

## **November 2017 Competitive Round Call for Expressions of Interest Closing date for applications 15<sup>th</sup> February 2018**

### **Call for Applications**

The Fisheries Research and Development Corporation ([FRDC](#)) is calling for Expressions of Interest (EOI) that address research, development & extension (RD&E) priorities nominated by the FRDC's Advisory Groups: Research Advisory Committees ([RACs](#)), Industry Partnership Agreements ([IPAs](#)) and FRDC [Subprograms](#).

The nominated RD&E priorities for investment are outlined below. EOI's that address multiple priorities are encouraged.

Applicants may also submit an EOI that does not address a nominated priority; however, it should be noted that preference may be given to applications that address nominated priorities. If you do wish to submit an application that does not address one of these priorities, it is recommended that you first discuss your research concept with the relevant [FRDC Advisory Group](#) contact. In addition, FRDC strongly recommends that all applicants consult with the relevant stakeholder groups and expected end users to ensure that research concepts has the support of beneficiaries. Support can be demonstrated through formal letters of support, in-kind contributions and project cash contributions.

### **Minimum EOI Requirements**

All EOIs **MUST** be completed via [FishNet](#). Refer to the FRDC website for more information on the FRDC's process for [Applying for Funding](#).

**Once you have completed your EOI you must finalise it on [FishNet](#) so that FRDC receives notification that the application is submitted. Failure to do so may mean that your application is not submitted and therefore not considered for funding.**

If you have any questions or issues with FishNet, please contact the FRDC by phone (02) 6285 0400 or email [frdc.programs@frdc.com.au](mailto:frdc.programs@frdc.com.au).

**Applications must be finalised by the 15<sup>th</sup> of February 2018. Applications not submitted by this date may not be accepted unless prior approval for a later submission date is provided by the FRDC.**

Each EOI must clearly outline how it will meet the relevant identified Need(s). Provide a succinct description of the proposed Method to achieve the stated Objectives, and deliver the expected Outputs and Outcomes. This should include a quantification of the impact of the research if the outputs were adopted such as a change in fisheries management, an improvement in the species population, increased profitability or efficiency of the commercial sector or improvements in recreational fishing experiences. Applicants also need to define project Extension activities that will be used to disseminate expected project findings. A realistic Budget that reflects the activity to be undertaken is to be provided along with Justification for the budget request. Where appropriate, applicants should demonstrate collaboration

with other relevant research providers and end users and also consider past and current research to avoid duplication and build on previous outputs.

After the 15<sup>th</sup> of February 2018, the FRDC will forward each EOI to the relevant FRDC Advisory Group(s) (e.g. RAC/IPA/Subprogram) for assessment. Following their meetings in March/April 2018, each FRDC Advisory Group will provide advice that will be communicated to applicants on whether their application has been supported or not supported in the round. An application that is not supported by an FRDC Advisory Group(s) is unlikely to be successful in obtaining funding.

The FRDC will assess all applications received in April, taking into consideration the level of FRDC Advisory Group(s) support and provide final advice to applicants on the result of their application in May.

Under the FRDC's flexible approach to investment this is one of three potential [Calls for Applications](#) in 2018; with subsequent calls for applications to be made in April and August if additional research priorities are nominated. If the RACs, IPAs and Subprograms do not have any priorities they wish to address, a call for applications may not occur.

**Nominated RD&E Priorities for Investment**  
(relevant Funding Partner(s) are shown in parentheses)

Increased Understanding of the Value Provided to Fisheries by Man-Made Aquatic Structures	WARAC
Viability of Small Commercial Fisheries	WARAC
The Need for Approaches to Distinguishing Between Stocked and Wild-Recruited Native Fish	NSWRAC; QLDRAC
People Development	WARAC
Increasing the Health and Productivity of <i>Pinctada maxima</i> Pearl Oysters	WARAC; NTRAC; Pearling IPA
Cost Effective Management Strategies for Small Scale/Capacity Limited Fisheries	NTRAC; WARAC; QLDRAC; NSWRAC
Influence of Changes in Reef Habitat Condition and Climate Change on Coral Trout — To Inform Abiotic Drivers of Coral Trout Stocks	QLDRAC
Managing Transition Both In and Out of the Seafood Industry	NTRAC
To Determine the Proportion of Queensland East Coast (Marine and Estuarine) Wild Barramundi Catch That is of Hatchery Origin	QLDRAC
Investigating Opportunities and Logistics for a Live Blue Swimmer Crab Market in NSW	NSWRAC; QLDRAC
Industry Recovery from White Spot Syndrome Virus (WSSV)	QLDRAC
Develop Estimates of Recreational Fishing Power Over Time	QLDRAC
Marking Of Offshore Fishing Gear for Navigational Purposes	NSWRAC
Develop an Efficient and Equitable Process for Allocation and Re-Allocation of Fisheries Resources, Across Sectors, to Align With Legislative Requirements of The Aquatic Resource Management Act 2016	WARAC; HDRS
Implications of Gulf St Vincent Productivity Loss: Developing Tools to Optimise Multi-Fishery Management in a Changing Environment	SARAC
Fisheries Biology of Western Australian Salmon: Improving our Understanding of Population Dynamics to Enable Quantitative Stock Assessment and Improved Fisheries Management	SARAC
Using New Technologies to Monitor Fishing for Sharks and Rays and Encourage Modified Angler Behaviour	SARAC; HDRS
Further Improvement of King George Whiting Hatchery Techniques for Aquaculture Development and Investigation of Strategies to Ensure Sustainable Harvest of this Species in South Australia	SARAC
Seal-Fisher-Ecosystem Interactions in the Lower Lakes and Coorong: Understanding Causes and Impacts to Develop Longer-Term Solutions	SARAC; HDRS
Development of Discard and Bycatch Triggers for Use in Commonwealth Fisheries Under the New Bycatch Policy	COMRAC
Developing Capacity and Capability Within the Recreational Fishing and Indigenous Sectors to Better Engage with Government on Fisheries Management Issues	COMRAC; HDRS
Cumulative Impacts Within Fisheries	COMRAC
Multi-Species Fisheries: Harvest Strategy Implications of Maximising Economic Yield and Implementation Options for Commonwealth Fisheries, With a Focus on the Southern and Eastern Scalefish and Shark Fishery (SESSF)	COMRAC; HDRS

Review of Abalone Stock Status Indicators: Is Estimation of Stock Biomass Defensible?	TASRAC
Assessing the Risk of Pathogenic Vibrio Species in Tasmanian Oysters	TASRAC
Risk from Diarrhetic Shellfish Toxins for the Tasmanian Shellfish Industry	TASRAC
Quantifying Mortality of Giant Crabs that Interact with Trawl Gear	TASRAC
Victorian Pipi Population Demography and Stock Discrimination	VICRAC
Improving Outcomes of Fisher Interactions with Sharks and Rays	VICRAC
Empirical Investigation of Demand Conditions and Dynamics in the South East Fishery	HDRS
Non-Market Values to Inform Decision-Making and Reporting in Fisheries and Aquaculture – an Audit and Gap Analysis	HDRS
Knowing Who Has Influence: Key Influencers and Networks for Socially-Supported Fisheries and Aquaculture	HDRS
Engaged Fisheries and Aquaculture	HDRS; NSW RAC; QLD RAC; NTRAC, WARAC; SRL IPA; ACPF IPA

## November 2017 Competitive Round Call for Expressions of Interest

Priority	Increased Understanding of the Value Provided to Fisheries by Man-Made Aquatic Structures
Need	<p>The energy sector has a number of man-made structures currently deployed in the aquatic environment. These structures are known to attract fish species and create productive fish habitats. Many of these structures currently underpin commercial and recreational fisheries.</p> <p>With Australia’s marine energy sector moving into a new phase (Decommissioning) the current decommissioning policy favours full removal of all aquatic infrastructure. Full removal of infrastructure will adversely affect a number of commercial and recreational fisheries who currently rely on this infrastructure.</p> <p>In order to ensure the best interests of the fishing sector are considered when decommissioning of a man-made structures is assessed there is a need to better understand and quantify the value this infrastructure currently provides to both commercial and recreational fishers.</p> <p>This information can be used to better inform regulators of the best interests of the fishing industry when optimal decommissioning solutions are being considered.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Quantify the current value man-made structures are making to commercial and recreational fisheries</li> <li>• Provide energy regulators with a better understanding of impacts to commercial and recreational fishing associated with the pending de-commissioning phase</li> <li>• Provide commercial and recreational fishing sectors with a better understanding of the opportunities and risks associated with the pending de-commissioning phase</li> <li>• Increased understanding of the options and potential utility of creating reefing precincts for the purposes of enhancing fisheries</li> <li>• Ensure the needs of the fishing sector are adequately considered by policy makers tasked with overseeing decommissioning of aquatic structures</li> </ul>
Funding Partners	Western Australian RAC

