

PROPOSAL

Noosa Council and The Nature Conservancy

Noosa River Partnership

&

Bring Back the Fish  
Oyster Reef Restoration (Phase II and III)

2019 - 2021

The Nature Conservancy



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## 1.0. EXECUTIVE SUMMARY

### Noosa River Partnership

This project proposes to establish an innovative and regionally significant Noosa River Partnership, between the Noosa Council and the global conservation organization The Nature Conservancy, which seeks to improve the health and resilience of the Noosa River and the industries and local communities that rely on its long-term wellbeing.

The focus of the Public-Private Partnership is to:

- Capitalize on the expertise of The Nature Conservancy's global networks and experience (through knowledge brokering, mentoring, study tours and access to subject matter experts) to improve River management and strengthen the long-term social, environmental and economic health and resilience of the River;
- Demonstrate a leading example of a replicable, environmentally focused, Public-Private Partnership that achieves superior outcomes for the environment and local communities compared to existing river management models; and,
- Increase government (State and Federal), private, industry and community support for restoration and conservation-focused activities that improve the long-term social, economic and environmental health and resilience of the River.

The Partnership will initially prioritize the restoration of oyster reefs in the lower estuary (as described below) as the first activity, with other potential activities including:

- General strategic support/advice for planning, management and evaluation associated with the new Noosa River Plan and other initiatives and projects associated with the river system;
- Coordination of research required to inform the delivery of the implementation of the Noosa River Plan; and
- Critical evaluation and potential reform of current and future management activities (e.g. commercial and recreational fishing, recreation, tourism, wetland restoration, sediment and nutrient inflows, community engagement).

The partnership will commence from July 2019 and will run for at least three years with the outcomes of the first three years of the partnership to be reviewed in July 2022. The total operating budget is \$2.4M, inclusive of \$1.2M from The Nature Conservancy and \$1.2M from Noosa Council with the expectation that further funding will be raised from a variety of other sources to support on ground management activities. \$1.36M of the available \$2.4M will be quarantined to support the next phase of oyster reef restoration as described in Section 3 in this proposal.

The terms of reference for the partnership will be finalized between January - June 2019, culminating in a Memorandum of Understanding and grant agreement between The Nature Conservancy and Noosa Council executed by July 2019.

### Oyster reef restoration

Oyster reefs were once common throughout the lower sections of the Noosa River estuary, particularly around Tewantin but have been lost over the last century, primarily as a result of historical overfishing and physical and ecological changes to the estuary. The project will help deliver community aspirations identified in the Noosa River Plan (Noosa Council, 2019) particularly objectives relating to upholding and improving the ecological resilience and fish life within the lower estuary by restoring oyster reefs created by the native rock oyster, *Saccostrea glomera*.

The restoration project will be delivered through a public-private partnership led by The Nature Conservancy and Noosa Council, and include Kabi Kabi (Gubbi Gubbi), Noosa Parks Association and Noosa Biosphere Reserve Foundation. Key stakeholders include: Queensland Government, Healthy Land and Water, The Thomas Foundation, local universities, fishing and aquaculture industries, restaurants and community groups including State Government and private businesses, individuals, trusts and foundations. The Project will commence in July 2019 and operate until at least 2021 when the need for further restoration will be assessed.

Oyster reef restoration methodology will follow standards aligned with best practice oyster restoration and the Society for Ecological Restoration global guidelines. Deliverables associated with the project include: 1. Planning and governance, 2. Reef restoration, 3. Monitoring, evaluation and reporting and 4. Community engagement and volunteering. The project will follow a staged approach to restoration: Phase I – *feasibility* which has been completed by University of Sunshine Coast, Phase II- *optimal design* (2019-2020) which seeks to determine the optimal design, locations and most cost effective method of reef restoration and Phase III- *full restoration* (2020-2021) which seeks to construct reefs at all feasible locations identified during Phase I and II. This phased, timebound approach will reduce ecological and financial risks through the application of an adaptive management framework.

Project outcomes include: The restoration of a threatened ecosystem (shellfish reefs) and associated increases in local marine biodiversity and recreationally important fish species and increased community engagement, volunteering and environmental stewardship within the Noosa community.

## **2.0. NOOSA RIVER PARTNERSHIP (initial scope)**

### ***2.1. Recognition of prior collaboration and rationale for Noosa River partnership***

Over the last four years, Noosa Council and The Nature Conservancy 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:

#### *1. Noosa River Expert Workshop, Powerhouse Museum, 2014*

A two day workshop, hosted by The Nature Conservancy 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 Noosa Council.

