivity Analyses

A sensitivity analysis was carried out on the discount rate. The analysis was performed for the total investment and with benefits taken over the life of the investment plus 30 years from the last year of investment. All other parameters were held at their base values. Table 10 presents the results. The results showed a moderately low sensitivity to the discount rate as the benefit period was restricted to four years and occurred quite rapidly after the investment period

Table 10: Sensitivity to Discount Rate
(Total investment, 30 years)

Investment Criteria	**Discount rate**		
	0%	**5% (base)**	**10%**
Present value of benefits ($m)	0.65	0.60	0.57
Present value of costs ($m)	0.26	0.28	0.31
Net present value ($m)	0.39	0.32	0.26
Benefit-cost ratio	2.53	2.15	1.84

Pessimistic and Optimistic Scenarios

Sensitivity analyses were undertaken for pessimistic and optimistic levels of the variables with the highest level of uncertainty: the reduction in the probability of the social licence to fish due to the TV series. Results are reported in Table 11. The results show that the benefits are sensitive to small changes in the assumption for the reduced probability driven by the first season of the TV series. Even with the pessimistic scenario the net present value is still positive.

Table 11: Sensitivity to the Effect of the First Season of Seafood Escapes on the Social Licence (Total Investment, 30 years)

Investment Criteria	**Sensitivity to the effect of the first season the TV series on the social licence**		
	9.75%	**9.50%**	**9.25%**
Present value of benefits ($m)	0.36	0.60	0.85
Present value of costs ($m)	0.28	0.28	0.28
Net present value ($m)	0.07	0.32	0.57
Benefit-cost ratio	1.26	2.15	3.03

Table 12 shows the investment criteria were not sensitive to the percentage of viewers who purchased seafood after the airing of each episode, with only a minor change to the investment criteria when this assumption was varied.

Table 12: Sensitivity to the Percentage of Viewers who Later Purchased Seafood (Total Investment, 30 years)

Investment Criteria	**Sensitivity to the percentage of viewers who later purchased seafood**		
	5%	**10%**	**15%**
Present value of benefits ($m)	0.55	0.60	0.66
Present value of costs ($m)	0.28	0.28	0.28
Net present value ($m)	0.27	0.32	0.38
Benefit-cost ratio	1.95	2.15	2.34

Confidence Ratings and other Findings

The results produced are highly dependent on the assumptions made, some of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes.

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 13). The rating categories used are High, Medium and Low, where:

High:	denotes a good coverage of benefits or reasonable confidence in the assumptions made
Medium:	denotes only a reasonable coverage of benefits or some uncertainties in assumptions made
Low:	denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 13: Confidence in Analysis of Project

Coverage of Benefits	**Confidence in Assumptions**
Medium	Low

The coverage of benefits was assessed as Medium as the benefit valued addressed the most important impacts, the social licence and increased consumption. The long-term consumption effects of the first season of Seafood Escapes with Andrew Ettingshausen was not valued.

The confidence in assumptions is rated as Low as, while the assumptions made are logical and indicative, they are not well supported by the available evidence.

Conclusions

Overall, the project achieved its objectives of highlighting underutilised seafood species to the Australian public and raising awareness and educating the community on sustainable commercial fishing practices.

The airing of the six episodes align with FRDCs objective of ensuring Australian commercial fisheries are sustainable and recognised and some underutilised fish stocks are known to the Australian public (FRDC, 2016). The first season of Seafood Escapes with Andrew Ettingshausen has helped make sure Australian commercial fisheries are recognised to be sustainable.

Total funding for the project over the four months totalled $0.28 million (present value terms) and produced estimated total expected benefits of $0.60 million (present value terms). This gave a net present value of $0.32 million, a benefit-cost ratio of 2.15 to 1, an internal rate of return of 34.92% and a modified internal rate of return of 8.1%.

The valuation of the two impacts are based on uncertain assumptions. However, the assumptions made in the valuation are conservative, and there may be long-term benefits of the project that are not valued. The impacts not valued along with these conservative assumptions, make it likely that the investment criteria are underestimated.

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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