FINAL REPORT

An Impact Assessment of Investment in FRDC Project 2019-095:

an Update of the AQUAVETPLAN Disease Strategy Manual, White Spot Disease

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Abbreviations

CBA	Cost-Benefit Analysis
CRRDC	Council of Rural Research and Development Corporations
DAFF	Department of Agriculture, Fisheries and Forestry (Commonwealth)
FRDC	Fisheries Research and Development Corporation
OIE	Office International des Epizooties
PVC	Present Value of Costs
RD&E	Research, Development and Extension
WSD	White Spot Disease

Executive Summary

This report presents an impact assessment of investment in Fisheries Research and Development Corporation (FRDC) investment in Project 2019-095: *Update of AQUAVETPLAN Disease Strategy Manual, White Spot Disease*. The assessment was completed as part of a fifth annual series of impact assessments under the FRDC 2015-2020 Research, Development and Extension Plan. The fifth series of assessments included 20 randomly selected FRDC investments worth a total of approximately $5.30 million (nominal FRDC investment) and that 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 impact assessments 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 impact assessment guidelines of the Council of Rural Research and Development Corporations.

The investment in Project 2019-095 facilitated the update of the AQUAVETPLAN manual for white spot disease (WSD). The updated AQUAVETPLAN manual now reflects the current scientific knowledge on WSD and ensures that strategies used for WSD control reflect current 'best-practice' approaches.

Though no specific evidence of impact was obtained within the scope of the assessment, it is likely that the updated AQUAVETPLAN for WSD will have some contribution to:

- Avoided future production losses from WSD through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.
- Maintained aquatic/marine ecosystem health through improved surveillance and management of WSD in Australian waters.

Total funding for the Project was $29,707 (present value terms) and FRDC was the sole funding contributor. No impacts were valued in monetary terms in the current assessment.

Keywords

Project 2019-095, AQUAVETPLAN manual, white spot disease, WSD, impact assessment, evaluation, cost-benefit analysis

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 2019-095: *Update of AQUAVETPLAN Disease Strategy Manual, White Spot Disease* 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 2019-095 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 2019-095.

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

White spot disease (WSD) is a highly contagious viral infection caused by White spot syndrome virus that affects crustaceans such as prawns, yabbies, and crabs. When found in high intensity production areas, such as prawn farms, white spot disease results in the rapid mortality of prawns. Australia had remained free of WSD, but the disease was confirmed in 2016 in seven prawn farms located on the Logan River in Queensland. This was the first confirmed case of WSD in Australian prawn farms (Queensland Government, 2020).

AQUAVETPLAN is the Australian Aquatic Veterinary Emergency Plan. It is a series of manuals that outline Australia's approach to national disease preparedness and proposes the technical response and control strategies to be activated in a national aquatic animal disease emergency. The Department of Agriculture, Fisheries and Forestry (DAFF) manages the development and maintenance of AQUAVETPLAN manuals. The manuals are authored by Australian aquatic animal health experts with extensive stakeholder consultation. Each manual undergoes a formal endorsement process through government and relevant industry sectors. Manuals are prepared during 'peace time' so that the information is readily available in the event of an actual emergency. The AQUAVETPLAN manuals are working documents that are updated as required to ensure they take into account new research, experience, and emerging disease threats (DAFF, 2019a).

Rationale for Project 2019-095

The WSD AQUAVETPLAN manual was first published in 2005, and the second version was published in 2013. Given the incursion of WSD in Queensland and additional research and investment that was undertaken following the incursion, the WSD AQUAVETPLAN manual required revision to reflect new scientific knowledge, and to ensure that strategies used for WSD control reflected current 'best-practice'.

FRDC Project 2019-095 was funded to facilitate the update of the WSD AQUAVETPLAN manual.