#### *2. TNC Oyster Restoration Scoping Study, 2015*

The Nature Conservancy and Ecological Service Professionals Pty on behalf of Noosa Council 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 a number of pilot reefs for further assessment.

#### *3. 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 The Nature Conservancy and Noosa Council 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.

#### *4. University of Sunshine Coast, Bring Back the Fish, 2017-2019*

A three year study which has installed a series of reef units consisting of coir bags filled with oyster shell (pilot reefs) at 15 sites across the estuary. The project will assess the structural integrity, oyster recruitment, fish and invertebrate community assemblages and human interactions with the reefs. This project will collect important ecological information that will support the final design and implementation of reef restoration in Phases II and III of *this Project* (see 6.1. below for more information on project phases). The initial concept was developed by The Nature Conservancy and University of Sunshine Coast and is partially funded by Noosa Council.

#### *5. Review of Bring Back the Fish Project, 2018*

In February 2018, The Nature Conservancy and several independent academics provided a review of the Bring Back the Fish project (including a review of the Prawn Study, Oyster Restoration and Keep it in Kin Kin) and provided a number of strategic recommendations to Noosa Council, Noosa Biosphere Reserve Foundation and Noosa Parks Association associated with their continuation.

## 6. Noosa River Plan, 2019

The completion of the Noosa River Plan by Noosa Council in early 2019 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. TNC provided comments on the initial draft of the plan.

Noosa Council and The Nature Conservancy 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 Council Executive Committee, have recognized the strategic priorities of both organizations and of others would be more effectively served through a formal public-private partnership, rather than on an individual project basis. This agreement has led to the development of *this proposal* and rationale for establishing the partnership.

### 2.2. Partnership scope

The Partnership will initially prioritize the restoration of oyster reefs in the lower estuary (as described in the section below) and will also include support for other potential activities including:

- Strategic support for planning, management and evaluation associated with the new Noosa River Plan;
- Coordination of research required to inform the delivery of the Noosa River Plan and other initiatives and projects associated with the Noosa River systems; and
- Critical evaluation and potential reform of current and future management activities (e.g. commercial and recreational fishing, recreation, tourism, wetland restoration, sediment and nutrient inflows, community engagement).

Engagement could occur through:

- Access to TNC subject matter experts (particularly in conservation planning, fisheries, aquaculture, restoration, community engagement) to provide guidance and advice to Council environment and river management staff
- Assistance with strategic planning, co-creation of management plans and activities and evidence-based decision analysis, particularly through the development of reports, workshops and mentoring
- Site visits and study tours to TNC projects and TNC expertise visiting

The specific terms of reference for the partnership (including deliverables and outcomes) will be developed between Noosa Council and The Nature Conservancy between January - June 2019. The terms of reference will form the basis for of a Memorandum of Understanding and/or Grant Agreement between the two organizations.

To finalize the scope of the partnership, it is proposed to match the needs of Noosa Council and the management objectives of the Noosa River Plan to The Nature Conservancy's global marine and coastal expertise, which includes:

- Marine ecosystem restoration
- Community conservation planning and engagement
- Marine protected area and marine spatial planning design and management
- Fisheries management

- Aquaculture
- Coastal resilience planning and adaptation
- Nature based adaptation and natural solutions to coastal risks

This needs and expertise analysis will occur through a joint workshop scheduled within the first quarter of 2019.

### 2.3. Draft budget

Indicative resources required to deliver the Noosa River Partnership including support for oyster reef restoration (detailed in next section) are outlined in the table below.

Resource include support for:

- TNC conservation staff to provide support and capacity building to Noosa Council Environment and River Management staff
- Travel costs and management associated with site visits and knowledge exchanges
- Management of the oyster reef restoration project for Phase I and Phase II, including planning, permitting and management of associated sub-contractors with researchers and maritime companies
- Construction costs associated with of Phase II oyster reef restoration
- Communication and media
- Community engagement including workshops and public presentations

A final budget will be provided with the partnership terms of reference.

<i>DRAFT PROJECT COSTS</i>	Year 1	Year 2	Year 3	Total
<b>Activity #1 - Strategic planning, project planning, governance and support</b>	132,904	136,069	139,329	408,303
<b>Activity #2 – Site visits, exchanges, workshops</b>	52,246	52,799	53,368	158,412
<b>Activity #3 - Oyster restoration</b>	404,438	646,999	310,860	1,362,297
<b>Activity #4 – Communication, community engagement and media</b>	62,472	57,920	58,877	179,269
<b>Activity #5 - Project and contract management</b>	106,413	92,136	94,366	292,916
<b><i>Subtotal</i></b>	<b>758,473</b>	<b>985,924</b>	<b>656,800</b>	<b>240,1197</b>
Noosa Council contribution	379,237	492,962	328,400	1,200,599
<b>Total Expense (GST exclusive)</b>	<b>758,473</b>	<b>985,924</b>	<b>656,800</b>	<b>2,401,197</b>