Priority	Viability of Small Commercial Fisheries
Need	<p>A number of priority areas have been identified through a recent significant review completed by WAFIC for the southern regions of Western Australia.</p> <p>It was identified that without effective leadership and a strategic approach the importance of the WA southern commercial fishing sector (covering approx. 21 fisheries) will diminish and the limited opportunities available will not be realised.</p> <p>From these identified priority areas, a recommendation has been made to the develop and implement a WA south and south west coast commercial fishing strategy in order to establish the future direction for management the region.</p> <p>In particular the review identified the need for a strategy for a multi-species purse seine fishery under the Aquatic Resources Management Act 2016, including trialing of purse seining for Australian salmon.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Outlook on the prospect of future fisheries resource development on the south and south-west coasts of WA including market development opportunities</li> <li>• Specific determination of a WA South and South West Coast Purse Seine Strategy</li> </ul>
Funding Partners	Western Australian RAC

Priority	The Need for Approaches to Distinguishing Between Stocked and Wild-Recruited Native Fish
Need	<p>Currently large-scale fish stocking programs release over 4.6 million native fish annually in the Murray-Darling Basin to support recreational and Aboriginal fishing.</p> <p>The Murray-Darling Basin Plan (MDBP) includes new sustainable water management arrangements to achieve environmental objectives including outcomes for native fish.</p> <p>However, the benefits of stocking for recreational fishing cannot be assessed due to the inability to distinguish between stocked and wild-recruited individuals.</p>
Planned outcomes	The ability to distinguishing between stocked and wild-recruited native fish will inform policies and strategies on stocking of native fish in areas based on where wild-recruitment events are naturally occurring.
Funding Partners	New South Wales RAC; Queensland RAC

Priority	People Development
Need	<p>The Western Australian RAC has set aside an annual amount for a standard priority seeking applications for People Development from industry in WA.</p> <p>Some of the more common types of people development applications that are likely to be considered include:</p> <ul style="list-style-type: none"> <li>• Bursaries, scholarships awarded to enable study to be undertaken</li> <li>• Capacity building - process of developing and strengthening the skills, processes and resources needed to survive, adapt, and thrive</li> <li>• Knowledge exchange (e.g. holding workshops/conferences, visiting experts)</li> <li>• International exposure (e.g. attend conferences, study tours)</li> <li>• Educational opportunities for learning new skills</li> <li>• To provide stewardship into the future (e.g. youth development programs)</li> <li>• Succession planning within industry</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Provide opportunities for knowledge transfer and R&amp;D adoption</li> <li>• Enhance industry leadership within, and across, all sectors</li> <li>• Build industry capacity to drive change to achieve goals</li> <li>• Build workforce capability</li> <li>• Financial contribution from applicant</li> </ul>
Funding Partners	Western Australian RAC

Priority	Increasing the Health and Productivity of <i>Pinctada maxima</i> Pearl Oysters
Need	<p>For over a decade the <i>Pinctada maxima</i> pearl oyster fishery in the North Western bioregion has been affected by shell heath and productivity issues.</p> <p>A recent FRDC <i>P. maxima</i> pearl oyster heath and productivity workshop in Cairns highlighted that continued uncertainty with respect to the driver of <i>P. maxima</i> health and productivity issues noting that the cause could be readily be an infectious agent, an environmental agent or multifactorial.</p> <p>The workshop highlighted a number of issues with the current shell health case definition and the lack of real understanding with respect to <i>P. maxima</i> epidemiology, and recommended in the first instance that these two issues be addressed in order to better understand the drivers of <i>P. maxima</i> health and productivity issues.</p>

Planned outcomes	<ul style="list-style-type: none"> <li>• A re-visit of the case definition to ascertain whether or not it is actually a pathogen that is responsible for decreased shell health and productivity, that relies less on existing information and more on carefully structured research to generate new information, that utilises optimal techniques that provide for clear indications of infection/pathology</li> <li>• An epidemiological study may be able to assist in exploring the question as to whether the problem is <i>either</i> a pathogen <i>and/or</i> an environmental problem. But, it is quite plausible that there is an interaction in which one or more pathogens are triggered by an external environmental stimulus. One way to approach this is by coupling real-time environmental monitoring systems with high- frequency measurements of oyster health.</li> </ul>
Funding Partners	Western Australian RAC; Northern Territory RAC; Pearling IPA

Priority	Cost Effective Management Strategies for Small Scale/Capacity Limited Fisheries
Need	<p>Managing small scale and socially complex, but capacity limited fisheries can be time-intensive and financially expensive. Developing tools to streamline, improve the accuracy throughout decision making processes, and making them more transparent and approachable to stakeholders is important. Critically, the tool(s) need to:</p> <ul style="list-style-type: none"> <li>• Aid and inform objective setting processes</li> <li>• Identify management options that match the characteristics and circumstances of the fishery (from a resource and a user perspective)</li> <li>• Provide clear guidance on stock status and monitoring options that should be associated with each management option, to inform decisions and allow for cost-appropriate choices to be made</li> </ul>
Planned outcomes	Improved and more consistent approaches to managing small scale/capacity limited fisheries
Funding Partners	Northern Territory RAC; Western Australian RAC; Queensland RAC; New South Wales RAC



Priority	Influence of Changes in Reef Habitat Condition and Climate Change on Coral Trout — To Inform Abiotic Drivers of Coral Trout Stocks
Need	<p>Coral trout are the main commercial and recreational species in Queensland’s Coral Reef Finfish Fishery, and also caught in other fisheries in northern Australia. The reef habitats that support coral reef finfish are already being impacted by ongoing climate change, including severe coral bleaching and storm damage, and further environmental deterioration is most likely.</p> <p>Experimental research suggests high vulnerabilities for coral trout from climate change, for example these fish appear to already be living in waters now at the upper end of their thermal tolerance and their physiology is expected to be impaired with further ocean warming. The different life-stages of coral trout also have various dependencies on healthy coral reefs (e.g. for settlement habitat, prey). There is a need to expand this laboratory research into the reef environment to better understand the flow-on effects of changing reef condition and environment on coral reef finfish fisheries.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Improved understanding of the likely flow-on effects of changing reef condition and environment on coral reef finfish fisheries, particularly the key fishery species Common Coral Trout.</li> <li>• Resulting information to inform fishery assessments (e.g. stock assessments), harvest strategies</li> <li>• Adaptation options for industry to allow rapid mitigation efforts in relation to climate risks</li> </ul>
Funding Partners	Queensland RAC

Priority	Managing Transition Both In and Out of the Seafood Industry
Need	<p>There is a continuous transition of the seafood industry, with people wishing to leave and new entrants entering, but without a formal process there is significant difficulty and pain being experienced especially by those leaving.</p> <p>To mitigate this problem, the process should be identified and managed by government with support from the industry. There is little succession planning in the fisher's businesses. Many invested in their licences as a form of superannuation but when the price of licences is reduced, so is their ability to retire: they are trapped. With the reduced capacity to fish, with advancing age and depreciating assets, they're in a squeeze which requires recognition, and management. With appropriate and timely action however, the transition experience can be more appropriately managed.</p> <p>Historically, the approach to reduce the amount of licences has been perceived as inconsistent and unfair. Conversely, there is no clear path to develop skills and "grow" a fishing business. In a managed industry-transition process, there should be clear acknowledgement of the issues and a clear vision about which fisheries have the sustainable catch and markets to grow (and then a focus on how to do this), versus fisheries without social license due to sacred sites, competition with recreational fishermen or insufficient catch.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Adoption of suitable Northern Territory transition pilot programs and communication tools</li> <li>• Better informed and timely processes to manage the well-being of members that are transitioning in or out of the commercial industry</li> </ul>
Funding Partners	Northern Territory RAC

