

Noosa Oyster Ecosystem Restoration Project

Restoration and conservation of shellfish reefs in the Noosa River

Six monthly Report No. 3

Report prepared by: The Nature Conservancy

Reporting Period: August 2021 to February 2022



Figure 1. Mullet feeding over a rock oyster reef in NSW. Photo by Francisco Martinez-Baena

This project was made possible by The Nature Conservancy, Noosa Shire Council, The Thomas Foundation and Australian Marine Conservation Society. The project is located on Kabi Kabi Country.

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Purpose and scope

The purpose of this report is to provide an update on overall performance and progress of the project: *Noosa Oyster Ecosystem Restoration Project*; a partnership between The Nature Conservancy (TNC), Noosa Shire Council (NSC) and the community of the Noosa shire.

The governance arrangements for the Project are defined in the *Alliance and Funding Agreement* between The Nature Conservancy and Noosa Shire Council, which was executed on the 25th of July 2019.

This report pertains to the period of 23rd of August 2021 and 28th of February 2022

Report Log

Six Monthly Report 1 – 28th July 2019 to 28th of February 2020

Annual Report – 28th of July 2019 to the 21st of August 2020.

Six Monthly Report 2 - 22nd August 2020 to 28th of February 2021

Annual Report 2 – 22nd August 2020 to 22nd August 2021

Six Monthly Report 3 – 23rd August 2021 to 28 February 2022

Background

Noosa Shire Council (NSC), The Nature Conservancy (TNC) and a range of stakeholders have worked together to build a deeper understanding of the environmental significance and long-term sustainable management options for the Noosa River. This has included:

Noosa River Expert Workshop, Powerhouse Museum, 2014

A two-day workshop, hosted by TNC on behalf of The Thomas Foundation and Noosa Parks Association, comprising 12 academic and NGO estuary scientists. The workshop identified 14 conservation activities that could lead to a healthier Noosa River, with oyster reef restoration listed as a priority action in addition to prawn restocking and Kin Kin sediment management. These activities (including further scoping studies) were later jointly funded by NSC Noosa Parks Association, The Thomas Foundation and the Noosa Biosphere Reserve Foundation.

TNC Oyster Restoration Scoping Study, 2015

TNC and Ecological Service Professionals Pty on behalf of NSC and others undertook a short, five-month ecological assessment to quantify oyster densities across 11 intertidal and subtidal sites within the estuary. The study confirmed high densities of oyster recruitment particularly around Weyba Creek, the main channel around Tewantin, and in the narrow channel between Goat Island and Noosa North Shore. The project recommended installing several pilot reefs for further assessment.

University of Queensland Historical Ecology of the Noosa Estuary fisheries, 2015

Ruth Thurston from the University of Queensland undertook a historical ecology study on behalf of TNC and NSC in the Noosa River estuary to develop an understanding of historical fisheries productivity, including oysters. The study confirmed oyster reefs used to exist in the estuary and were commercial harvested in the early 1900s. Fish populations were also significantly larger in the past than they are today.

University of Sunshine Coast, Bring Back the Fish, 2018-2020

A three-year study which installed a series of experimental 'reef units' consisting of coir bags filled with oyster shell at 15 sites across the estuary. The project studied the structural integrity, oyster recruitment, fish and invertebrate community assemblages and human interactions with the reefs. This project collected important ecological information that will support the final design and implementation of reef restoration in this Project.

NSC-TNC Partnership Agreement and Contract 2019

NSC and TNC, in addition to other organizations with an interest in the river's sustainability (including Noosa Parks Association, The Thomas Foundation and Noosa Biosphere Reserve Foundation), through a series of dialogue and presentations to Noosa Shire Council, have recognized the strategic priorities of both organizations and of others would be more effectively served through a formal partnership, rather than on an individual project basis. This agreement led to the development of *this* Project, and associated contract between NSC and TNC, and is the main delivery mechanism of the TNC-NSC Partnership.

Noosa River Plan, 2020

The completion of the Noosa River Plan by NSC in 2020 will identify current and future threats and management interventions to abate identified threats within the Noosa River estuary. The Plan will identify the strategic alignment of oyster reef restoration to the long-term health and resilience of the Noosa River estuary. The Noosa River Plan will support the delivery of the Noosa Environment Strategy.

TNC Project Management Plan 2020

The TNC Project Management Plan including Communications Plan and Monitoring, Evaluation and Reporting (MER) Plan was finalized and endorsed by Noosa Shire Council in November 2020.

Project overview

Past research projects demonstrated that the Noosa River estuary held the promise of sufficient oyster recruitment and survival, and invertebrate colonization, at a number of locations to make the estuary a viable place to pursue an oyster reef restoration project at scale.

The primary objective of the *Noosa Oyster Ecosystem Restoration Project* ("The Project") is to construct and restore shellfish ecosystems to the Noosa River estuary. These oyster ecosystems will be here for the benefit of nature and for people.

Historically, oyster-dominated ecosystems were prolific throughout the Noosa River estuary. These ecosystems (beds and reefs) were created predominantly by Sydney rock oysters (*Saccostrea glomerata*) which formed three-dimensional infrastructure in the river and attracted a myriad of species and their associated ecosystem functions.

The oyster ecosystems added extensive 'natural infrastructure' to the estuary and provided the estuary with a range of environmental services including:

- Providing complex habitats for marine species such as fish, invertebrates, corals, ascidians, encrusting sponges and algae, and reef communities.
- Filtering sediment and pollution.
- Aiding bank stabilization and protection, and
- Providing complex vertical and horizontal living spaces, and feeding grounds, for a multitude of intertidal and marine creatures, which are today important for marine and coastal tourism activities such as fishing, diving and bird watching.

This Partnership commenced on 25 July 2019 and will run for three years and three months, with the outcomes of the Partnership to be reviewed in July 2022. The total operating budget is \$2.4M, inclusive of \$1.2M from The Nature Conservancy (TNC), which includes \$200,000 from the Australian Marine Conservation Society (AMCS), and \$1.2M from NSC. In 2021, the Australian Government-funded national Reef Builder project provided an additional \$1.2m to the project, bringing the total project budget to \$3.6m.

Project management is led by TNC in partnership with NSC and the Noosa community (see Figure 2). A Technical Advisory Committee will oversee scientific and technical aspects of the project and include representatives from TNC, NSC, State Government, Kabi Kabi Traditional Owners and other experts as required. The governance arrangements for this project are defined in the *Alliance and Funding Agreement* between TNC and NSC executed on 25th July 2019.

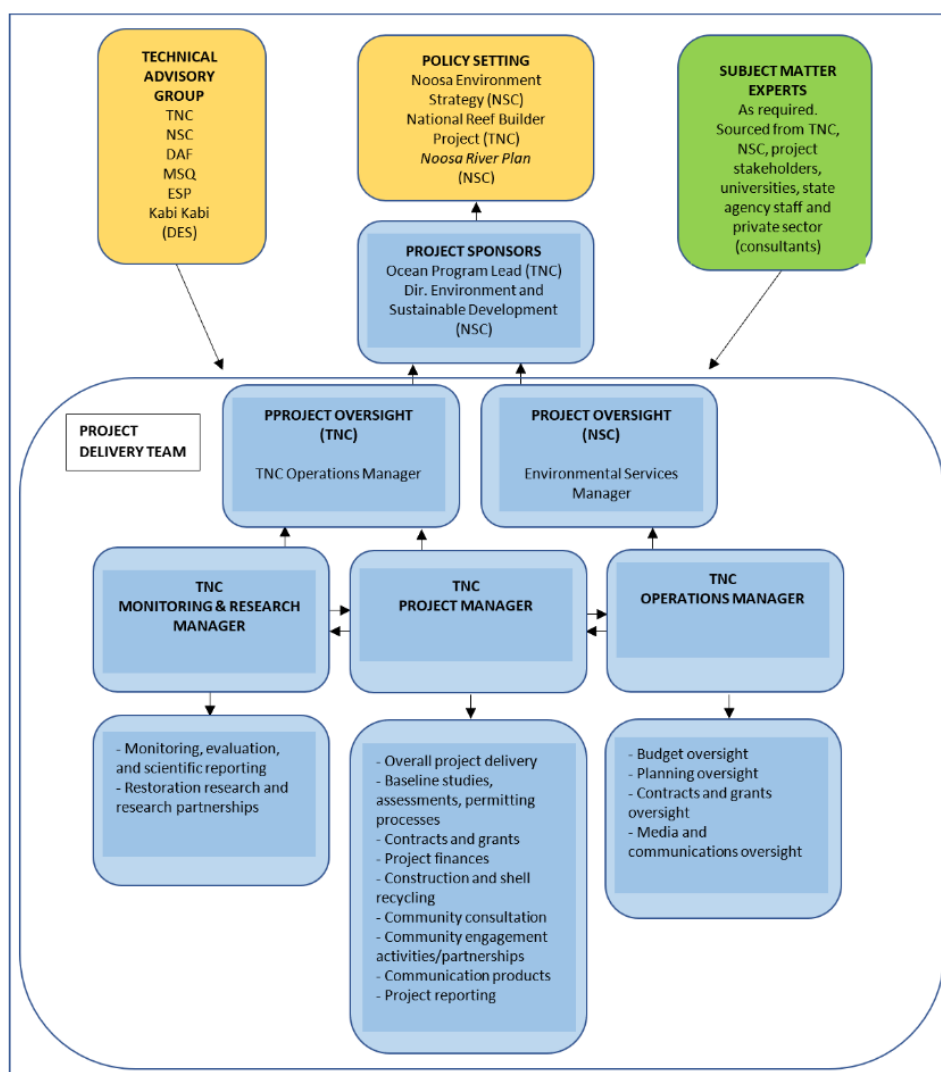


Figure 2. Project Delivery Team, including Project Sponsors, Technical Advisory Group and Subject Matter Experts.