### 3.0. OYSTER RESTORATION PROJECT SCOPE

#### 3.1. Historical significance

The underwater environment of the Noosa River lower estuary was once dominated with extensive reef ecosystems created primarily by the Australian rock oyster (*Saccostrea glomerata*). These reefs provided food and habitat for many other species including desirable fish species such as whiting, bream and snapper whilst also filtering and removing nutrients from the water column (a single oyster can filter up to 100 L of water a day). The reefs were largely lost in the late 1800s to early 1900s primarily as a result of dredging (which broke up the reef complex) and overharvesting (which removed oyster biomass) by commercial wild oyster fishers. At the peak of the wild oyster harvest industry (1906-1907) it is estimated that 2-3 million oysters were harvest in the lower estuary each year<sup>1</sup>.

The loss of oyster biomass likely resulted in the ecosystem collapsing, with reefs now replaced primarily by soft (sandy and muddy) sediments. Changes to the estuary's physical-chemical condition, canal development and shoreline armoring have also likely contributed to the decline of the ecosystem or inhibited its natural recovery. Today, no oyster reefs exist in the Noosa River estuary despite the presence of individual and small populations of rock oysters. The closest known intact reef ecosystems occur near North Stradbroke Island in Morton Bay. Notably, a recent study has identified that the Australian rock oyster ecosystem is the most threatened marine ecosystem in Australia, with up to 94% of the ecosystem lost throughout Australia since European settlement<sup>2</sup>.

#### 3.1. Project Purpose

The purpose of this project is to improve the ecological productivity and resilience of the Noosa River lower estuary, and the industries and local community that rely on its long-term health, by restoring oyster reef ecosystems and thereby increasing biodiversity, fish habitat, natural water filtration and amenity value.

The project will support the implementation of the Noosa River Plan<sup>3</sup> particularly objectives relating to upholding and improving the ecological resilience and fish life within the lower estuary.

The ecological purpose, or ecosystem goal, is to re-establish a reef ecosystem developed by the indigenous rock oyster (*Saccostrea glomerata*) in the lower estuary. Higher levels of biodiversity and biomass, including desirable recreational and commercial fish species, are associated with oyster reef ecosystems (in some instances up to 500% greater than adjacent soft sediments). The restoration goal is to meet ecological community and biomass targets defined during the planning stages of the project and adapted from nearby reference sites.

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<sup>1</sup> Thurston R. 2015. Historical ecology of the Noosa Estuary fisheries. Report to: Noosa Council, The Nature Conservancy and The Thomas Foundation (available on request from TNC).

<sup>2</sup> Gillies et al. 2018. Australian Shellfish Ecosystems: past distribution, current status and future management. PLoS ONE 13(2):e0190914. <https://doi.org/10.1371/journal.pone.0190914>

<sup>3</sup> Noosa River Plan, Noosa Council, 2019. [Http://noosa.qld.gov.au](http://noosa.qld.gov.au)



### **3.2. Funding Sources**

This project is funded through a public-private partnership including:

\$1.2M from the Nature Conservancy

\$1.2M from Noosa Council

\$1.2M from various other sources yet to be secured (likely State Government, corporate businesses and private individuals, trusts and foundations).

The Nature Conservancy and project partners will endeavor to secure the \$1.2M during the first 18 months of the project, with resource acquisition to be led by The Nature Conservancy's Business Development Team (see 7.0 below). The unsecured \$1.2M component of the project will be used to support Phase III construction (see Project Construction Phases below).

### **3.3. Project Description and workflow**

This project seeks to restore an oyster reef system comprised of several individual but connected reef patches (collective known as a reef ecosystem) throughout the lower sections of the Noosa River estuary. The project builds on the ecological studies and trials led by University of Sunshine Coast (2016-2018) identified as the *feasibility component of this project* (i.e. Phase I, see 6.1. below).

The project workflow encompasses four work streams:

#### **1. Planning, governance and communication**

The first 12 months of the project will deliver activities required to effect successful ecosystem restoration and community engagement. These include: Development of a project implementation plan, project risk assessment, communications framework, habitat suitability modelling, community volunteering projects, reef design and construction briefs, permits, project governance and monitoring and evaluation reporting framework.