Priority	To Determine the Proportion of Queensland East Coast (Marine and Estuarine) Wild Barramundi Catch that is of Hatchery Origin
Need	<p>Barramundi are stocked in impoundments along the Queensland east coast and there is strong evidence that a substantial proportion of these fish find their way into the estuarine and coastal environments.</p> <p>The recent assessment of the East Coast Queensland Barramundi fisheries, commissioned by Fisheries Queensland and conducted by fishery assessment scientists in DAF, was unable to be completed because of the unknown, but significant, proportion of the commercial catch that is made up of hatchery-reared barramundi that had been stocked into impoundments, and that had entered east coast populations during flood events.</p> <p>To carry out a successful assessment of the East Coast Barramundi stock we first need to be able to determine what contribution impoundment-sourced barramundi make to estuarine and coastal barramundi populations. The capacity to answer that basic question depends on our ability to distinguish between wild and stocked Barramundi.</p> <p>Because of the sporadic (irregular) nature of flood events, the proportion of impoundment-sourced Barramundi in the East Coast fishery will vary over time. Taking this into account as well as the fact that flood events are often concurrent with peak times for spawning, means that measuring the ‘hatchery signature’ of the stock will need to be carried out periodically to trace potential dilution of signatures—it is not a once-off study.</p> <p>Established methods for identifying the source of fish—genetics and otolith microchemistry—can be effective but are costly and time-consuming, and therefore not a practical tool for answering this fishery assessment information gap. There is therefore a need to evaluate alternative (preferably cheap) rapid-assessment methods to distinguish between impoundment and non-impoundment barramundi.</p> <p>In a previous FRDC-funded study (FRDC Project No. 2012/011), the practical applicability of near-infra-red spectroscopy (NIRS) to detect differences between fish from different regions was confirmed. However, this research did not investigate the full potential of NIRS in determining origin of individuals.</p> <p>Therefore an opportunity has been identified to investigate NIRS’ ability to determine the origin of a singled individual, based upon its ability to detect differences between fish, by applying the method to the Queensland barramundi fishery.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Agreeance in NIRS ability to distinguish wild and hatchery-reared barramundi into impoundments</li> <li>• Adoption of an efficient, economically viable and scalable NIRS method that will improve the Queensland east coast barramundi fishery assessment</li> <li>• Increased and more accurate knowledge of the ecological and genetic impact of barramundi stocking</li> </ul>

Funding Partners	Queensland RAC
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Priority	Sectoral implications of White Spot Syndrome Virus (WSSV)
Need	<p>The FRDC has undertaken economic impact studies across both the aquaculture and wild harvest fisheries in Moreton Bay. However, the incursion of White Spot and the extent of the sectoral impacts in the Moreton Bay region is not fully understood.</p> <p>The Queensland RAC has identified a need to develop, using current market and impact data, an understanding of the Moreton Bay sectoral implications that might emerge over the next two to three years. This may include analysis of projected market changes, the impact of shifted effort, retirement and exit strategies and business contingency planning.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Identification of the medium-term sectoral implications for the Moreton Bay Region post-White Spot</li> <li>• A projection of the state of the Moreton Bay sector over the next two to three years in relation to the impacts of White Spot on industry</li> </ul>
Funding Partners	Queensland RAC

Priority	Investigating Opportunities and Logistics for a Live Blue Swimmer Crab Market in NSW
Need	<p>As the NSW fishing industry moves forward into the future with quota managed fisheries, there is a need for industry to develop procedures and process on catching, holding and transporting Blue swimmer crab that would value add to the wild harvest sector's product – particularly for the live sales market.</p> <p>The current market is predominantly made of sales of cooked and raw blue swimmer crabs. An approx. price range of blue swimmer crab for 2015 / 2016 was \$8.50 &lt; \$9.00 per kilo. The live trade in blue swimmer crab in 2016 / 2017 is approx. \$20.00 per kilo. A move to selling into the live market would provide a better return for effort and would help in maximizing return on investment in the blue swimmer crab quota fishery.</p> <p>The "Live Blue Swimmer Crab" trade is in its infancy and it is timely to invest in technologies that will assist in lowering the mortality rates of these animals. Any investment now will accelerate the development of this fishery and ensure the best chance for the restructure of the NSW fishery to achieve its goals – i.e. viability and efficient use of a quota species.</p>

Planned outcomes	<ul style="list-style-type: none"> <li>• Development of handling guidelines/advice for a live Blue Swimmer Crab trade market</li> <li>• Trained handling industry staff at all key Blue Swimmer Crab ports in NSW</li> <li>• Added value to the Blue Swimmer Crab</li> <li>• Increased GVP of Blue Swimmer Crab</li> </ul>
Funding Partners	New South Wales RAC; Queensland RAC

Priority	Develop Estimates of Recreational Fishing Power Over Time
Need	<p>Technical advances have improved the efficiency and effectiveness of recreational fishing.</p> <p>Changes have included:</p> <ul style="list-style-type: none"> <li>○ Improvement in rod design</li> <li>○ Fishing line</li> <li>○ Improved safety of small recreational vessels</li> <li>○ Technology – e.g. Sounders, GPS &amp; Larger vessels with greater range</li> </ul> <p>Currently this change in fishing power is not considered quantitatively in stock assessment or during stock status discussions, but qualitative evidence indicates that fishing power has increased substantially. The formal inclusion of fishing power estimates into the quantitative stock assessments will remove this important source of bias.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• A quantitative evaluation of the changes to the fishing power of recreational fishers.</li> <li>• Improvements in the assessment of stock assessments and classification of the status of fish stocks.</li> </ul>
Funding Partners	Queensland RAC

Priority	Marking of Offshore Fishing Gear for Navigational Purposes
Need	<p>Commercial fishers have reported loss of fishing gear due to suspected interaction with large traversing vessels such as the cargo vessels etc. Fishers estimate that the loss of gear (anywhere from 20-50 floats/gear lost per year) and product per fisher is equating to estimated \$15,000 each. With 5 fishers advising the PFA of the incidences – it is likely there are more that have not been reported. An area that is well known for this type of interaction is from Port Stephens to Sydney. In addition, DPI Fisheries has also advised that their FADs are also going missing from the area – with an estimated 5 FADs lost a year.</p> <p>The PFA has been working with AMSA for the last year to investigate options to mitigate this interaction with the following options explored but considered impractical or ineffective.</p> <p><u>Electronic Charts</u></p> <p>On Electronic Charts, there is a cautionary note, embedded as a data set. That states that there is fishing gear in the areas. This dataset does two things. Firstly, when a mariner plans a voyage, the Electronic Charting Data and Information System (ECDIS) will provide a warning during their planning process which will bring up the text as above. The warning needs to be accepted by the navigator before the plan can be finalized. Secondly, when a ship navigates in or near the area, the note will pop up on the screen with an associated warning/caution.</p> <p>This needs to be accepted by the Officer of the Watch, or it will keep alarming. Ships crews are most certainly aware of fishing around Australia, in particular, the chartered Rock Lobster fishery on the East Coast. There are other areas around Australia that also have chartered fishing grounds.</p> <p><u>AUSCOAST</u></p> <p>An AUSCOAST (coastal) warning is not appropriate for this purpose. The regulations for these have changed recently (2016), and the operative words are very clear "Navigational warnings are issued in response to SOLAS regulation V/4 and carry information which may have a direct bearing on the safety of life at sea". It is clear that these do not apply to fishing gear.</p> <p><u>Virtual AIS</u></p> <p>AMSA also investigated the use of Virtual AIS AtoN's to mark an area temporarily. However, this has been trialed previously in WA, with no success. In addition, AMSA cannot facilitate Virtual AIS in this situation as AMSA does not have an AIS Base station within range of the area.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• A cost effective method or gear that fishers could utilise to mark their offshore floats/gear and reduce likelihood of interaction</li> </ul>
Funding Partners	New South Wales RAC