Conservation deliverables

The Project principally delivers the following conservation initiatives:

1. Restoration of Noosa's oyster ecosystems at practical and agreed locations.
2. Engagement of the Noosa community and local businesses in meaningful volunteering and marine education opportunities.
3. Exploration of the potential to restore seagrass habitats in Lake Cooroibah (and potentially elsewhere) to reduce sediment resuspension and increase invertebrate and fish biomass in the estuary (to be delivered as part of Objective two and five), and
4. Provision of technical advice to NSC in identifying opportunities for sustainable commercial and recreational fisheries in the Noosa River.

Work sequence

The Project is split into three work packages, or phases, to reduce ecological and financial risks through the application of an adaptive management framework whereby learnings from previous phases are included in future phases to consider prior learning and minimize risk:

1. *Optimal design and siting* (2020) which includes pre-planning to determine the optimal design, locations and most cost-effective method of reef restoration.
2. *First site implementation* (2020-2021) which will construct full sized oyster beds at two sites in the estuary to test initial restoration methods and designs; and,
3. *Full restoration* (2021-2022) which restore oyster beds at all suitable (and approved) sites within the estuary.

These timings have been adjusted are as follows:

1. *Optimal design, siting, detailed bathymetric, ecological and engineering assessments and public consultations and engagement* (2020 - 2021).
2. *Quarry selection, selection and appointment of construction and monitoring companies, permit negotiations and approvals* (late 2021 to present)
3. *Construction of oyster reef patches at all sites (subject to costs) and baseline ecological monitoring* (mid 2022)
4. *Post reef construction monitoring and ongoing monitoring* (end 2022, then annual throughout the permit period)

Progress summary (September 2021 to February 2022)

TNC has achieved the following:

- Submission of all permit applications to government including development of an detailed project restoration plan. Permits requested include:
 - Owners Consent – to allow certain developments to occur on public land (permit secured from the Department of Resources)

- Resource Allocation Authority (RAA) - to undertake restoration activities in the Noosa Fish Habitat Area (currently under negotiation with Department of Agriculture and Fisheries (DAF))
 - General Fisheries Permit - to collect and spawn adult oysters from the Noosa River (permit received)
 - General Fisheries Permit - for handling and translocation of live oysters during the oyster reseeded activity (permit agreed and drafted by not yet issued)
 - Development Approval - under the Queensland Planning Act 2016 and related acts, regulations (nearing finalisation pending the outcome of discussions between TNC and government related to liability and indemnity)
 - Development application for Operational Works with Noosa Council
 - Roads and Footpaths permit with Noosa Council
- Preparation for construction work including:
 - Identification and site visit with TNC's preferred specialist construction contractor (M&J Marine Services)
 - Review of all regional quarries and selection of a referred quarry (Boral - Moi Pocket)
 - Confirmation of the construction load out site in consultation with Noosa Council Staff. The site is at the end of Hilton Esplanade, which will be managed in accordance with a special site management plan and in accordance with the requirements of a Roads and Footpaths Permit to be requested from Noosa Council.
 - Completion of a detailed construction engagement plan in consultation with Noosa Council staff. The plan includes:
 - Strategic communications for residents near to the load out site and the constructions sites
 - General communications to the community about the reef building process and timeframes
 - Public notices, temporary signage designs and QR code linked to online information.
 - Continued to partner with three local restaurants as part of Noosa's Shuck Don't Chuck shell recycling project. The restaurants are:
 - Noosa Yacht and Rowing Club
 - Noosa Harbour Fish Market
 - Grenny's Noosa by the River

These restaurants continue to supply oyster shell with collection facilitated by the Resource Recovery Australia facility. The project has diverted more than 10 tonnes of oyster shell from entering local landfills.

- Facilitated the washing and bagging of cured oyster shell at the Doonan Resource Recovery Centre between October and December 2021. The activity included:
 - Participation of 18 volunteers who contributed over 160 hours of labour
 - On site presentations to 2 school groups (coordinated with Noosa Council staff) and one community tour
 - Washing and bagging of over 10 tonnes of oyster shell
 - Packing of 7 pallets with 5kg bags of oyster shell and delivery of these to the Bribie Island Research Centre ready for setting with oyster spat
 - Washing, drying and bagging of a further 5 pallets of oyster shell, for direct use in reef base construction
- Continued to partner with Noosa Integrated Catchment Association (NICA) to deliver oyster gardening and water quality monitoring.
- Approximately 20 interested oyster gardeners from waterfront properties, and additional volunteers interested in participating (those that do not have a suitable jetty but are keen to participate). Three information workshops have been held, as well as letterbox drops and face to face engagement with over 400 households fronting the river.
- Developed Noosa's Rock Oyster Gardening Manual for local our local Oyster Gardeners.

- Continued to partner with Noosa Environmental Education Hub (EEhub) to deliver the Noosa Senior Schools engagement project with local schools. School activities are in preparation including two activities focused on First Nations and their relationship to oysters and the Noosa River planned post flooding recovery.
- Continued to partner with Noosa Biosphere Community Association (NBCA) to deliver the Junior Schools engagement project. The project has developed a large banner showing local connections to the Noosa River, stunning oyster hand puppets for use in school events, pottery oyster babies and delivered its first live performance in Kin Kin Primary School.
- Developed and distribute special project information sheets on biosecurity, rock oysters, reef design and sites and frequently asked questions and answers (Q&A sheet).
- Developed the Spring 2021 edition of the Noosa Oyster Chronicle news circular. Direct circulation of each edition was to over 100 locally engaged stakeholders on the Noosa mailing list.
- Reached 32,289 people through mainstream media and 3,884 people through social media.
- Appointed an independent restoration monitoring contractor (Ecological Service Professionals). Baseline restoration monitoring will commence in Autumn 2022.
- Entered into contract negotiations with the DAF for the Bribie Island Research Centre to support oyster seeding. Oyster seeding will take place in early Spring 2022 following construction of the oyster reef patches.
- Entered into contract negotiations with International Coastal Management, specialist coastal engineer consultants, to oversee and accredit the construction of the oyster reef patches.
- Responded to an inquiry to Noosa Council regarding the project's risk management approach to QX and Winter Mortality diseases, which are endemic diseases of oysters in river systems of eastern Australia.

Currently in progress:

TNC is currently:

- Finalising scope of build based on financial analysis and negotiations with construction contractor and quarry.

The reef build is planned to occur at all 4 restoration sites in one build to save time, considerable cost and to reduce impacts on Noosa residents. The build will occur over winter (subject to permits) and subsequent seeding of the oyster reef patches with oyster spat (set on oyster shells) planned for Spring 2022. At this time the oyster spat will grow fastest and be more resilient to local predators than if set during winter.

- Finalising contract negotiations for construction, oyster seeding and monitoring (subject to issuance of permits).
- Developing a request to Noosa Council for a Roads and Footpaths Closure Permit (for the load out site).
- Preparing interpretive signage for the Tewantin demonstration site.
- Preparing for baseline monitoring prior to construction commencement.
- Supporting community partnership programs involving junior and senior students continuing with activities scheduled for term 1 and 2, 2022.

- Supporting a PhD student from Griffith University who is studying the diversity of oysters and their settling patterns in the Noosa River.
- Finalising a grant to Noosa Parks Association who is undertaking a baseline scientific study of sedimentation patterns in the Noosa River.
- Finalising community information packages related to the reef build. Information packages include letters to residents adjacent to Weyba Creek (Noosa Sound) sites, as well as those affected by the load out site at Hilton Esplanade. This is part of the community engagement plan.

Reef Builder

In January 2021, TNC launched the Australia-wide Reef Builder initiative. The initiative aims to bring shellfish reef ecosystems back from the brink of extinction across Australia— for the benefit of both people and nature. The initiative is a partnership between the Australian Government and TNC.

For Noosa, Reef Builder resulted in a cash injection of an additional \$1.2m for reef building on top of the already \$1.2m already committed to the project from TNC and the Thomas Foundation and the \$1.2m committed by Noosa Council.

The additional Reef Builder funds means the project can restore oyster reefs at all 4 restoration sites thus more than meeting TNC's contract obligations. A presentation about the national Reefbuilder program is attached (see Appendix 1).

Unforeseen issues arising and project adaptation

The following were unseen and required an adaptive management response:

Permits

There is no efficient state planning and approvals process for marine restoration in Queensland. TNC has had to navigate multiple layers of tenure and environmental protection over the Noosa River and has required the development of sophisticated restoration and site management plans, detailed risk assessments, multiple regulatory code and environmental assessments, ecological mapping, and site engineering, as well as multiple contingency measures for the construction and site management aspects of the project.

While TNC supports the thoroughness of the process, it has taken more time than was originally forecast in the partnership agreement to negotiate Queensland's development approvals process.

TNC has responded to this situation by:

- Partnering with bathymetric, ecological, and engineering consultants to help collect data, undertake analyses, and populate the restoration plan and regulatory code assessments.
- Regularly liaising with stakeholders and agency staff.
- Actively enlisted the support of the Noosa TAG to advise on technicalities.
- Engaging two casual assistants to help with data acquisition, assessments and community consultation and engagement actions,
- Engaging consultant firm ICM to specifically to support TNC through the complex permit application review and submission process, and

- Enlisting the support of TNC's Chief Executive Officer, Operations Manager and Lead Scientist (Asia Pacific) to help expedite the numerous contracting and assessment steps.
- Engaging consultant legal firm, Prolegis, to review the Queensland regulatory environment and to advise TNC (and government) in respect of the permitting process.