#### **2. Reef restoration and long-term management**

This phase of the project focuses on the procurement of materials and in water construction of oyster reefs. Activities associated with this phase will be outlined in the project implementation plan and include: preparation of tender documents and legal contracts for procurement of materials and reef construction by third parties, final preparation of reef design, locations and site management, execution of permit requirements and reef construction. The long-term management and tenure of restoration sites including the harvest of oysters and associated marine life is an important component of the project which should be negotiated amongst stakeholders prior to reef construction. This component is best led by the responsible governing agency and guided by TNC and stakeholders.

#### **3. Community engagement and volunteering**

The project will establish a number of community engagement and volunteering opportunities, to be determined collaboratively by project stakeholders during the detailed planning phase of the project. These could include:

- Oyster shell recycling with local restaurants, oyster growers and seafood suppliers
- Oyster gardening
- Fish surveys
- Reef construction
- Reef monitoring including oyster settlement surveys

The concurrent delivery of community volunteering and engagement activities is an important component of reef restoration, helping to foster a high level of support and long term stewardship amongst the local community and estuary-dependent businesses. Volunteering also helps to reduce costs associated with reef construction and monitoring and strengthens community support for the Project and other related estuary management activities. Community volunteering and engagement activities will include regular public information nights, seminars and consultation.

#### 4. Monitoring, evaluation and reporting

During the planning phase of the project a comprehensive Monitoring, Evaluation and Reporting framework will be developed to support the project. This includes:

Clear articulation of the project's goals, targets, objectives, monitoring and reporting methodology. Stakeholder roles and responsibilities will be defined separately in the Project Implementation Plan.

Project targets are defined under five ecological and social categories, each with a number of associated measures:

- *Shellfish*- assessment of density, growth and survival of the ecosystem engineer, *S. glomerata*
- *Biodiversity* - assessment of increase in marine life and biomass
- *Fish*- assessment of increase in desired fish species and biomass
- *Reef Integrity*- assessment of structural features of the reef including height, shape and stability
- *Social-economic*- assessment of social outcomes including volunteering, job creation, community support.

The project's annual progress will be reported in digestible, community friendly project report cards. A more detailed technical monitoring report and annual project report will also be developed.

#### 4.0. PROJECT STAGES AND DELIVERABLES

Deliverable	Lead Origination	Details	Indicative Timeline
<b>1. Planning, governance and communication</b>			
Project staffing	TNC	Hiring of project manager and identification of project staff responsible for project delivery.	2 months
Project Advisory Group established consisting of key stakeholders	TNC	Informal advisory group chaired by TNC and containing representatives from funding partners, responsible agencies and technical advisors. Group to meet quarterly or as determined in the TOR.	6 months
Communication strategy	TNC	Outlines key media opportunities, notification protocols, key messages and responsible persons.	3 months
Project Implementation Plan	TNC	Contains detailed information relating to delivery of the project.	9 months
Project Risk Assessment	TNC	Contains information on environmental, social and economic project threats, risk ratings and mitigating actions	9 months
Habitat suitability model and analysis	TNC	Identifies the optimal locations for restoration based on pilot studies undertaken during feasibility in addition to new analysis. From these analyses, restorable bottom area targets for each restorable site are defined.	6 months
Identification of suitable community engagement/volunteering activities	TNC	Identifies the project(s) most suitable for community engagement and volunteering (e.g. shell recycling, fish monitoring, reef building, oyster gardening)	9 months
<b>2. Reef restoration and long-term management</b>			
Long-term reef management plan	Noosa Council	Outlines the long-term management plan and agency responsibilities, including public access, anchoring, oyster resource extraction, signage, compliance, liability and risk management. Requires consultation/negotiation with Queensland Government.	12 months
Construction permits	TNC	Submission and procurement of construction and scientific permits	18 months

Reef design and engineering	TNC	Final construction designs and briefs and engineering recommendations. Includes site management plan for construction.	24 months
Procurement management	TNC	Procurement tenders, legal contracts and bid management associated with procurement of reef materials and reef construction.	Ongoing
Reef construction	Contractors	Construction of reef base from materials such as recycled shells, limestone or indigenous rock. May also include addition of oyster spat from hatchery if necessary.	24 months
<b>5.0. Community engagement and volunteering</b>			
Community volunteering project(s) (TBD)	Partner (supported by TNC)	May comprise of one or more of the following: shell recycling, oyster gardening, OysterWatch, fish monitoring, oyster reef construction and monitoring. Final project(s) to be determined during initial stakeholder meetings during planning stage.	Ongoing (established by 12 months)
Community information sessions	TNC	Includes public presentations and regular information sessions	Ongoing, regular
Volunteer management	Partners and TNC	Includes risk assessments, public liability and management protocols for volunteers	12 months
<b>4. Monitoring, evaluation and reporting</b>			
Monitoring, evaluation and reporting plan	TNC	Provides the framework and rationale for monitoring, evaluation and reporting	9 months
Six monthly report cards	TNC	Provides a 2 page progress summary in report card format	6 monthly from year 2
Annual Project Report	TNC	Provides a details report on the status of all project objectives and deliverables	Annual
Annual Technical Monitoring Report	TNC	Provides a detailed report on the monitoring and analysis of project measures of success	Annual
Annual project review	TNC	In person annual review meeting for project funders and Project Advisory Group members and including external independent reviewers	Annual