Priority	Develop an Efficient and Equitable Process for Allocation and Re-Allocation of Fisheries Resources, Across Sectors, to Align With Legislative Requirements of The Aquatic Resource Management Act 2016
Need	<p>Uncertainty over future access rights to aquatic resources have been identified as the single largest contributor to mental health issues, investment fatigue and disinterest in the commercial fishing sector. This uncertainty makes commercial fishing career paths less attractive for the younger generations within fishing communities and has resulted in a major '<i>generational shift</i>' challenge for industry.</p> <p>The same uncertainty over rights to access the publicly owned aquatic resources of Western Australia has led recreational fishers to question the equity of fisheries allocation regimes, which often have not taken into consideration their sector's aspirations.</p> <p>The absence of an efficient, equitable and transparent allocation/reallocation process adds to this uncertainty and has invariably led to disputes over resource sharing which are counterproductive and divisive across coastal communities, leading respective sectors to form entrenched positions which often lead to win/lose outcomes usually through political intervention.</p> <p>New fisheries legislation in WA (ARMA) is forecast to commence in January 2019 and will require each existing managed fishery, transitioning to the new Act, to be allocated/reallocated across the commercial, recreational and indigenous/customary fishing sectors. The allocation objectives include having regard to the economic, social and other benefits that the aquatic resources provide the State.</p> <p>An efficient, equitable and transparent process for allocation/reallocation based on the principles of Integrated Fisheries Management (IFM) is required for all fisheries transitioning to the ARMA legislation.</p> <p>Many of these fisheries will have a relatively simplistic allocation solution. For example, fisheries where the material historic catch has been in a single sector (e.g. Pearl Oysters) or those in which the catch levels across sectors is stable and generally accepted (e.g. Western Rock Lobster).</p> <p>The remaining fisheries, by exception, will require a different solution. These include those fisheries where aspirations of sectors are changing, or current levels of catch are clearly not accepted by some.</p> <p>Current IFM principles are, for the most part sound, however the former Integrated Fisheries Allocation Advisory Committee (IFAAC) process for allocation has failed to deliver in a timely or efficient manner and requires replacement by means of alternate assessment processes that meet current allocation requirements under the ARMA and, if required, future reallocation needs in general.</p> <p>An efficient, equitable and transparent process that leads to agreed sectoral allocations (and reallocation) will provide greater security of access, reduce uncertainty, potential to attract investment, employment and growth prospects for</p>

	<p>the commercial seafood producers. For recreational and indigenous fishers, a fair and equitable allocation process which maximises social utilisation of fish stocks will provide long term security of access and diminish community unrest.</p> <p>For fisheries in the 'exception' category, a mediation/negotiation style process which considers not only historical use, but more importantly future objectives for the resource as a whole, may provide an alternative which satisfies the legislative requirements and maximises outcomes across sectors. Importantly, social and economic objectives, for all sectors, must be given appropriate consideration within the development of an allocation framework.</p> <p>Allocations between sectors can, and should, change over time to reflect changes in social and economic values. A critical component of any allocation framework is a market based process for re-allocation of the resource to meet future needs.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Definitive understanding of current and historic resource allocation and re-allocation processes (noting DPIRD has an existing resource to draw from). Look for successful patterns and elements which may be applicable in a Western Australian fisheries resource context; use these to develop a theoretical model of world's best practice;</li> <li>• A policy framework and criteria toolbox for cross sectoral resource allocation</li> <li>• A practical, user driven process and timeframe for allocation of fisheries resources, with emphasis on the exception category, across sectors to include social and economic objectives;</li> <li>• Refined processes that deliver efficient and replicability -noting that some variances will be required for a bespoke fit to particular fisheries</li> <li>• A prescriptive process for extension of the model to meet requirements for future fishery resources transitioning to the ARMA legislation</li> <li>• A market based framework/process for re-allocation of fishery resources</li> </ul>
Funding Partners	Western Australian RAC; Human Dimensions Research Subprogram

Priority	Implications of Gulf St Vincent Productivity Loss: Developing Tools to Optimise Multi-Fishery Management in a Changing Environment
Need	<p>A recently developed trophodynamic model of the Gulf St Vincent (GSV) ecosystem provided the first integrated assessment of the status, performance and impact of its key fisheries over a 20-year period. The study identified that despite ongoing management to improve fisheries sustainability, overall catches declined by 30% between 1994 and 2014.</p> <p>Results from trophic modelling identified that these declining catches have occurred against a background of relatively stable mean trophic level of catch and fishing in balance, suggesting that declining catches may have occurred as a consequence of declining productivity in the GSV ecosystem.</p> <p>Identifying the causes of this apparent productivity loss and its impact on fish production are important to resolve, as its management and mitigation will be important to improving the future sustainability and profitability of GSV's fisheries and the ecosystem that supports them.</p>



	<p>This project is expected to further develop the GSV ecosystem model to enable:</p> <ol style="list-style-type: none"> <li>1) assessment of trends in ecosystem productivity over time</li> <li>2) identification of the potential causes for declining productivity, and</li> <li>3) assessment of its potential impact on future commercial fishery production.</li> </ol> <p>The GSV ecosystem model will provide a decision support tool to enable the evaluation and optimisation of alternate multi-fishery management scenarios (Management Strategy Evaluation) under different future GSV ecosystem production regimes.</p>
Planned outcomes	<p>This project is expected to develop a spatially explicit GSV ecosystem model that integrates key environmental times series. These and other key developments will enable complex ecological and spatial use change scenarios to be undertaken, including an assessment of the relative importance of a range of factors (e.g. seagrass loss, pollution, climate change) that may contribute to declining fishery production.</p>
Funding Partners	South Australian RAC

Priority	<p>Fisheries Biology of Western Australian Salmon: Improving our Understanding of Population Dynamics to Enable Quantitative Stock Assessment and Improved Fisheries Management</p>
Need	<p>The Western Australian Salmon biological stock extends from southern Western Australia to the east coast of Tasmania, with each State jurisdiction harvesting different life-history stages. The Western Australian fishery typically targets mature spawning fish that aggregate around the south-western tip of the State, whereas the South Australian, Victorian and Tasmanian fisheries predominantly harvest juveniles and sub-adults in coastal waters as they migrate along the southern coast of Australia. Given the shared nature of the stock it is important that each jurisdiction has adequate management in place to ensure that their respective fisheries do not compromise the overall sustainability of the resource.</p> <p>The harvest of Western Australian Salmon in South Australia (SA) has historically been confined to gulf and coastal waters and targeted by hauling net fishers and a few dedicated 'seine' fishers within the Marine Scalefish Fishery (MSF). Some of the catch was sold for human consumption, but given the low value of the product much of it is used as bait in the Southern Rock Lobster Fishery. The species is also a popular target within the State's recreational fishing sector. Since 1984 the commercial net harvest of Western Australian Salmon in SA has been managed through the implementation of a 1,100 t catch limit with varying entitlements allocated to individual licence holders on the basis of their net endorsements. Despite this capacity, the annual State-wide commercial catch has rarely exceeded 600 t (Fowler et al. 2016). The latest estimate of catch from the recreational sector was 61 t, representing approximately 48% of the State's total catch in 2013/14 (Giri and Hall 2015).</p> <p>There is an opportunity for this fishery to expand into emerging national and international seafood markets. The fishery has the capacity to alter its fishing practices to efficiently target large offshore schools and embrace new processing</p>

	technologies to maximise the quality, value and marketability of the product for human consumption. There is a need to improve our understanding of key biological characteristics and population dynamics of the stock to enable quantitative stock assessment and improved fisheries management.
Planned outcomes	The current level of biological information that exists for Western Australian Salmon in South Australia is dated (Malcolm 1960, Cappo 1987) and largely focussed on the coastal component of the shared stock. The potential expansion of the fishery into offshore waters represents access to an unknown component of the resource. There is a fundamental need to update our understanding of the population structure of the species throughout State waters including both the inshore and offshore components of the stock. There is also a need to update key biological metrics for this species (e.g. size/age structure, size at maturity, reproductive condition, growth rates) to underpin the development of a species-specific harvest strategy to ensure the sustainability of the resource.
Funding Partners	South Australian RAC