TNC is now working directly with the Queensland Government and Noosa Council to look possible solutions to the outstanding matters of liability and indemnity. All other aspects of the project related to construction and restoration monitoring are in place awaiting final development approval.

Community engagement

There is a high level of community enthusiasm about the project, which has been very encouraging. This has best been demonstrated by the high public interest in and contact to the oyster gardening project, its three community events, riverside letterbox drops and one-on-one contact with NICA's extensive riverside network about the project.

TNC discovered relatively limited local capacity to take the lead on developing relevant initiatives in a short time frame, that is, they lacked the staffing capacity to drive targeted projects specifically related to oyster restoration. TNC met with groups, heard their concerns, and responded by:

- Working closely with local groups to design great projects (which took 9 months).
- Resourcing some projects with contracts or grant agreements to increase local capacity (i.e., with NICA, NCBA, EEHub). These grant agreements and contracts are now in place. They are due to conclude in July 2022. Further information on these projects included later in the report.
- Appointing an additional TNC staff position in Noosa, full time, to support community outreach and general project activities is now in place. Megan Connell is facilitating the outreach and stewardship activities and is coordinating communication and reporting activities. Megan can be contacted at megan.connell@tnc.org

Total progress to date

Table 1: Total Progress to Date

#	Deliverable	Progress
1.1	1 Technical Advisory Group with TOR established	Achieved
1.2	1 Project Manager appointed	Achieved
1.3	1 Project Implementation Plan completed and endorsed by Noosa Council 1 Detailed Risk Assessment included 1 Communications and Media Plan completed 1 Monitoring, Evaluation and Reporting Plan completed	Achieved
1.4	3 community engagement forums facilitated 3 media statements released	Achieved
1.5	3 six monthly status updates submitted to Noosa Council 3 annual reports submitted to Noosa Council	On Track
2.1	1 Habitat suitability model developed which incorporates industry, Kabi Kabi and public interests	Achieved
2.2	1 set of 'all' relevant state and local permits for oyster reef restoration obtained	Delayed
2.3	1 set of engagement records provided to Noosa Council of public and stakeholder consultations, including one-on-one meetings, open forums, media, etc.	Achieved
3.1	1 consultation completed 1 volunteering opportunities identified	Achieved
3.2	1 volunteering program defined 1 volunteering program implemented	Achieved
4.1	1 approval from Noosa Council secured to restore 2 trial restoration sites 2+ sites recovered with at least overall 80 m shore length of reef constructed	Delayed
4.2	1 approval from Noosa Council secured to restore an additional 2+ sites 2+ additional sites recovered with at least an overall additional 600m ² surface area	Delayed
4.3	1 related reef monitoring program established	Achieved
	2 six monthly status reports submitted 2 annual monitoring and evaluation report cards produced and published	On Track
5.1	1 workshop facilitated	Achieved
5.2	5 peer review reports submitted to Noosa Council during the three-year term of this Agreement, if requested by Noosa Council.	On Track
5.3	3 study tours facilitated during the three-year term of this Agreement, if requested by Noosa Council.	On Hold
5.4	1 Conservation Action Plan developed, as required 1 set of Community Workshops facilitated, as required.	On Track
5.5	1 new formal networking connections facilitated to assist Noosa Council with ongoing and future marine conservation activities, as requested	On Track
5.6	1+ presentations given at national conference/s over 3 years 1+ presentations given at international conference/s over 3 years	On Track
5.7	1+ New corporate/ government/ philanthropic alliances formed 1+ New in-kind support/financial funding contributions secured	Achieved
5.8	1 Habitat mapping report, habitat suitability model, PhD study or similar output completed and presented to Noosa Council	Achieved

Table 2: Total Progress to Date - Detailed

Deliverables	Measurable outcomes	Expected Timeframe	Progress	Total progress to date and notes
(A1.1) A Technical Advisory Group (TAG) is established to provide project oversight. This will include a clear terms of reference (ToR) and consist of representatives from key stakeholders (NSC, TNC, Kabi Kabi and at least two other independent parties).	1 Technical Advisory Group with TOR established	30 April 2020	Achieved	<p>Terms of Reference (ToR) for the TAG finalised</p> <p>Inaugural meeting held 13 May 2020.</p> <p>TAG meetings are held as required and TAG members are mostly engaged on a regular basis out of session to advice on specific aspects of the project (e.g. biosecurity, permits) and to review draft project reports.</p>
(A1.2) Appointment of dedicated project manager who is a marine biologist with extensive project management experience, for the term of the Agreement.	1 Project Manager appointed	31 January 2020	Achieved	Craig Bohm appointed by TNC as Marine Coordinator for Southeast Queensland, based in Noosa. Position commenced 29 January 2020.
(A1.3) A Project Implementation Plan detailing at a minimum: A detailed risk assessment associated with the project. A communications and media plan, outlining media protocols, opportunities, and the role of TNC and NSC. A monitoring, evaluation and reporting plan which identified ecological and social monitoring programs, how they will be reported on and how this will fed-back into the project.	1 Project Implementation Plan completed and endorsed by Noosa Council	31 December 2019	Achieved	<p>The project implementation plan was endorsed by Noosa Shire Council as the 'Project Management Plan' at its <i>Ordinary Meeting</i> held 16 July 2020. The Project Management Plan included a detailed risk assessment, Communications and Media Plan and Monitoring, Evaluation and Reporting (MER) Plan.</p> <p>The MER Plan was then reviewed by an independent consultant and the recommendations responded to and adopted by TNC.</p>
	1 Detailed Risk Assessment included		Achieved	
	1 Communications and Media Plan completed		Achieved	
	1 Monitoring, Evaluation and Reporting Plan completed		Achieved	
(A1.4) Participation and delivery of public education and engagement forums and media statements	3 community engagement forums facilitated	30 June 2022	Achieved	<p>Noosa Community Engagement Workshop</p> <p>Public Information Sessions</p> <p>Produced and distributed:</p> <p>- Noosa Oyster Chronicle</p>
	3 media statements released		Achieved	

				<ul style="list-style-type: none"> - Project information sheet - Project Q&A sheet - Rock oyster fact sheet - Project Brief (restoration sites and designs) - Project FAQs (conversational edition) - Oyster Biosecurity fact sheet
(A1.5) Annual project reports and final reports each of which address, at a minimum: Activities undertaken during the subject financial year, status and progress against deliverables, budget progress, income and expenditure, report against monitoring and evaluation program and measurable outcomes and outline of proposed upcoming works/activities for future period.	<p>3 six monthly status updates submitted to Noosa Council</p> <p>3 annual reports submitted to Noosa Council</p>	<p>First Report: 31 January 2020</p> <p>For each annual report - yearly</p>	<p>On track</p> <p>On track</p>	<p>This document is the last of three 6 monthly reports submitted</p> <p>Six Monthly Report 1 Six Monthly Report 2 Six Monthly report 3 (this one)</p> <p>Two of three annual reports have been submitted.</p> <p>Annual Report 1 Annual Report 2</p>
(A2.1) Oyster reef restoration suitability model incorporating physical parameters of oysters and public and industry usage, access etc. to identify priority sites for restoration.	1 Habitat suitability model developed which incorporates industry, Kabi Kabi and public interests	30 June 2020	Achieved	<p>Habitat Suitability Model + refined Restoration Suitability Model developed.</p> <p><i>Previously reported:</i></p> <p>1 restoration suitability model developed as well as associated habitat suitability model and socio-economic suitability models.</p> <p>1 restoration suitability presentation</p>
(A2.2) Obtain necessary State Government permits/authorities including resource	1 set of 'all' relevant state permits for oyster reef restoration in	30 June 2020	Delayed	<p>Permit applications submitted:</p> <ul style="list-style-type: none"> - Owners Consent - Resource Allocation Authority

allocation authority, for oyster reef restoration	the Noosa River obtained			<ul style="list-style-type: none"> - General Fisheries Permits - development approval (DA)
(A2.3) Community, industry, and stakeholder consultation sufficient to gain majority support for reef restoration locations.	1 set of engagement records provided to Noosa Council of public and stakeholder consultations, including one-on-one meetings, open forums, media, etc.	30 June 2020	Achieved	<p>TNC has continued to meet with stakeholders, to keep them updated and seek input to various aspects of the project.</p> <p>Community oriented publications and media opportunities have been developed.</p> <p>Information continues to be shared via the Noosa Oyster Chronicle, personal communications and through development and release of special information sheets.</p>
(A3.1) Community, industry, and stakeholder consultation to identify most appropriate community volunteering opportunities (e.g., shell recycling, oyster gardens, oyster watch, video monitoring).	<p>1 consultation completed</p> <p>1 + volunteering opportunities identified</p>	31 August 2020	Achieved	<p>Shell Recycling facilitated at Doonan Solid Waste Depot utilizing 166 hours of volunteer contribution.</p> <p>NICA volunteers have contributed over 150 in-kind hours toward the project additional to the above.</p>
(A3.2) Establish at least one community volunteering program identified from the above process which considers current and future resources, management, and interest.	<p>1 + volunteering program defined and implemented</p> <p><i>Record of volunteer hours dedicated to community volunteering programs, such as: shell recycling, oyster gardens, oyster watch, video monitoring.</i></p>	31 December 2020	Achieved	<p>TNC established community-based oyster gardening with NICA, who will lead oyster gardening activities with 20 households/businesses/groups</p> <p>TNC established a volunteer water quality monitoring project with NICA.</p> <p>TNC established three community partnerships with local restaurants who now voluntarily supply the project with oyster shell under the <i>Shuck Don't Chuck</i> project banner.</p> <p>The restaurant partners are:</p> <ul style="list-style-type: none"> • Noosa Yacht and Rowing Club • Noosa Harbor Fish Market