Project Details

Summary

Project Code: 2019-095
Title: *Update of AQUAVETPLAN Disease Strategy Manual, White Spot Disease*
Research Organisation: DigsFish Services Pty Ltd
Principal Investigator: Ben Diggles, Director
Period of Funding: September 2019 to January 2020
FRDC Program Allocation: Environment 100%

Objectives

The specific objective of Project 2019-095 was:

1. To revise the AQUAVETPLAN Disease Strategy Manual: White Spot Disease

Logical Framework

Table 1: Logical Framework for FRDC Project 2019-095

Activities	• A comprehensive scientific literature review for WSD was completed. • The findings of the literature review were incorporated into the WSD AQUAVETPLAN manual to ensure the latest scientific information on WSD was available. • Consultation was undertaken with personnel from prawn farms affected by the 2016 WSD outbreak, commercial fisheries, and Biosecurity Queensland involved in the WSD response. • The findings of the initial stakeholder consultation were considered when revising the WSD AQUAVETPLAN manual to ensure that WSD control measures meet industry requirements with reference to the WSD outbreak in Queensland in 2016. • A draft of the updated WSD AQUAVETPLAN then was reviewed for consistency with the current Australian Government Style Manual, departmental accessibility standards, and, where possible, aligned with the relevant chapters of the manual from the Office International des Epizooties (OIE), now known as the World Organisation for Animal Health. • The completed draft manual then was circulated to key stakeholders in industry, research, and government for review. • Feedback from key stakeholders was incorporated into the updated WSD AQUAVETPLAN manual and a final version was completed in January 2020.
Outputs	• The updated WSD AQUAVETPLAN strategy sets out the disease control principles for use in an aquatic veterinary emergency incident caused by the suspicion or confirmation of WSD in Australia. • The strategy was scientifically reviewed by the Sub Committee for Aquatic Animal Health of the Animal Health Committee, before being endorsed by the Animal Health Committee of the National Biosecurity Committee in February 2020. • The updated WSD AQUAVETPLAN manual now is available on the DAFF website: https://www.agriculture.gov.au/agriculture-land/animal/aquatic/aquavetplan

Outcomes	• The updated WSD AQUAVETPLAN manual now reflects the current scientific knowledge on WSD and ensures that strategies used for WSD control reflect current 'best-practice' approaches. • The WSD manual will be used by industry, government, and other key stakeholders when undertaking surveillance and control activities for WSD in Australia.
Impacts	• Some contribution to avoided future production losses from WSD through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries. • Some contribution to maintained aquatic/marine ecosystem health through improved surveillance and management of WSD in Australian waters.

Source: FRDC project documentation

Nominal Investment

Table 2 shows the total annual investment made in project 2019-095 by FRDC. The FRDC provided 100% of the project funding on behalf of DAFF.

Table 2: Total Investment in FRDC Project 2019-095
(nominal dollar terms)

Year ended 30 June	**FRDC ($)**
2020	20,125
Totals	**20,125**

Source: FRDC project 2019-095 project agreement and financial acquittal

Management and Administration 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 a five-year average of the ratio of total FRDC cash expenditure to project expenditure reported in the FRDC's Cash Flow Statement (FRDC Annual Reports, 2017-2021). This multiplier then was applied to the nominal investment by FRDC shown in Table 2.

Real Investment and Extension Costs

For the purposes of the impact analysis, the investment costs of all parties were expressed in 2020/21-dollar terms using the Implicit Price Deflator for Gross Domestic Product (ABS, 2020).

No additional costs of extension were included as the project included significant stakeholder consultation and engagement.

Impacts

Table 3 provides a summary of the principal types of potential impacts from Project 2019-095. Impacts have been taken, and potentially expanded, from those listed in Table 1 and categorised using a triple bottom line framework into economic, environmental, and social impact types.

Table 3: Principal Potential Impact Types from Investment in FRDC Project 2019-095

Economic	• Some contribution to avoided future production losses from WSD through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.
Environmental	• Some contribution to maintained aquatic/marine ecosystem health through improved surveillance and management of WSD in Australian waters.
Social	• Nil. • Though no direct social impacts were identified, the investment in Project 2019-095 may contribute indirectly to future maintenance of Australian food security and amenity provided by Australian prawns through AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries (Jennifer Marshall, pers. comm., 2022).

Public versus Private Impacts

The potential impacts from Project 2019-095 were primarily private impacts. Private impacts may be delivered through avoided future production losses from WSD driven by improved management.