Priority	Using New Technologies to Monitor Fishing for Sharks and Rays and Encourage Modified Angler Behaviour
Need	<p>Recent events have focussed attention on policy, research, management and public perception issues associated with recreational fishing for sharks and rays in South Australia, and other jurisdictions.</p> <p>To address this, the PIRSA Fisheries and Aquaculture has identified the need to develop a citizen science supported project that uses modern techniques and communication media to disseminate information relevant to the sustainable management of sharks and rays.</p> <p>Focus on this issue identified a need to improve education and awareness levels among the recreational fishers in relation to the importance of sustainable and ethical capture, handling and release processes for shark and rays. It is considered that a citizen science approach will create a platform from which to develop a more positive culture of releasing sharks and rays to enhance survival rates and at the same time enable the collection of relevant biological data.</p> <p>A study of the post-release survival of key target species using modern tagging technologies will be designed to inform development of a code of conduct for sustainable capture, handling and release of sharks and rays. This study component will incorporate direct engagement with the recreational fishing sector that targets sharks and rays, and will be coupled with broad-scale public and fishery dissemination and feedback strategies to address the management challenges and perception issues.</p> <p>In the United States new mobile phone App technology is being used in a citizen science project administered by NOAA to record in real time the capture and release of shortfin mako sharks (a species also considered vulnerable in Australian waters)</p>

	<p>and this methodology could potentially be applied to a suite of species in SA including bronze and dusky whalers and hammerhead sharks.</p> <p>See <a href="http://www.nmfs.noaa.gov/sfa/hms/shortfinmako/mako_app.html">http://www.nmfs.noaa.gov/sfa/hms/shortfinmako/mako_app.html</a></p> <p>This project is expected to:</p> <ul style="list-style-type: none"> <li>• Use modern information gathering and tagging techniques to monitor catch distribution and assess the post-release survival of selected commonly targeted species of sharks and rays.</li> <li>• Apply the data generated through the assessment to identify sustainable capture, handling and release techniques.</li> <li>• Develop a recreational fishery code of conduct for sustainable capture, handling and release of sharks and rays, and utilise new technologies to disseminate the information.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Educate recreational fishers that target elasmobranchs to improve engagement and awareness.</li> <li>• Develop a more positive culture of releasing sharks and rays to enhance survival rates and at the same time enable the collection of relevant biological data among anglers targeting sharks and rays.</li> </ul>
Funding Partners	South Australian RAC; Human Dimensions Research Subprogram

Priority	Further Improvement of King George Whiting Hatchery Techniques for Aquaculture Development and Investigation of Strategies to Ensure Sustainable Harvest of this Species in South Australia
Need	<p>King George Whiting (KGW) is an iconic and high value marine fisheries species in South Australia. However, previous research on spawning and larval rearing of this species (FRDC Project No. 97/314, “Spawning and larval rearing research on King George whiting relevant to aquaculture and fisheries biology”) has identified challenges associated with production through aquaculture, including: shortcomings in the ability to achieve a regular supply of good quality eggs; poor hatchery survival; and slow growth.</p> <p>Development of techniques to improve hatchery production and on-growing, in pond and tank systems using warmer water, suggest that further investigation is required. Improving the viability of aquaculture of KGW could support the industry uptake of production, leading to new market opportunities for this popular white-flesh fish species.</p>
Planned outcomes	<p>This project is expected to improve the potential for KGW aquaculture development and stock enhancement by achieving:</p> <ul style="list-style-type: none"> <li>• reliable fingerling supply through refining / developing hatchery techniques;</li> <li>• faster growth rates through techniques and reliable production for unisex stocks (if one sex grows faster than the other) and / or hybrids (hybrid vigor); and</li> <li>• identification of optimal operational strategies for aquaculture, e.g. brood stock management and water quality parameters.</li> </ul>

Funding Partners	South Australian RAC
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Priority	Seal-Fisher-Ecosystem Interactions in the Lower Lakes and Coorong: Understanding Causes and Impacts to Develop Longer-Term Solutions
Need	<p>In recent years, the number of fur seals entering The Coorong and Lower Lakes ecosystem has increased markedly. Interactions with commercial fishers have had significant economic impact through depredation of catches and damage to fishing gear. Many fishers and community members are also concerned about the potential impacts that seals are having on waterbirds and on the broader lakes and estuary ecosystems.</p> <p>Recent initiatives through the cross-Government Long-nosed fur seal Working Group, including seal crackers and investigation and trialling of alternate fishing gear (FRDC project 2016-001), may provide some potential relief, but do not provide long-term solutions to the problem. Industry and communities are now seeking additional options to mitigate the potential of future impact of seals. Identification of the factors that make the Coorong and Lower Lakes attractive to seals, and non-lethal ways to make it less so, are likely to provide important information in the development of practical and effective longer term solutions.</p> <p>This project is expected to identify the environmental and fishery related factors that drive the seasonal build-up of fur seal numbers in the Lakes and Coorong, and make the region attractive to them. The expected project approach will utilise a range of methods to improve information on seal-fisher-ecosystem interactions, including: improved log-book reporting; population and haul-out availability/suitability surveys; the importance and limitation of suitable haul-outs; satellite tracking and dietary investigation to determine where, when and on what fur seals are predated; and ecological modelling. It is expected that the proposed project will use these data and analyses to identify and assess a range of non-lethal options that will help reduce the attractiveness of the region as a place for fur seals to visit, and return to.</p> <p>Refer to project 2016-001 “Developing alternative strategies for managing seal-fisher interactions in the South Australian Lakes and Coorong Fishery”.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Understand Seal-Fisher-Ecosystem Interactions in the Lower Lakes and Coorong</li> <li>• Reduce the interactions between seals and fishers in the Lower Lakes and Coorong using non-lethal options</li> </ul>
Funding Partners	South Australian RAC; Human Dimensions Research Subprogram

Priority	Development of Discard and Bycatch Triggers for Use in Commonwealth Fisheries Under the New Bycatch Policy
Need	<ul style="list-style-type: none"> <li>• The Commonwealth utilises ecological risk assessment and ecological risk management to prioritise management for bycatch in its fisheries. Their objective is to apply management that results in very few (if any) bycatch species being consistently ranked in the high risk category to the impacts of fishing.</li> <li>• Operationalising this approach benefits from developing triggers and indicators that can be generated from currently collected fishing data and inform regulators on the potential for a species to have changed risk ranking (from low to high and vice-versa).</li> <li>• Such triggers and indicators allow rapid response by managing agencies to a change where risk ranking increases (i.e. low to high) and facilitates more efficient reporting on the performance of bycatch management in Commonwealth fisheries.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Consolidation of knowledge gaps and assumptions associated with estimation of risk using the methods typically applied in Commonwealth fisheries.</li> <li>• Develop and test guidelines for choosing fisheries triggers that indicate when risk thresholds have been exceeded for priority bycatch species (noting that this may include groups of species).</li> <li>• Provide examples of the implementation of these guidelines for a line and net fisheries.</li> </ul>
Funding Partners	Commonwealth RAC

Priority	Developing Capacity and Capability Within the Recreational Fishing and Indigenous Sectors to Better Engage with Government on Fisheries Management Issues
Need	<ul style="list-style-type: none"> <li>• Increasingly recreational and Indigenous fishers are being required to engage with Government on fisheries management issues and represent their sectors. However, the recreational and Indigenous sectors now struggle to meet the existing requirements for MACs and RAGs.</li> <li>• Provide education and training for new recreational and Indigenous members of MACs &amp; RAGs and fisheries managers. This training should build on previous research/training in this area.</li> <li>• The applicant is required to demonstrate consultation with both the recreational fishing and Indigenous sectors.</li> <li>• Review harvest strategies to account for recreational and Indigenous interests.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Improvement in the capacity for Indigenous and recreational members to participate in fisheries forums and for other RAG/MAC members to have a better understanding of indigenous fishery and community issues and how to engage and support recreational and Indigenous involvement.</li> <li>• An increase in the ability of the recreational fishing community to effectively engage with Government on fisheries management and other key policy issues.</li> <li>• Better fisheries management and policy outcomes on key issues such as resource sharing.</li> </ul>