				<ul style="list-style-type: none"> Grenny's Noosa by the River <p>TNC established a senior schools and indigenous engagement project with Noosa Environmental Education Hub (EEHub).</p> <p>TNC has established a junior schools and indigenous project with Noosa Biosphere Community Association (NBCA).</p> <p>TNC is working with Tewantin Bushcare to establish a foreshore demonstration project at Tewantin</p> <p>TNC has agreed with Noosa and District Landcare (NDL) to provide training opportunities for Kabi Kabi Youth once oyster beds are laid.</p> <p>TNC collaborates with Ozfish to collect underwater footage of the Noosa River and is planning actions to educate fishers about oyster ecosystem restoration and the value of conserving and restoring river riparian and aquatic habitats.</p>
(A4.1) Restoration at two sites (approx. 40m-50m shore length per site) which test reef design and construction and oyster growth and survival.	<p>1 approval from Noosa Council secured to restore 2+ trial restoration sites in the Noosa River estuary</p> <p>2+ sites recovered with at least overall 80 m shore length of reef constructed</p>	30 June 2021	Delayed	Full reef build planned for winter 2022
(A4.2) Restoration across multiple further sites, as determined by habitat suitability modelling and	1 approval from Noosa Council secured to restore an	30 June 2022	Delayed	Full reef build planned for winter 2022

outcomes of community consultation.	<p>additional 2+ sites as agreed to by stakeholders, in the Noosa River estuary</p> <p>2+ additional sites recovered with at least an overall additional 600m² surface area of established oyster reef, constructed in the Noosa River estuary.</p>			
Se;(A4.3) Monitoring and evaluation study for both pilot and full restoration sites. Monitoring to include oyster metrics, invertebrates, and fish use (detailed in MER plan).	<p>1 related reef monitoring program established</p> <p>2 six monthly status reports submitted</p> <p>2 annual monitoring and evaluation report cards produced and published</p>	As required	Delayed	The Monitoring, Evaluation and Reporting (MER) Plan is in place. Water quality monitoring has commenced with local partner, NICA. Trials of Remote Underwater Video (RUV) techniques has commenced with local partner, Ozfish. Baseline monitoring to commence with selected partner, Ecological Service Professionals, in Autumn 2022.
(A5.1) Run workshop with Noosa Council to identify ongoing focus areas for TNC support.	1 workshop facilitated	31 March 2020	Achieved	TNC and NSC met regularly to discuss ideas and opportunities.
*(A5.2) Provide technical/peer review on minimum five plans/reports/studies if requested by Noosa Council.	<p>5 + peer review reports submitted to Noosa Council during the three-year term of this Agreement, if requested by Noosa Council.</p> <p><i>If Noosa Council requests a peer review, TNC will</i></p>	30 June 2022	On Track	As requested

	<i>provide a minimum of 3 experts who are qualified in the relevant area of expertise for Noosa Council consideration and Noosa Council's acceptance of 1 expert for the peer review.</i>			
*(A5.3) Facilitate a minimum of three study tours of relevant sites in line with objectives and scope of the program in Australia/US if requested by Noosa Council (flights and incidentals covered separately by Noosa Council, accommodation and in country travel covered by this Grant).	3 + study tours facilitated during the three-year term of this Agreement, if requested by Noosa Council.	30 June 2022	On hold	Study tour 1 was in planning for 2020 but has been placed on hold due to COVID-19 travel restrictions. The study tour schedule will be revisited by TNC and NSC once COVID-19 travel restrictions have been eased or lifted.
*(A5.4) Review and feasibility of opportunities for sustainable commercial and recreational fishing management options for the Noosa River.	1 Conservation Action Plan developed, as required 1 set of Community Workshops facilitated, as required.	30 June 2022	On track	If requested by Noosa Shire Council
(A5.5) Facilitate access to TNC conservation networks and researchers if requested by Noosa Council.	1+ new formal networking connections facilitated to assist Noosa Council with ongoing and future marine conservation activities <i>* As and if requested by Noosa Council</i>	30 June 2022	On track	TNC have provided two peer reviews when requested on the following: 1. Draft Noosa River Plan 2. Fishing Futures Report
(A5.6) Promote Noosa Council's Noosa River Plan and shellfish restoration project in at least one national and one international conference.	1+ presentations given at national conference/s over 3 years 1+ presentations given at international	30 June 2022	On track	Reef Builder presentation, including the Noosa Project given at the International Conference for Shellfish Reef Restoration at Port Stephens (April 2021) Reef Builder presentation with a spotlight on Noosa given at the

	conference/s over 3 years			National Coast to Coast Conference (July 2021) Further opportunities are being sought.
(A5.7) Promote Noosa Council's Noosa River Plan and shellfish restoration project to corporate, philanthropic, and state/federal government audiences to establish further support for conservation activities that support the Noosa River Plan	1+ New corporate/ government/ philanthropic alliances formed 1+ New in-kind support/financial funding contributions secured	30 June 2022	Achieved	TNC has secured an additional \$1.2m under the Reef Builder program to support oyster ecosystem restoration in Noosa. TNC is currently entering a partnership with the QLD government-owned Bribie Island Research Centre (BIRC), to enhance its capacity to support oyster ecosystem restoration in Noosa and across the state, as well as commercial oyster aquaculture development. TNC is working through its university network to encourage projects which can further knowledge of the Noosa River. TNC is specifically sponsoring one PhD student who is studying shellfish; the Noosa Parks Association who is investigating sediment distribution in the system and Ecological Service Professionals who have been mapping marine habitats, seagrass distribution and seagrass abundance.
(A5.8) Assess feasibility of seagrass restoration in Lake Cooroibah as a method of reducing sediment resuspension and increasing invertebrate biodiversity	1 Habitat mapping report, habitat suitability model, PhD study or similar output completed and presented to Noosa Council	30 June 2022	On track	TNC contracted Ecological Service Professionals to develop a baseline map of seagrass in the Noosa River estuary and to evaluate trends in seagrass distribution and abundance. This Seagrass Distribution Report is attached as Appendix 2.

Table 3: Community Partnerships Update

Project area	Objective	Partnership	Status
<i>Shuck Don't Chuck</i>	Engage local businesses in the project	3 restaurants participating in supplying local oyster shell to the project as Shuck Don't Chuck partners: <ul style="list-style-type: none"> Noosa Yacht and Rowing Club Noosa Harbor Fish Market Grenny's Noosa by the River 	Restaurants enthusiastically collecting, washing, and storing shells. Contractor engaged to collect shell from restaurants on a fortnightly basis.
	Collect oyster shells to add to oyster beds and for use in oyster gardening	Resource Recovery Australia (RRA), Cleanaway and Mooloolaba Fish Market	More than 10 tonnes of oyster shell are now clean and awaiting seeding or construction
<i>Water quality monitoring</i>	Improve resolution of water quality data sets at the oyster restoration sites	NICA to provide water quality information at the oyster restoration sites	Partnership established Baseline monitoring has commenced
<i>Oyster gardening</i>	Engage local households, businesses and/or groups in the project Improve public knowledge about shellfish restoration	NICA to implement oyster gardening, beginning with a pilot phase, then review and consideration of upscaling, if practical	Partnership established Grant agreement in place and work has commenced
<i>Indigenous inclusion</i>	Support the aspirations of Kabi Kabi Nation Benefit from traditional knowledge	Noosa and District Landcare to involve indigenous youth in hands-on or on-water actions, where opportunities arise.	Partnership established Events to be planned on an ongoing basis. Endorsement from Kabi Kabi elders and permission to integrate traditional knowledge in project-related products secured. Elders kept up to date with project happenings. TNC will meet with elders as they request.
<i>Schools' participation</i>	Engage local schools in the project Improve public knowledge about shellfish restoration	Noosa Environmental Hub to integrate Sunshine State High School into the project Noosa Biosphere Community Association to carry out school activities and indigenous river	Partnerships established and activities in planning and underway.

		awareness actions with Tewantin schools	
<i>Tewantin Demonstration Site</i>	Provide a focus site for community education activities and access to one of the oyster restoration sites	Tewantin Bushcare to help develop restoration demonstration site at Tewantin	Partnership established Discussions underway Interpretive signage concept raised at Council / TNC meeting
<i>Fish habitat monitoring</i>	Bring Noosa's underwater life and the value of habitat diversity to life in the public realm, particularly to fishers	Ozfish – Noosa Chapter Ozfish to use Remote Underwater Video (RUV) techniques to seek out and record marine species diversity Ozfish to also help test RUV techniques at different river locations and promote the importance of marine habitats and restoration to its members and public	MoU in place between TNC and Ozfish Ozfish has equipment locally and is being supported by TNC where needed to identify and record Noosa River fish habitats TNC is also being supported by the Pumicestone Passage oyster ecosystem restoration project (Ozfish + Healthy Land and Water). The project is sharing oyster gardening experiences and equipment with the Noosa project team.

Shuck Don't Chuck

TNC continued its exciting partnerships with three local Noosa restaurants:

- Noosa Yacht and Rowing Club
- Noosa Harbour Fish Market
- Grenny's Noosa by the River

These proud project partners supply the project with buckets of washed oyster shell, which they collect from their customers, then wash and store.