Public impacts also may be delivered and would include maintained aquatic/marine ecosystem health from improved WSD surveillance and management. Indirectly,

Distribution of Private Impacts

Any private impacts from the investment in Project 2019-095 will primarily accrue to Australian crustacean producers such as prawn farmers that are better able to respond to and/or manage WSD.

Impacts on other Australian industries

No direct impacts to other Australian industries were identified.

Impacts Overseas

WSSV is listed by the World Organisation for Animal Health (OIE) as a notifiable disease (Moody & Mohr, 2022). WSSV currently is limited to the Movement Regulated Area in south-east Queensland in Australia and is under an official control and containment program. Project 2019-095 is likely to contribute to reduced risk of WSSV incursion and spread for both Australian producers and international importers of Australian prawns through improved response and ongoing management in Australian prawn fisheries.

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 2019-095 contributed to National Science and Research Priority 1. Further, the RD&E investment is likely to contribute to Agricultural Innovation Priorities 1 and 3 through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.

Table 4: Australian R&D Priorities

Australian Government	
National Science and Research Priorities[1]	**National Agricultural Innovation Priorities**[2]
1. Food – optimising food and fibre production and processing; agricultural productivity and supply chains within Australia and global markets. **2. Soil and Water** – improving the use of soils and water resources, both terrestrial and marine. **3. Transport** – boosting Australian transportation: securing capability and capacity to move essential commodities; alternative fuels; lowering emissions. **4. Cybersecurity** – improving cybersecurity for individuals, businesses, government, and national infrastructure. **5. Energy and Resources** – supporting the development of reliable, low cost, sustainable energy supplies and enhancing the long-term viability of Australia's resources industries. **6. Manufacturing** – supporting the development of high value and innovative manufacturing industries in Australia. **7. Environmental Change** – mitigating, managing, or adapting to changes in the environment. **8. Health** – improving the health outcomes for all Australians.	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. **1.** Australia is a trusted exporter of premium food and agricultural products by 2030. **2.** Australia will champion climate resilience to increase the productivity, profitability, and sustainability of the agricultural sector by 2030. **3.** Australia is a world leader in preventing and rapidly responding to significant incursions of pests and diseases through futureproofing our biosecurity system by 2030. **4.** Australia is a mature adopter, developer, and exporter of digital agriculture by 2030.

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

[2] 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.

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 2019-095 indirectly addressed FRDC national RD&E priority 2 through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.

Valuation of Impacts

Impacts Not Valued

Based on the scope of the assessment of the investment in Project 2019-095 none of the impacts identified were valued in monetary terms. Table 5 describes the reasoning for non-valuation of each of the impacts identified (Table 3).

Table 5: Reasons for Non-Valuation of Impacts

Impact Identified	**Reason(s) for Non-Valuation**
Some contribution to avoided future production losses from WSD through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.	The incremental improvement to the WSD AQUAVETPLAN manual and how any changes to the manual have affected WSD surveillance and management were uncertain and there were no data available on which to base credible assumptions.
Some contribution to maintained aquatic/marine ecosystem health through improved surveillance and management of WSD in Australian waters.	The pathways to impact were highly uncertain and the complexity of assigning monetary values to changes in ecosystem health were beyond the scope of the current assessment.
The investment in Project 2019-095 may contribute indirectly to future maintenance of Australian food security and amenity provided by Australian prawns through AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.	The linkages between the original investment in Project 2019-095 and the potential impact were highly uncertain and relatively week. Further, the social impact was not valued due to the complexity of estimating monetary values for benefits associated with food security and amenity (beyond the scope of the current assessment).

Results

All costs were expressed in 2020/21-dollar terms and were discounted to 2021/22 using a discount rate of 5%. Though no impacts were valued, in the interests of consistency with other project analyses and reporting, the Present Value of Costs (PVC) was reported for the length of the investment period plus for different periods up to 30 years from the last year of investment (2019/20).

Investment Criteria

Tables 6 shows the investment criteria estimated for different periods of costs for the total investment. FRDC contribute 100% of the project funding. As no impacts were valued, the investment criteria reporting is restricted to the PVC.