	<ul style="list-style-type: none"> <li>Adjusted Harvest Strategies where appropriate to account for Indigenous and recreational fishing interests.</li> </ul>
Funding Partners	Commonwealth RAC; Human Dimensions Research Subprogram

Priority	Cumulative Impacts Within Fisheries
Need	<ul style="list-style-type: none"> <li>There are no clearly agreed methods for assessing cumulative impacts across all sectors and all fisheries, but the importance of tackling the topic is increasingly being realised.</li> <li>Within the Commonwealth, changes in legislation have also meant that the contributions by, and implications for, recreational and indigenous components must now be explicit.</li> <li>The need for assessment of cumulative impacts includes commercial and bycatch species.</li> <li>Methods for cumulative assessment of impacts need to be trialled in order to develop a consistent approach that can applied to Australian fisheries.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>Developing consistent assessment frameworks and harvest strategies that explicitly include data rich and data poor components and the interaction between sectors (both spatially but also across the life history of the stocks).</li> <li>These assessments will also contribute to assessing cumulative impacts for bycatch species, including in ERAs and other habitat or ecosystem assessments.</li> <li>This will also lead to improved and consistent reporting of catches across all sectors and system components.</li> </ul>
Funding Partners	Commonwealth RAC

Priority	Multi-Species Fisheries: Harvest Strategy Implications of Maximising Economic Yield and Implementation Options for Commonwealth Fisheries, With a Focus on the Southern and Eastern Scalefish and Shark Fishery (SESSF)
Need	<p>One of the objectives AFMA is required to pursue is maximising net economic returns to the Australian community from the management of Australian fisheries. The new Commonwealth Fisheries Harvest Strategy Policy (CHSP) provides guidance in pursuing this objective through maintaining fish stocks at maximum economic yield (MEY) targets. However, the CHSP recognises that net economic returns for multi-species fisheries may be maximised by applying differential targets:</p> <ul style="list-style-type: none"> <li>Where a harvest strategy applies to a multi-species fishery it may be appropriate for some species to be maintained below BMSY, but always above BLIM, to ensure that the fishery maximises net economic returns.</li> <li>AFMA understands this approach is consistent with the proposed approach in the revised CHSP and guidelines.</li> <li>AFMA has applied MEY to several species or species groups across several fisheries. However, with the exception of the Northern Prawn Fishery which has</li> </ul>

	<p>been able to apply a fishery bio-economic model, harvest strategies for multi-species fisheries are poorly developed and seldom applied.</p> <ul style="list-style-type: none"> <li>• The SESSF, which is itself comprised of several sub-fisheries, applies, in general, the same MEY targets for 'key commercial species' and the same MSY targets for 'secondary commercial species', with targets usually based on policy proxies. Recent research shows that it is not possible to maintain all species at these same targets and that this approach is unlikely to maximise the net economic returns for the fishery as a whole. Consequently, to address this objective, a different approach needs to be developed and implemented.</li> <li>• Long-term approaches for SESSF monitoring and assessment are being examined through several projects and activities (principally the SESSF monitoring and assessment review project [SMARP]), including decision frameworks around setting multi-year TACs.</li> <li>• Operationalising MEY, SMARP recommendations and multi-year TAC decision frameworks need to be consolidated into a revised harvest strategy. To do so, a fishery-wide harvest strategy with multiple and appropriate reference points, and multispecies decision rules needs to be developed, operationalised and tested.</li> <li>• Success factors for this work include the outputs being practically implementable, best optimise MEY for the fishery as a whole (and where possible sub-fisheries), affordable and identify principles that can then be applied to a range of multi-species fisheries (Commonwealth &amp; State/NT).</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Consolidation of background information and experience on: (1) application of MEY in multispecies fisheries, (2) the identified SESSF multispecies sub-fisheries and the biological and technical interactions within them, and (3) the preferred future monitoring and assessment option(s) that have been identified by SMARP.</li> <li>• Develop and quantitatively test options for a fishery-wide harvest strategy, including reference points and decision rules that can be applied to the appropriate sub-fisheries and achieve MEY outcomes for the fishery as a whole.</li> <li>• Integrate the outputs from 2 and 1 (iii) above to produce a complete tested draft revision of the SESSF Harvest Strategy Conduct a cost-benefit analysis for implementation of a new draft SESSF HS, drawing on SMARP project analyses and recommendations</li> </ul>
Funding Partners	Commonwealth RAC; Human Dimensions Research Subprogram

Priority	Review of Abalone Stock Status Indicators: Is Estimation of Stock Biomass Defensible?
Need	<p>The gold standard for assessment of fisheries is sufficient biological and fishery independent data to support a model based assessment of stocks.</p> <p>Abalone fisheries around Australia rarely have access to such data, and continue to rely significantly on catch per unit effort for assessment of abalone stock status. Some jurisdictions invest significantly in fishery-independent data, and this data is assumed, but not proven, to be of better quality than CPUE. CPUE logically is linked to exploitable biomass, however relationship between CPUE, fished area and total annual catch suggest this relationship is complex and that CPUE in abalone fisheries while useful, needs to be used cautiously in the context of overall stock biomass.</p>

	Limitations on interpretation of CPUE data apply equally to fishery-independent data, such that the high regard held for FI data in abalone fisheries may not be warranted.
Planned Outcomes	<ul style="list-style-type: none"> <li>• Robust methods for determining stock status of abalone fisheries.</li> <li>• Establish a logical argument for/against determination of absolute biomass in abalone fisheries.</li> <li>• Tests of the assumption that fishery-independent data is more useful than CPUE</li> </ul>
Funding Partners	Tasmanian RAC

Priority	Assessing the Risk of Pathogenic <i>Vibrio</i> Species in Tasmanian Oysters
Need	<p>In 2016 an outbreak of gastrointestinal illness was confirmed through a health trace back to be associated with marine bacterial pathogen <i>Vibrio parahaemolyticus</i> consumed via commercially grown oysters harvested in Moulting Bay harvest area. In response to the outbreak the State Shellfish Control Agency (SSCA -Biosecurity Tasmania) worked with SARDI (South Australian Research and Development Institute) on the FRDC Project 2015-042 to assess the occurrence of Pathogenic <i>Vibrio</i> Species in Oysters from Moulting Bay. This project detected pathogenic strains of <i>V. parahaemolyticus</i> and <i>V. vulnificus</i> in the Moulting Bay harvest areas.</p> <p><i>Vibrio</i> is an emerging food safety issue for the Tasmanian and broader Australian shellfish industry and the data collected during the FRDC project 2015-042 highlighted the paucity of information on the prevalence of these organisms in Australian bivalve harvest regions. In order to effectively maintain product integrity, market access and consumer safety for the commercial bivalve fishery understanding the prevalence and risk of commercial product to <i>V. parahaemolyticus</i> and <i>V. vulnificus</i> is crucial in providing the Australian bivalve industry and SSCA's the necessary knowledge and tools to mitigate risk to the consumer and ensure product integrity and market access for industry.</p> <p>The successful application will implement outputs of FRDC Project 2015-042 "Assessing occurrence of pathogenic species of the marine bacteria <i>Vibrio</i> in Tasmanian oysters from St Helens".</p>
Planned outcomes	<p>This project is expected to:</p> <ul style="list-style-type: none"> <li>• Assess the total and potentially pathogenic <i>V. parahaemolyticus</i> and <i>V. vulnificus</i> in all Tasmanian harvest areas.</li> <li>• Inform monitoring programs that are required by the SSCA to manage risk of <i>Vibrio</i> into the future.</li> <li>• Inform foods safety management plans for industry and risk management protocols for time of product into the cool chain based on seasonality.</li> <li>• Undertake a market survey of oysters from Australian regions during warmer months to assess the level of risk.</li> </ul>