The shell is collected fortnightly from the restaurants by the project's contractor, Resource Recovery Australia (RRA) and cured at the dedicated site at the Doonan Solid Waste Depot

This is a big effort for the restaurants and an important contribution, which is adding to the project's shell recycling collection.



Shell cleaning

TNC worked closely with partner, and generous sponsor, Resource Recovery Australia (RRA) to involve the Noosa community in oyster shell washing and bagging. The activity included:

- Participation of 18 volunteers who contributed over 160 hours of labour
- On site presentations to 3 school groups (coordinated with Noosa Council staff)
- Washing and bagging of over 10 tonnes of oyster shell
- Packing of 7 pallets with 5kg bags of oyster shell and delivery of these to the Bribie Island Research Centre ready for setting with oyster spat
- Washing, drying and bagging of a further 5 pallets of oyster shell, for direct use in reef base construction

After spending more than six months baking in the Queensland sun, the dried, sterile oyster shells were washed by a team of staff and 18 volunteers over more than 160 hours.

Repurposing everything from buckets, baskets, ladders, and chairs, supplied the team at RRA, the Doonan Waste Recovery facility shell washing station evolved into a highly efficient washing system. The project team and a troupe of volunteers washed over 10 tonnes of oyster shell— saving all this resource from ending up in landfill.

Following washing, the shell was bagged up and sent to the Bribie Island Research Facility or stored locally for use in reef building.



Figure 3: Staff and volunteers wash oyster shells at the Resource Recovery Centre, Doonan. Photo by Craig Bohm

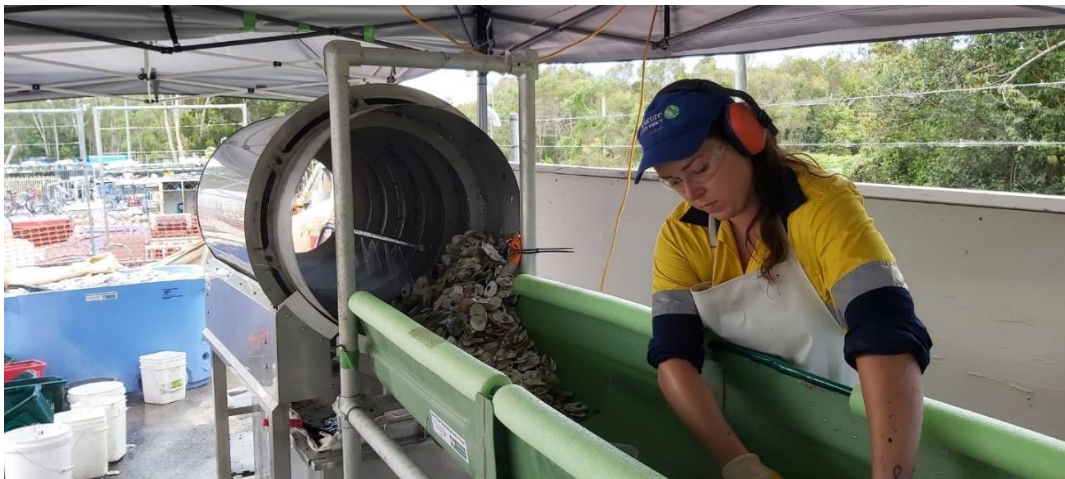


Figure 4: Volunteer Ruby Bowyer inspects oyster shells after washing. Photo by Craig Bohm



Figure 5: Volunteers that assisted with the shell washing process get a kick out of making a contribution. Photo by Craig Bohm



Figure 6: Washed oyster shells are loaded onto a truck for transport to Bribie Island Research Centre. Photo by Craig Bohm

School talks

During the shell washing process, Council's Waste Education and Sustainability Officer, Emma Menzies, ran tours of the recycling facility for school groups and groups of interested community members. Emma and Megan Connell (from TNC) coordinated opportunities to share information on the shell recycling process and the oyster ecosystem restoration project to a broad, interested audience.



Figure 7: Megan Connell giving a talk to local school students about oyster shell recycling Photo by Emma Menzies

Senior schools project

TNC continued its a partnership with Noosa Environmental Education Hub (EEHub) to deliver the Senior Schools Project.

This project engages local secondary schools in curriculum-centred student activities, which celebrates the values of the Noosa River, the role that oyster ecosystem restoration plays, and the important connection between the Kabi Kabi Nation. Dalia Mikhail has been working closely with local schools to identify activities, which will be rolled out to schools during 2022.



Junior schools project

TNC continued its partnership with the Noosa Community Biosphere Association (NCBA) to deliver the Noosa Junior Schools and Community Awareness Project.

This project engages local junior schools and the general Noosa public in actions which lead to the local participation in on-ground activities, which raise awareness about the oyster restoration project and the importance of environmental restoration.



In November 2021, the “pilot” junior schools event took place at Kin Kin State School. Further activities are planned to be completed in 2022.



Figure 8. Kin Kin State School student, Eli, in the puppet theatre. The Puppet show is part of a presentation on the Oyster Restoration project and the habitats of the Noosa River. Photo by Megan Connell



Figure 9: The Joyology presenter Marc Bright at Kin Kin State School. Photo by Megan Connell

Oyster gardening project

TNC partnered with NICA to facilitate oyster gardening in Noosa. Oyster gardening is an activity whereby locals grow out local oysters, provide by the project, in baskets, or 'oyster gardens' suspended from jetties. The volunteer gardeners care for the gardens, keep citizen science records of their experience and become better educated about oysters and oyster restoration in the process. Once the juvenile oysters are large enough to survive on their own, they are carefully placed onto the oyster reef patches in the project's restoration sites. These oysters help kick start ecosystem recovery.



An oyster gardening information evening was held in early December to share information with interested Oyster Gardeners and to share information about the ecosystem restoration project.



Figure 10: Noosa Integrated Catchment Association representatives Alex Western (foreground) and Richard Howard at the Oyster Gardening information session at Tewantin Marina. Photo by Megan Connell

NICA has also:

- Engaged over 20 river-front households, 5 community groups and multiple schools through partnerships with NCBA and EEH as prospective oyster gardeners. Interested households located in geographically diverse locations across the river system including the Noosa Waters canals.
- Identified multiple additional residential and commercial sites, including Tewantin Marina, where gardeners without direct access to the river can also participate in oyster gardening (Jul 2021 - present)
- Hosted 1 x presentation to NICA's "Monday with NICA" forum (attendees 40+, Oct 2021)
- Provided volunteers and engaged additional community groups to participate in the cleaning and drying of oyster shells located at the Doonan Solid Waste Depot (Nov 2021)
- Conducted letter drops and engaged residents at over 400 households fronting the river in Noosa, Noosaville, Weyba Creek, Tewantin, Cooribah and Noosa North Shore (October to December 2021)

- Provided multiple social media updates via NICA's social media channels and newsletters (June 2021 - present, views +1000)
- Conducted 1 x river-side workshop to build and prepare oyster baskets (attendees 15+, September 2021)



Figure 11: Noosa Integrated Catchment Association oyster garden demonstration activity at Ely Park on the Noosa River.
Photo by Richard Howard

Indigenous engagement

TNC continues to keep Kabi Kabi elders up to date with project happenings and supplies them with periodic reports, as per their request. TNC also continues to work with elder, Uncle Fred, to scope opportunities for Kabi Kabi students and youth to be involved in marine restoration. Uncle Fred has also agreed to work with TNC to design interpretive signage for the Tewantin demonstration site. This activity will also involve further liaison with Brian Warner and Kabi Kabi elders more broadly as it unfolds over the next 12 months.

Late in 2021, TNC worked with Noosa and District Landcare to bring indigenous trainees to the shell washing activity. The team spent a very hot and busy day scrubbing shell, learning about biosecurity and talking about shell restoration. TNC is also engaging Kabi Kabi in oyster gardening and is currently scoping opportunities for them to be more directly involved with TNC and NICA.

Ozfish

TNC is working with the Noosa chapter of Ozfish to collect Remote Underwater Video (RUV) footage of estuarine habitats in the Noosa River. Ozfish has been using this exercise to hone its techniques, educate its members and to celebrate the value of diverse habitats to estuarine fish communities. Ozfish has shared some of the RUV footage gained on YouTube.