Table 6: Investment Criteria for Total Investment in Project 2019-095

Investment criteria	**Number of years from year of last investment**						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Present value of costs ($)	29,707	29,707	29,707	29,707	29,707	29,707	29,707

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

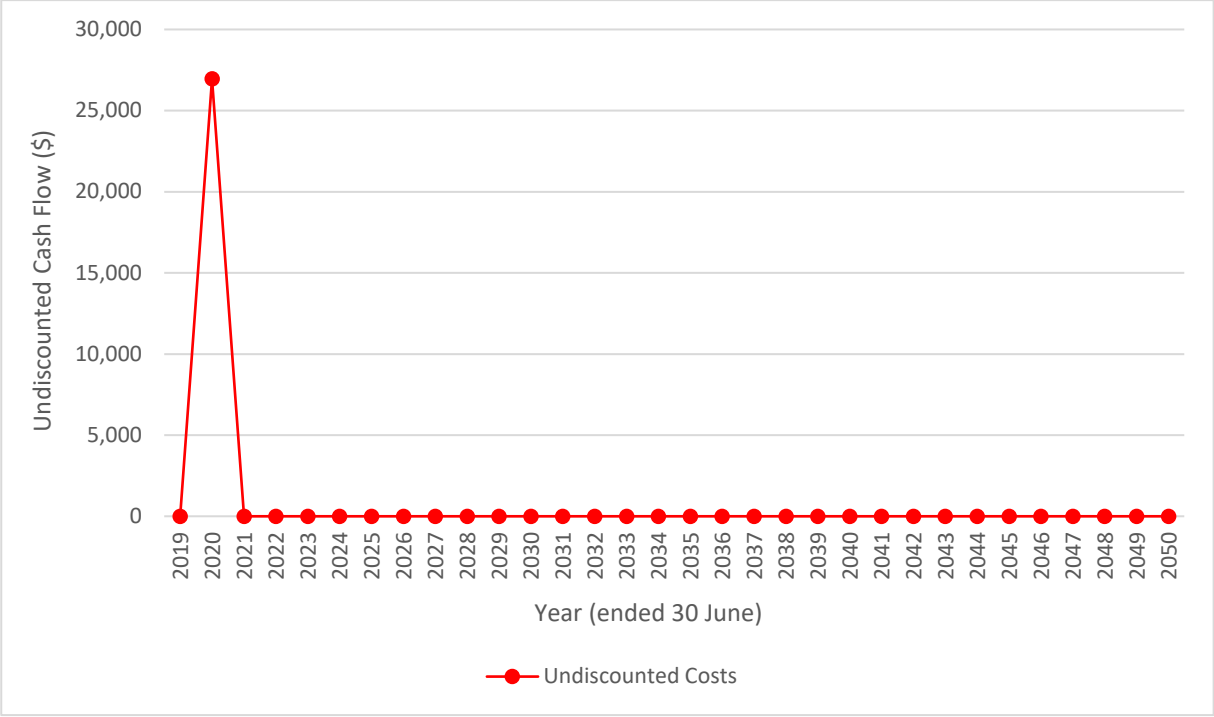

Figure 1: Annual Cash Flow of Undiscounted Total Costs

Conclusions

The investment in Project 2019-095 facilitated the updated of the AQUAVETPLAN manual for white spot disease. The updated AQUAVETPLAN manual now reflects the current scientific knowledge on WSD and ensures that strategies used for WSD control reflect current 'best-practice' approaches.

Though no specific evidence of impact was obtained within the scope of the assessment, it is likely that the updated AQUAVETPLAN for WSD will have some contribution to:

- Avoided future production losses from WSD through the AQUAVETPLAN's contribution to improved responses to WSD incursions and/or ongoing management of WSD in Australian fisheries.
- Maintained aquatic/marine ecosystem health through improved surveillance and management of WSD in Australian waters.

Total funding for the Projects was $29,707 (present value terms) and FRDC was the sole funding contributor. No impacts were valued in monetary terms in the current assessment.

Glossary of Economics 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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