Funding Partners	Tasmanian RAC
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Priority	Risk from Diarrhetic Shellfish Toxins for the Tasmanian Shellfish Industry
Need	<p>While considerable attention has focused in Tasmania on the problem of seafood contamination by Paralytic Shellfish Toxins (PST) from <i>Alexandrium tamarense</i> dinoflagellates, contamination of oysters and mussels with low concentrations of Diarrhetic Shellfish Toxins (DST) from planktonic <i>Dinophysis</i> spp. and benthic <i>Prorocentrum lima</i> dinoflagellates have also occasionally occurred.</p> <p>DST toxins have been responsible for a Spring Bay mussel recall in March 2016, long-term closures of Boston Bay shellfish farms in 2000-2001, and a significant human poisoning event (56 hospitalisations) in 1997 in Ballina NSW after consumption of contaminated pipis.</p> <p>There is a need for better understanding of DST profiles in Tasmanian shellfish to aid in informing seafood contamination guidelines.</p>
Planned outcomes	<p>This project is expected to:</p> <ul style="list-style-type: none"> <li>• Define the precise DST profiles in Tasmanian shellfish (including inter-calibration between AAA, AST and Cawthron LC-MS analyses);</li> <li>• Reach agreement with Australian regulators on appropriate DST closure levels (currently set under FSANZ code 1.4.1 as 0.2 mg/kg OA <u>equivalent</u>, that is requiring agreement on Toxin Equivalency Factors for analogues other than OA; EU guidelines use 0.16 mg/kg for the <u>sum of OA/DTX analogues</u>);</li> <li>• Assess the efficacy of a range of commercial DST immunological test kits <i>Zeulab/Abraxis, Beacon, Bioo Scientific, Biosense / Abraxis, Europroxima, Neogen, Scotia</i> for Tasmanian shellfish profiles.</li> </ul>
Funding Partners	Tasmanian RAC

Priority	Quantifying Mortality of Giant Crabs that Interact with Trawl Gear
Need	<ul style="list-style-type: none"> <li>• A potential impacts of benthic trawlers on Giant Crabs in southern Australia is through direct contact between crabs and gear. Specifically, there is a need for a greater understanding of the mortality of Giant Crabs that come in contact with trawler gear but are not caught. A second need is to measure post release survival of those crabs that are captured and discarded. This may be different from previous observations of post release survival of crabs from traps due to the fragility of Giant Crab to physical shock as seen in live transport.</li> <li>• Currently the species is classified as 'Overfished' in the 2016 Status of Australian Fish Stocks. This is evident by substantial TACC reductions since the introduction of the Quota Management System in 2000 which has seen the TAC reduced from 100t to 20.7t (from 38.3 t to 20.7 t in 2017/18) and ongoing declines in catch rate.</li> </ul>

	<ul style="list-style-type: none"> <li>• There is a need for improved life history data and understand all sources of direct and indirect mortality to improve the management of Giant Crabs in southern Australia.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Improved understanding of direct impacts of trawlers on Giant Crab populations</li> <li>• Improved understanding of the survival rates of Giant Crabs discards</li> <li>• Improve stock assessment models by incorporating all sources of direct and indirect mortality</li> </ul>
Funding Partners	Tasmanian RAC

Priority	Victorian Pipi Population Demography and Stock Discrimination
Need	<p>Pipis are found on high-energy sandy beaches in the intertidal zone throughout southern Australia. In Victoria, fishing for Pipis occurs over the entire Victorian coastline, with the exception of Port Phillip Bay and in Marine Parks. The Victorian Fisheries Authority has commenced a process to develop a fishery management plan for the Victorian Pipi Fishery. An important precursor to effective management is understanding stock discrimination and demography of the species.</p> <p>Therefore, there is a need for a project that will enhance the understanding of the demography and stock structure of Pipis in Victoria that includes an assessment of connectivity between potential sub-stocks/regions.</p>
Planned outcomes	This information will assist in establishing appropriate spatial scales for management and testing management arrangements for the Victorian Pipi Fishery.
Funding Partners	Victorian RAC

Priority	Improving Outcomes of Fisher Interactions with Sharks and Rays
Need	<p>There has been increasing community concern in response to the killing and inhumane treatment of large rays Victorian waters.</p> <p>This project will aim to improve the understanding of catches of sharks and rays in Victoria and root causes of fisher's behaviour. In addition, this project will review the available literature and various practices of stakeholder groups to identify world's best practices for the capture and handling of sharks and rays to improve the likelihood of survival upon release. These learnings should be extended to the Victorian fishing community.</p> <p>It is recommended that the applicant(s) will consult, and where appropriate, collaborate with relevant fishing associations and fisheries managers.</p>
Planned outcomes	<ul style="list-style-type: none"> <li>• Identify and promote world's best practices for the catch and successful release of sharks and rays</li> </ul>

	<ul style="list-style-type: none"> <li>• Improve the rates of survival of released sharks and rays</li> <li>• Mitigate the impacts of fishing on Victoria’s shark and ray populations</li> <li>• Foster greater sense of environmental stewardship for the broader Victorian fishing community</li> </ul>
Funding Partners	Victorian RAC

Priority	Empirical Investigation of Demand Conditions and Dynamics in the South East Fishery
Need	<p>Markets play a pivotal role in determining how fish, once landed, is allocated among competing uses, and through their determination of prices (and thereby revenues and profits), provide incentives for fishers (and others along the supply chain) to alter their behaviour in response to changes in demand and supply conditions.</p> <p>Knowing the sensitivity of seafood prices to various changes in demand and supply, and the interconnectedness between different products/sources of supply, is important for individual businesses making production, pricing and investment decisions; managers responsible for regulation of the common pool fish resource, particularly in MEY-managed fisheries; and policymakers interested in predicting the impact of various policy interventions.</p> <p>Very limited empirical research has been conducted on this topic in Australia. It is with the aim of filling this research gap that the HDR intends supporting a suite of empirical studies, based on specific species/fisheries/markets. The first of these will focus on the key species of the South East Fisheries as traded through both the Sydney and Melbourne Fish Markets.</p> <p>Possible specific research questions will include:</p> <ul style="list-style-type: none"> <li>• How flexible is the price of key individual species to changes in supply?</li> <li>• How integrated are the prices for different species, or for particular species from different fisheries, including imports?</li> </ul> <p>These questions will be addressed empirically through desk-based research, using revealed preference data on quantities and prices sourced from the two main markets and other data as appropriate. Given data availability and quality, the selected estimation technique will represent disciplinary best practise.</p> <p>Project outputs will include:</p> <ul style="list-style-type: none"> <li>• A report describing market relationships and demand for the South East Fishery, based on best practise statistical analysis of available data, and including key messages for policy, management and industry.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Improved policy, management and industry performance through better understanding of key market relationships, demand conditions and price formation</li> </ul>
Funding Partners	Human Dimensions Research Subprogram

Priority	Non-Market Values to Inform Decision-Making and Reporting in Fisheries and Aquaculture – an Audit and Gap Analysis
Need	<p>Decisions about the use and management of marine resources increasingly require data on the value of benefits (and costs) that are not expressed through market transactions (non-market values). For example, in the case of fisheries, allocation decisions often require estimates on the value of recreational fishing, including health benefits, and cultural fishing. Aquaculture planning and development also requires information on impacted values such as water and habitat quality, carbon footprint and visual amenity. Such values are also sometimes used in reporting sectoral contributions and in evaluating and demonstrating industry performance.</p> <p>Empirical studies of values at particular study sites can be expensive and time consuming, and available evidence of these values to support decision-making and performance reporting in the marine environment lags that for comparable values in the terrestrial environment. The use of information from existing primary study sites to estimate values at other unstudied policy sites, known as Benefit (or value) transfer, allows estimates of value to be included in decision analysis and reporting in cases where resource limitations or other constraints preclude primary research. Transferred values however are subject to a number of issues including errors in estimating original values at studied sites and in transferring values to policy sites that are different from study sites without adequately adjusting estimates to reflect these differences.</p> <p>The imperative for evidence-based decision-making in fisheries and aquaculture will intensify the need for robust and defensible estimates of values, including those generally viewed as difficult to measure. When done poorly, the inclusion of non-market values can undermine the scientific rigour of decisions and reporting, weakening trust in practitioners and users of non-market values and in decision making processes. There is a strong need to ensure that practitioners and users of non-market values in fisheries and aquaculture in Australia have the understanding and resources to account for non-market values in a robust and defensible manner.</p> <p>In response to this need this project will address the following specific research questions:</p> <ol style="list-style-type: none"> <li>1. What non-market values are required to support decision-making and reporting at various scales and stages in fisheries and aquaculture?</li> <li>2. What are the empirical estimates of the values identified in the first step, and what are the key gaps that need to be addressed?</li> <li>3. What is the potential currently for using benefit transfer methods to provide estimates of these non-market values and what is best practise in applying benefit transfer in the current context?</li> </ol> <p>These questions will be addressed largely through desk-based research, and will include reviews of relevant non-market valuation studies and databases, and current use of non-market values and of benefit transfer in Australian fisheries and aquaculture decision-making. Research question 1. will be supported by a workshop of key management/policy analysts and decision-makers at State and Commonwealth levels. Synthesis of these project elements will inform an assessment of key research</p>