See: https://youtube.com/playlist?list=PLsJuji_1WAnE8yi_dyBMzdFxRA8dWNCMt

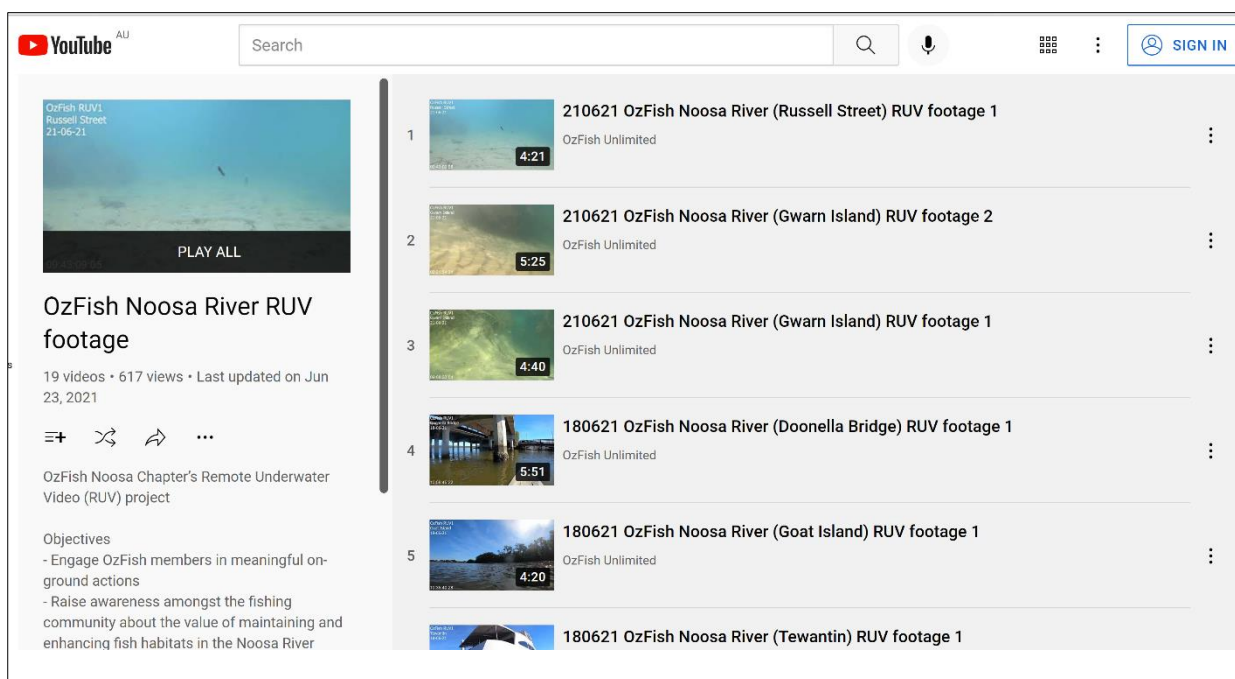


Figure 12: Ozfish Noosa River RUV footage

Hatchery partnership

TNC is working with the Bribie Island Research Centre (BIRC) in a project, which will spawn a handful of adult rock oysters (called 'brood stock') under controlled conditions in tanks and settle the oyster larvae onto the project's cured oyster shell (called 'cultch'). The oyster larvae attach to the oyster shell and form oyster 'spat'. The oyster cultch set with oyster spat is called 'seeded oyster cultch'. An oyster seeding event is called a 'set'. A set takes 2-3 months to orchestrate.

The TNC-BIRC partnership is new and cutting edge. It is involving many personnel, as spawning rock oysters for restoration purposes is highly technical and has not been undertaken before. Even though TNC would typically partner with the private sector to undertake the hatchery work, there are few commercial shellfish hatcheries in South-East Queensland and none with the current capacity to support oyster ecosystem restoration.

The TNC-BIRC partnership will support the Noosa project, aligns with the Queensland Government's strategy for marine habitat restoration and will deepen the Queensland Government's involvement in delivering on that strategy. The partnership will also benefit the rock oyster aquaculture industry throughout Queensland, as TNC's support of BIRC has helped reinvestigate BIRC's investment in oyster research and industry development.

Handling oysters and oyster shell - biosecurity

TNC is registered as a 'resource provider' with the Department of Environment and Science, as per the *Queensland End of Waste Code - Oyster shells (ENEW07278317)* and *Waste Reduction and Recycling Act 2011*.

TNC cures the oyster shell following best practice, in compliance with the Code, and in consultation with Queensland Department of Agriculture and Fisheries biosecurity, who also sits on the project's Technical Advisory Group. Shell curing occurs using the following protocol:

1. Shell is only cured at the designated and sign-posted shell curing site.
2. Clean, shucked oyster shell is collected by the contractor from wholesaler/s, in bulk, in 1 tonne food-safe seafood transport containers and delivered to the shell curing site.
3. Pre-washed shell is collected by the contractor from oyster retailers in Noosa in clean 20 litre buckets and delivered to the designated shell curing site.
4. All containers used for shell transport are thoroughly washed and disinfected before storage and re-use.
5. At the shell curing site, shell is placed on the ground in rows separated and sign-posted by month collected.
6. The shell is dried and cured (desiccated) in direct sunlight for 6 months, which is two months more than is required by the End of Waste Code.
7. The shell is turned after three months of curing, as an additional desiccation measure.
8. Each shell pile is no higher than 1 metre, which further enhances the desiccation process.
9. The site is regularly monitored and maintained to reduce contamination of the shell piles.
10. The curing site is located in an isolated area of the depot, so the risk of contamination from the depot's other waste management activities is negligible.
11. Once cured, and prior to its removal from the depot, oyster shell may be washed with freshwater to remove any cumulated sediment or dried organic matter, and
12. The shell, when needed, is transported in clean containers

Waterwatch

TNC is also partnering with NICA to record water quality information at the restoration sites.

NICA volunteers led by Bruce McConkey have been busy collecting baseline water quality information for the Tewantin restoration site. Other restoration sites will be added to this data set in the coming months and ultimately a valuable monitoring output.


Table 4 – Water quality data for the Tewantin restoration site, up to January 2022.

NOO TNC 1 OYSTERBED TEWANTIN												
	19/02/2021	26/03/2021	21/04/2021	21/05/2021	17/06/2021	14/07/2021	16/08/2021	13/09/2021	15/10/2021	13/11/2021	10/12/2021	26/01/22
Temp	26.21	27.13	23.8	20.46	19.7	17.58	21.68	21.63	24.73	26.29	29.06	28.56
pH	8.25	7.85	8.27	8.24	8.38	8.11	8.18	8.34	7.76	7.73	7.65	8.05
Condy	45	18.9	27.4	33.7	29.6	29.6	29.4	39.8	44.4	36.8	28.1	32.4
Turbidity	6.1	13.5	12	8.2	15.3	8.3	3.4	9.7	8.3	7.8	8.8	8.8
Diss Oxygen mg/l	5.9	6.15	6.17	7.09	7.07	6.5	6.28	6	6.07	6.19	5.92	6
Diss Oxygen %	87.8	83.3	82.1	90.4	88.4	78	81	86.6	87.9	88.9	85.5	90.8
TDS ppt	27.5	11.7	17	20.5	18.4	18.4	18.2	82	27.1	22.4	17.4	21.1
Salinity ppt	29.1	11.2	16.8	21	18.3	18.2	18.2	24.3	28.7	23.2	17.3	21.7
Rain <30 days	101	353	314	143	55	103	13	18	65	97	269	239
Time	1005	1024	1007	0904	0933	0926	1003	1002	0916	1030	0944	0951
Low tide @ NH	649	1036	0946	0948	0709	0503	0747	0718	0957	0929	0626	0815

New communication products

Biosecurity Fact Sheet

After discussions with DAF, TNC developed a biosecurity factsheet to help further explain the raft of biosecurity protocols TNC follows in close liaison with government and private sector experts.



NOOSA OYSTER ECOSYSTEM RESTORATION PROJECT

Oyster Shell Biosecurity Fact Sheet

The Nature Conservancy Australia

Noosa Oyster Shell Biosecurity

What is the project?
The Nature Conservancy (TNC) is working with Noosa Council, the Australian and Queensland governments, The Thomas Foundation, Noosa local businesses and community to restore critically endangered rock oyster ecosystems (*Saccostrea glomerata*) in the Noosa River estuary.

How do you restore the ecosystem?

- We place clean, locally-sourced rock on the riverbed. The rock is arranged in elevated 'reef patches' to keep oysters away from being smothered by mobile river sediment. Reef patches form the foundation of the rock oyster ecosystem.
- Adult oysters are then collected from the Noosa River and spawned in tanks at the Queensland government operated Brisbane Research Centre. The juvenile oysters (or spat) are attached to clean oyster shells (called 'culch'). The oyster shells are recycled from Noosa restaurants and Sunshine Coast seafood wholesalers as part of TNC's Shuck Don't Chuck shell recycling project.
- Oyster shells and their attached oyster spat are then returned to Noosa and placed in voids in the reef foundations. Wild oyster spat also naturally recruits on to the reef foundations, as well as a variety of plants and invertebrates. Together, this mix of species grows and forms the complex oyster reef ecosystem.

How do you ensure the recycled oyster shell is safe to use?
The oyster shells have been dried (desiccated and cured) and cleaned against Queensland's strict biosecurity protocols* and international best practice**. Shells are collected from local restaurants and seafood suppliers in disinfected buckets.

How do you dry the shells?
The shell is cured in the sun for a minimum of 6 months, which is 2 months longer than required by the government protocol. For Noosa, the shell has been dried for more than 12 months. The shell is sorted and labelled with the month of collection, and piled no more than one metre high. The shells are turned after 3 months to aid in the desiccation process.

How do the shells get washed?
The cured shells are washed in a commercial shellfish tumbler. This process cleans the dried shell of anything that may have settled on the shells during the curing process.

Biosecurity Facts:

- Shells are cured to kill any pathogens or diseases that may be present.
- Using imported raw prawns as bait has far greater biosecurity risks to local species.
- Moving vessels between waterways without cleaning poses a higher risk to Noosa ecosystems.

How are the shells stored?
The cured, washed oyster shell is placed in 5 kg bags on pallets wrapped in shade cloth and are stored under cover at the Brisbane Research Centre. They are also stored in bulk at the Doonan Solid Waste Depot prior to use.

What happens to the juvenile oysters?
The juvenile oysters attached to shell is called oyster culch. This culch is transported directly from Brisbane Research Centre to the Noosa River estuary and placed into the oyster reef patches or deployed into oyster gardening baskets that are placed directly into the Noosa River.

What is oyster gardening?
Oyster gardening involves attaching oyster culch filled baskets to solid structures such as private jetties. The owners of these jetties have nominated themselves as oyster gardeners and will maintain these gardens for 6-12 months, after which the adolescent oysters will be seeded on to the oyster reef patches. This activity is being managed by NICA (Noosa Integrated Catchment Authority).

Do you need permission to do this?
Yes. The Nature Conservancy is registered as a "resource provider" with the Department of Environment and Science, as per the Queensland End of Waste Code - Oyster shells (ENW02/2017) and Waste Reduction and Recycling Act 2011. TNC also consults regularly with marine pathologists and the Department of Agriculture and Fisheries biosecurity unit, which is a member of the project Technical Advisory Group. The biosecurity processes are communicated through the project's standard reporting protocol to government, donors, stakeholders, and the project Technical Advisory Group. TNC also requires a General Fisheries Permit from the Department of Agriculture and Fisheries to release live oysters into the Noosa River and Development Approval from the Queensland Government and Noosa Council to construct the reef foundations.

Where can I find out more?
Website: natureaustralia.org.au/noosa
Email: quosland@tnc.org

*Dugan, R.E. Biosecurity Risks related to recycling of oyster shell waste for shellfish reef restoration in Australia. Ecology of Management and Restoration 2020.
**Farrington, J., Burrows, S., Broadbent, R.D., McDonald, J. and van Engeman, P.S. (eds) (2005). Recreational Guidelines for Shellfish Safety. The Nature Conservancy, Arlington VA, USA.
***Lorenz, D., McDonald, J., Walker, R., Auerbach, J., Robson, C.E., Jensen, J., Hallett, K., Fawcett, C., Gumbrell, M.R., Liu, J., Hua, J., Echeverria, C., Gonzalez, I., Shaw, N., Decker, K., Olson, B.W. (2019). International principles and standards for the practice of ecological restoration. Second edition. Restoration Ecology 27(2):32-546.

The Nature Conservancy Australia

Figure 13: TNC's Noosa Oyster Shell Biosecurity factsheet

Oyster Gardening Manual

The oyster gardening manual has been developed as part of the toolkit for oyster gardeners.

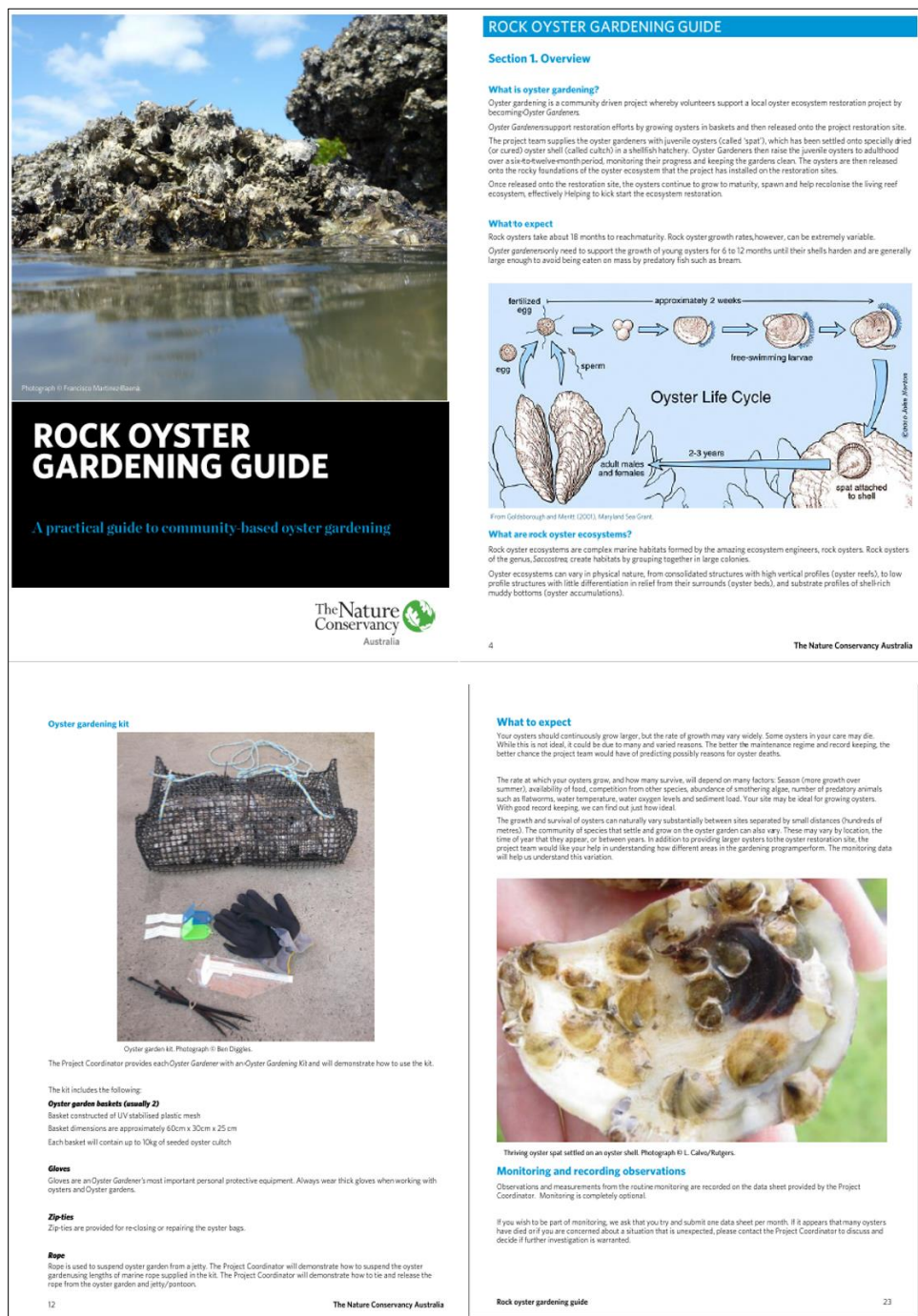



Figure 15: Oyster Gardening Manual

Frequently Asked Questions (conversational edition)



A frequently asked question document was developed to aid project partners in communicating information about the project to Noosa community members and project participants.



NOOSA OYSTER ECOSYSTEM RESTORATION PROJECT

Frequently Asked Questions

November 2021

Noosa Oyster Ecosystem Restoration

What is the project?
The Nature Conservancy (TNC) is working with Noosa Shire Council, the Australian and Queensland governments, Noosa local businesses and Noosa community, to restore critically endangered rock oyster ecosystems in the Noosa River estuary.

How are you restoring the ecosystem?

- We place locally sourced rocks at the bottom of the river - this forms the foundation of the rock oyster ecosystem.
- Adult oysters are taken from the Noosa River and spawned in tanks at the Brittle Island Research Centre. The juvenile oysters (or spat) are attached to clean oyster shells. The oyster shells are recycled from Noosa restaurants and Sunshine Coast seafood wholesalers as part of TNC's Shuck Don't Chuck shell recycling program.
- Oyster shells, and attached oyster spat are then placed onto the rocky reef foundations where they grow and help form the reef structure. Wild oyster spat will also settle on the reef foundations, as will a variety of plants and invertebrates. Together, these organisms restore the oyster ecosystem.

What else will live on these reefs other than oysters?
The oyster ecosystems become home to fish such as bream, mullet, pufferfish and gobies. Other possible critters include crabs, stingrays, sea stars and octopus (100+ species of marine life potentially).

Why do the reefs need restoring?
Up until the early 1900's, naturally occurring rock oyster ecosystems were all along the east and southern coasts of Australia. Today, these ecosystems have disappeared from many estuaries, including Noosa. More than 90 percent of the original oyster beds and reefs have been lost.

Where will the oyster ecosystems be?
Tewantin, below the council chambers, Goat Island, along the southern shoreline, and in lower Weyba Creek, opposite Noosa Sound.

Are there still oysters here?
There are naturally occurring rock oysters and flat oysters in the river. These oysters will be the "parents" of the future reef building oyster population. There are however, no longer rock oyster ecosystems in the Noosa River, just remnant populations of oysters.

Are there community members involved in this?
Yes, there are many projects run by local groups including oyster gardening run by NICA (Noosa Integrated Catchment Association), a junior schools program run by NCBA (Noosa Community Biosphere Association) and a senior school program run by Noosa ECHub (Noosa Environmental Education Hub).

Are there community volunteers?
Yes. Volunteers collect and clean oyster shells, develop outreach actions of their own (such as events and presentations) and participate in our partner-run projects.

Do you need a permit to do this?
Yes. Owners Consent to work in the waterway, a Resource Allocation Authority, to restore oyster ecosystems in the Noosa Fish Habitat Area, development approval, to place the rocky reef foundations in the river, and general fisheries permits to handle live oysters and carry out community oyster gardening.

Who is funding the project?
The Nature Conservancy, The Thomas Foundation, Noosa Shire Council and the Australian Government's national Reef Builder program.

Where can I find out more?
Website: natureaustralia.org.au/noosa
Email: queensland@tnc.org

Fun Facts

- One rock oyster can filter between 50-100 litres of estuary water per day.
- This project is leading the way in Queensland to restore Australia's critically endangered rock oyster ecosystems.






Figure 16. Project Frequently Asked Questions, conversational edition

E. Frequently asked questions – conversational edition

A new, simpler, shorter version of the Frequently Asked Questions factsheet was developed for project partners and interested community members.