	<p>gaps and recommendations related to the need for further empirical non-market valuation studies</p> <p>Project outputs will include:</p> <ul style="list-style-type: none"> <li>• A concise review identifying the current use of non-market values and benefit transfer in Australian fisheries and aquaculture, and of the values identified by decision makers required to support evidence-based decision-making and reporting;</li> <li>• An audit of relevant non-market valuation studies and of existing databases (national or international);</li> <li>• A gap analysis identifying key areas where further valuation studies are needed to support the use of non-market values in fisheries and aquaculture decision-making.</li> </ul>
Planned outcomes	<ul style="list-style-type: none"> <li>• Ensure scientific rigour of decisions and reporting based on the use of non-market values through improved practice in the measurement and use of non-market values.</li> <li>• Greater transparency, consistency and reliability in the use of benefit transfer in fisheries and aquaculture.</li> <li>• Support evidence-based setting of investment priorities in non-market valuation research in fisheries and aquaculture.</li> </ul>
Funding Partners	Human Dimensions Research Subprogram

Priority	Knowing Who Has Influence: Key Influencers and Networks for Socially-Supported Fisheries and Aquaculture
Need	<p>This project will address the need for improved understanding of <u>who</u> currently has influence and what is it they have influence over (e.g. market access, consumer perceptions/behaviour, local community support, resource access and conditions of access, science communication); <u>how</u> they gain and use that influence; and, <u>what</u> opportunities are available to fisheries and aquaculture to more effectively engage with influencers, build networks, and communicate messages. A key influencer is defined as someone with authority and standing who has the ability to influence the behaviour of others and, in this case, influence outcomes for fisheries and aquaculture.</p> <p>This project will focus on who has influence over decisions about resource access, allocation, re-allocation, regulation and re-structuring within fisheries and aquaculture.</p> <p>Research undertaken will address the following questions:</p> <ul style="list-style-type: none"> <li>• Who are the main ‘actors’ and key influencers in these decisions? e.g. Certification schemes and other ethical ‘standard bearers’; other resource users; eNGO campaigners. How can they be identified for specific fisheries and aquaculture sectors?</li> <li>• What types and levels of influence and judgement do these actors have/make? To what extent and in what context are the various types of influence ‘positive’, ‘negative’ or ‘neutral’ in relation to outcomes for fisheries and aquaculture?</li> </ul>

	<ul style="list-style-type: none"> <li>• How do these actors gain and maintain influence? Is the type and strength of influence related to the social, political and knowledge networks in which actors operate?</li> <li>• What influences the judgement of key decision makers regarding the industry's social acceptability? Specifically, what factors or activities have most influence on their judgement of social acceptability? In addition, what level of influence do scientists, science communication products and communicators have on such judgements?</li> </ul> <p>Suggested methods for data collection and analysis include a small number of comparative case studies (historical and current, and at different scales) that capture a range of types of influence, influencers, and networks which have or could affect outcomes for fisheries and aquaculture. For each of these cases, suggested methods include: desktop review of available information; key-informant interviews (key decision makers, industry leaders, key influencers); and, social/knowledge network analysis of networks of influencers where appropriate.</p> <p>Outputs from the project will include a report presenting:</p> <ul style="list-style-type: none"> <li>• Synthesis of case study findings in which the types of influence, influencers and networks are identified and compared</li> <li>• Steps for identifying 'who has influence' for specific fisheries and aquaculture sectors (to supplement the License to Engage report)</li> <li>• Recommendations of opportunities which are available to more effectively engage with influencers, build networks, and communicate messages</li> </ul>
Planned outcomes	The RD&E undertaken will contribute to improved understanding of how key decisions affecting fisheries and aquaculture are influenced by the actions and judgements of external and internal actors, and how these networks and processes can be effectively engaged with.
Funding Partners	Human Dimensions Research Subprogram

Priority	Engaged Fisheries and Aquaculture (National Collaboration Project – Human Dimensions Research Subprogram led)
Need	<p>When commercial fisheries and aquaculture activities do not have sufficient levels of social support – it can negatively affect industry member well-being; contribute to restricted resource access, etc. More and appropriate engagement is needed to improve stakeholder and community trust and support; both with those <u>affected by</u> industry activity, and with those <u>who affect</u> industry activity (i.e. decision-makers and 'influencers').</p> <p>This project addresses the need to ensure that the range of engagement activities and strategies undertaken by organisations and operators within fisheries and aquaculture are effective at:</p> <ul style="list-style-type: none"> <li>• building relationships and trustworthiness;</li> <li>• understanding concerns and needs arising from industry activity; and</li> <li>• influencing preferences and decisions.</li> </ul>

Limited information is available to assist fisheries and aquaculture organisations and operators in selecting which engagement activities and strategies are most likely to achieve their pre-defined goals. Similarly, no opportunities exist to facilitate mentoring and upskilling of personnel and knowledge transfer between industry organisations of successful and future engagement practice; or to support both improved return on investment and national coordination of engagement strategies.

To address this gap, this project will undertake the following stages:

1. Establish and coordinate the Engaged Fisheries and Aquaculture Working Group in partnership with Seafood Industry Australia (SIA)
2. Design and implement a range of types of engagement activities and strategies to meet a range of pre-defined goals of engagement
3. Evaluate these engagement activities and strategies against their pre-defined goals, using an engagement evaluation framework developed using standardised and defensible evaluation methods
4. Pilot and refine the evaluation framework using the above as case studies
5. Develop materials to support organisations/operators in selecting, designing, implementing and evaluating types of engagement activities and strategies which have been demonstrated to be highly effective at achieving specific engagement goals.

The project will be national in scale, level of coordination and provision of expertise. Case studies will be undertaken with collaborating RACs and IPAs, in which specific engagement activities and strategies will be developed, implemented and evaluated.

The project will use a participatory action research approach (learning by doing). The project team will include those with research expertise in relevant fields and may also include members of industry and extension group collaborators. The Engaged Fisheries and Aquaculture Working Group (members from: SIA, representative organisations and state/sector peak bodies, participating IPAs) would meet a number of times across the project to:

- Exchange and review information about research and case study findings, and develop nationally relevant resources
- Undertake skills development in key areas of engagement practice
- Communicate and extend the work of the project to their industry organisations and members
- Contribute to national engagement initiatives, as led by SIA

The project will generate the following outputs:

- An evaluation framework and examples of evaluations which provide information about the purpose and effectiveness of various engagement activities and strategies
- Tools and resources on different stages and steps of designing, doing and evaluating an engagement strategy (based on the License to Engage handbook), using a variety of recommended formats to increase their availability and uptake
- A Working Group model that supports effective engagement activity at product, regional and national levels

Applicants are advised to contact HDR Subprogram Leader, Dr Emily Ogier ([Emily.Ogier@utas.edu.au](mailto:Emily.Ogier@utas.edu.au), 0438697081) to discuss case study requirements.

<p>Planned outcomes</p>	<p>Members of participating fisheries and aquaculture sector groups are able to increase their capacity to design, implement and evaluate engagement activities and strategies to meet their needs</p> <p>Members of Australian fisheries and aquaculture sector more broadly are able to make informed decisions about investing resources in building their engagement capacity and undertaking specific engagement activities and strategies.</p>
<p>Funding Partners</p>	<p>Human Dimensions Research Subprogram  Collaborators: New South Wales RAC; Queensland RAC; Northern Territory RAC; Western Australian RAC; Southern Rocklobster Limited IPA; Australian Council of Prawn Fisheries IPA</p>