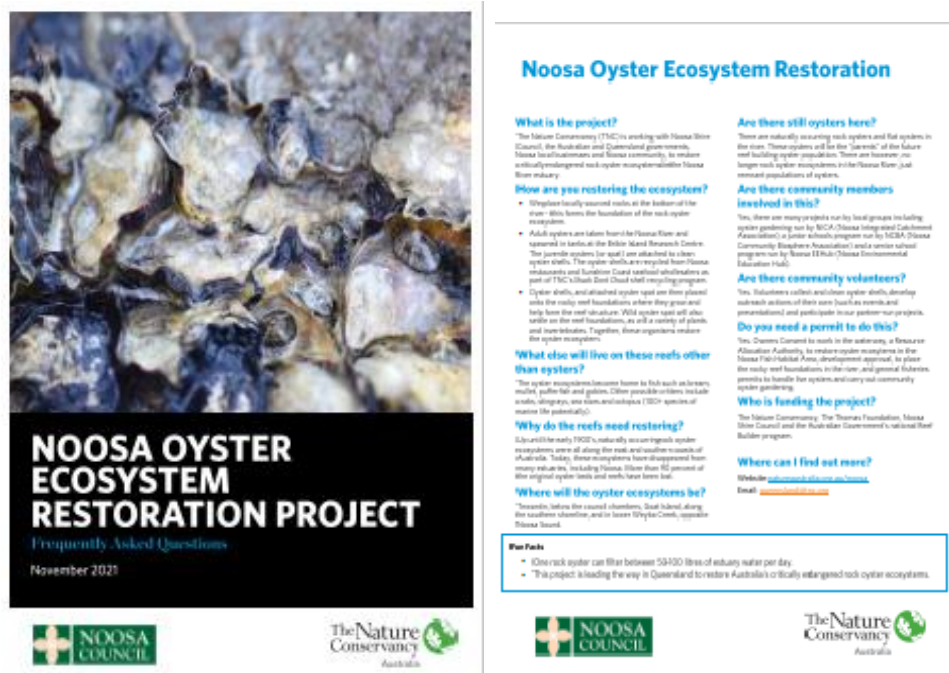



Figure 17: Frequently asked questions, conversational edition.

Noosa Construction News page (DRAFT)

A draft construction news information product has been developed for the Noosa Shire Council Works In Progress (WIP) page. Please note that the final product will include relevant dates for the construction period.



Project news

DATE 2022

Noosa River Oyster Ecosystem Restoration

Project summary

The Nature Conservancy, Noosa Shire Council and the Noosa community are rebuilding lost oyster beds and reefs in the Noosa River estuary.

This work is supported by the Thomas Foundation, the Australian Marine Conservation Society and the Australian Government's Reef Builder program.

Investigations and Options

Coastal engineering specialists and marine ecologists have worked closely with the community and The Nature Conservancy restoration experts to design the rock and shell foundations of the oyster beds and reefs and to select restoration sites.

Marine contractors will deploy the foundations on the riverbed in special configurations to create oyster reef patches. The contractor uses a barge and excavator to deploy the foundations using environmentally sensitive techniques.

Location of works

Site 1: Goat Island - centre of the southern shoreline, landward of the formal moorings.
Site 2: Tewantin shoreline - upstream of the boat ramp below the council chambers.
Site 3 and 4: Noosa Sound – east and west

Permits

All works are undertaken in strict adherence with state and local laws and government permits.

Scope of works

Locally sourced rock and clean oyster shell is transported to the project load out site at the end of Hilton Esplanade, Tewantin.

At the load out site, the rock and shell are loaded onto a barge and transported to the restoration sites.

The contractor then deploys the rock and shell onto the restoration sites in strict adherence to the design specifications.

Timing and duration of works

The construction work is due to begin on **date** and will continue until **date**.

The contractors will aim to minimise the duration of the construction process by working continuous days during this period.

Next Steps

Post construction, the sites will be clearly marked, mapped, and monitored by scientists.

Further information

Please contact us at queensland@tnc.org

Find out more about the project here:
www.natureaustralia.org.au/noosa

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Figure 18: DRAFT Project Noosa page ready for the construction phase

F. Noosa Estuary Seagrass Distribution Report, and Executive Summary.

Part of the partnership with Noosa Shire Council includes a report or summary of the extent and condition of seagrass in the Noosa River Estuary. This report has been provided to Noosa Shire Council, and an Executive Summary developed for sharing with interested parties that want a quick overview of the facts. Appendix 2 provides the report in full. The executive summary of the report is presented in Appendix 3.

Media

A summary of media exposure is presented in Table 5.

Table 5: Media secured

Media		
Date	Page title	Reach
21-09-21	Noosa Today – Noosa Estuary	11289
16-02-22	ABC Radio – Noosa Oyster Project	21,000
Social Media		
Date	Type	Reach
3-11-21	Facebook post – shell cleaning	3572
3-11-21	Instagram – Shell cleaning	312
TOTAL		36,173

TNC also produced its quarterly community news update: The Noosa Oyster Chronicle – Spring 2021 (attached as Appendix 4).

Project finances

The budget under the Noosa Partnership Agreement is \$2.4m. TNC secured an additional \$1.2m from the Australian government to augment this work. The Reefbuilder funds are being directly used to:

- Increasing the construction budget to allow twice the area of oyster reef patches to be constructed
- Engage the Noosa outreach coordinator, Megan Connell, until June 2023
- Resource community engagement activities until June 2023
- Fund post construction independent ecological monitoring

Table 5 below presents expenditure against the \$2.4 million partnership budget across the five project activity codes:

1. Reef Building
2. Hatchery and seedling
3. Reef integrity and performance assessment
4. Community engagement, volunteering and media
5. Project management

Considerable savings have been made in the following areas:

- Data analysis and restoration suitability mapping – achieved in-house rather than outsourcing
- Office space and equipment and sundry costs – project manager is working from home office
- Technical assessments – project manager and in-kind contributions from experts
- Travel, training and conferences – COVID-19 impact has minimised travel opportunities

Considerable savings have been made under the following budget lines:

- Hatchery and seeding – Bribie Island Research Centre offered TNC and excellent partnership rate for this work.
- Reef integrity and performance assessment - Monitoring in Year 2 will be funded from Reef Builder.

Savings made have been incorporated into the reef building budget to maximize the extent of the reef build.

Contracts

- NorthGroup Pty Ltd – Bathymetric and intertidal surveys at oyster restoration sites (\$13,200) – final outputs submitted. Payment pending.
- Ecological Service Professionals Pty Ltd - Seagrass and habitat mapping contract (\$42,592) – outputs submitted. Final report submitted. Final payment made.
- Integrated Coastal Management Pty Ltd – Engineering advice and RPEQ certifications (\$37,290) – outputs submitted. Final payment made.
- Integrated Coastal Management Pty Ltd – Permitting support (up to \$10,000) - ongoing
- Resources Australia Ltd - Oyster shell transport (up to \$10,000) - contract ongoing
- Griffith University PhD student sponsorship for Noosa River oyster research (\$20,000). Payment made.

Contracts pending (under negotiation)

- Integrated Coastal Management Pty Ltd – Construction engineering oversight and certification
- Ecological Service Professionals Pty Ltd – Restoration monitoring and reporting (Year 1)
- M&J Marine Services Pty Ltd – Reef construction
- Government of Queensland – Bribie Island Research Centre – Oyster seeding

Table 5: Total project expenditure (Noosa Partnership agreement funding only)

PROJECT COSTS	Total Budget	FY20 reported number	FY21	FY22 (Jul-Dec 2021)	Total Expenditure	Remaining budget
Reef Building	861,982	100,915	256,678.26	42,780.72	400,374	461,608
Bathymetric, hydrological assessments, oyster bed engineering, rock and shell material procurement, construction and engineering assessments.						
Hatchery and seeding	293,332	29,575	104,913.35	36,154.13	170,642	122,690
Procurement of oysters, hatchery/farmer engagement, shell transport, recycled shells collection, permitting, record keeping and reporting.						
Reef integrity and performance assessment	580,289	24,325	140,001.04	32,525.61	196,852	383,437
Pre-substrate deployment site assessments (bottom ecology, surface profiles, oyster densities, vulnerable habitats mapping (e.g. seagrass), river uses analysis (e.g. boating, fishing), data analysis, WHS and safety plans, operational equipment, periodic reports.						
Community engagement, volunteering and media	424,397	177,722	171,911.72	55,314.48	404,948	19,449
Community engagement products, engagement coordination, sub-contractor identification, contracting and management, volunteer briefings, volunteer recruitment, stakeholder meetings, personal protective equipment, media statements, media management and education material production and distribution.						
Project Management	240,000	102,017	135,947.49	1,918.66	239,883	117
Production of Project Management Plan, Monitoring Evaluation and Reporting Plan, Communications Plan, project risk assessments, plan and risk refinements and revisions, government permitting, legal, technical science support						
Total	2,400,000	434,554	809,451.86	168,693.60	1,412,699	987,301

Next steps

The steps planned for the next six months of the project include:

- Finalise construction contract to build reefs at 4 sites
- Finalise contract for engineering oversight of reef builds
- Construct reefs, map reefs and provide construction report to government
- Finalise contract for independent monitoring of the sites
- Undertake baseline monitoring
- Support Oyster Gardening Project activities
- Support Senior Schools Project activities with EEHub
- Support Junior Schools Project activities with NCBA
- Finalise grant to Noosa Parks Association (NPA) to undertake baseline sediment study
- Establish Tewanin demonstration project site
- Produce Summer/Autumn/Winter editions of the Noosa Oyster Chronicle
- Produce construction information package and distribute to community, respond to community queries
- Distribute seagrass report
- Review partnership arrangement
- Prepare final Annual Report – due September 2022.

[Appendix 1: Reefbuilder Presentation](#)

[Appendix 2: Current and Historical Distribution of Seagrass in the Noosa Estuary](#)

[Appendix 3: Seagrass Report Summary](#)

[Appendix 4: Spring Oyster Chronicle](#)