## 5.0. RESTORATION APPROACH

The Nature Conservancy follows the international Society for Ecological Restoration's principles and key concepts for ecological restoration<sup>4</sup>. In brief, this includes:

1. The use of a reference ecosystem or model ecosystem which is used to set ecological targets for the project, taking environmental change into account
2. Identifying the target ecosystem's key attributes prior to developing goals and objectives
3. Focusing on creating the ecological 'enabling conditions' that lets nature restore itself
4. Seeking 'highest and best effort' progression towards full recovery
5. Drawing on all available relevant knowledge sources to inform decisions
6. Early, genuine and active engagement with all stakeholders

In addition to the above principles, The Nature Conservancy also applies current best practice approaches for shellfish reef restoration as outlined in: *A Practitioners Guide to Shellfish Restoration Design and Monitoring*<sup>5</sup>. Importantly, our process includes principles of adaptive management, whereby lessons learnt from prior research studies, pilot projects and other restoration projects in Australia and the US are incorporated into the design and monitoring of current and future restoration.

### 6.1. Project Construction Phases

The restoration or construction element of the project is split into three phases that allow for a review of progress, targets and lessons learnt and incorporation of these into subsequent construction periods (i.e. adaptive management principles). These phases align with the concepts of a feasibility or pilot phase (Phase I), replicable reef unit development (Phase II) and full restoration (Phase III).

#### Phase I (2016-2018)

Phase I of the project was largely undertaken by University of Sunshine Coast with support and co-funding from Noosa Council, Noosa Parks Association, The Thomas Foundation and Noosa Biosphere Reserve Foundation. The key objectives and lessons learnt from Phase I include:

- An understanding of oyster recruitment potential, growth and survival at 16 different locations in the lower estuary. This information will be used in Phase II to assist with identification of priority sites and methods for restoration
- An understanding of state government permitting and regulatory requirements required to undertake reef restoration
- To a lesser degree, an understanding of material use, reef stability and design of reefs
- To a lesser degree, an understanding of community assemblages likely to be associated with restored shellfish ecosystems

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<sup>4</sup> McDonald T, Gann GD, Jonson J, and Dixon KW (2016) International standards for the practice of ecological restoration – including principles and key concepts. Society for Ecological Restoration, Washington, D.C.

<sup>5</sup> Brumbaugh, R. D., Beck, M. W., Coen, L. D., Craig, L., & Hicks, P. (2006). A practitioners guide to the design & monitoring of shellfish restoration projects: an ecosystem services approach.

The project was also successful in raising awareness amongst the local community of the need to restore oyster reefs.

### Phase II (2019-2020)

Phase II of this project seeks to identify the most appropriate design for a replicable 'reef unit' that will be deployed during Phase III at multiple sites across the estuary. Specifically, the goal of Phase II is to confirm the most cost-effective and appropriate construction materials, reef design and deployment methods. Once confirmed, the most appropriate reef 'unit' will then be replicated at multiple locations across the estuary during Phase III. Phase II will occur at only one or two locations within the estuary and would seek to test and determine the cost-effectiveness and appropriate use of:

1. Different ratios of recycled shells vs limestone or other rock materials (cost of deployment vs reef stability vs suitability for oysters and marine life)
2. Seeding vs not seeding the reef base with oysters (oyster density)
3. Using bagged vs non-bagged materials (structural integrity)
4. Different methods of reef construction (e.g. commercial barges, community support)
5. Reef design (e.g. optimal length, width and height of reef base)

The outcome of Phase II will determine the most cost effective, replicable reef unit that can be easily deployed at multiple sites across the estuary during Phase III.

### Phase III (2020-2021)

Phase III will take the most optimal design from Phase II and replicate this at other suitable locations across the estuary (identified through the habitat suitability modelling). This phase is analogous to a 'roll out' or 'full restoration', where the majority of works are carried out as a maritime construction project.

Costs required to construct Phase III are not included in the draft budget (Section 2.3) but are anticipated to cost approximately \$1.2M.

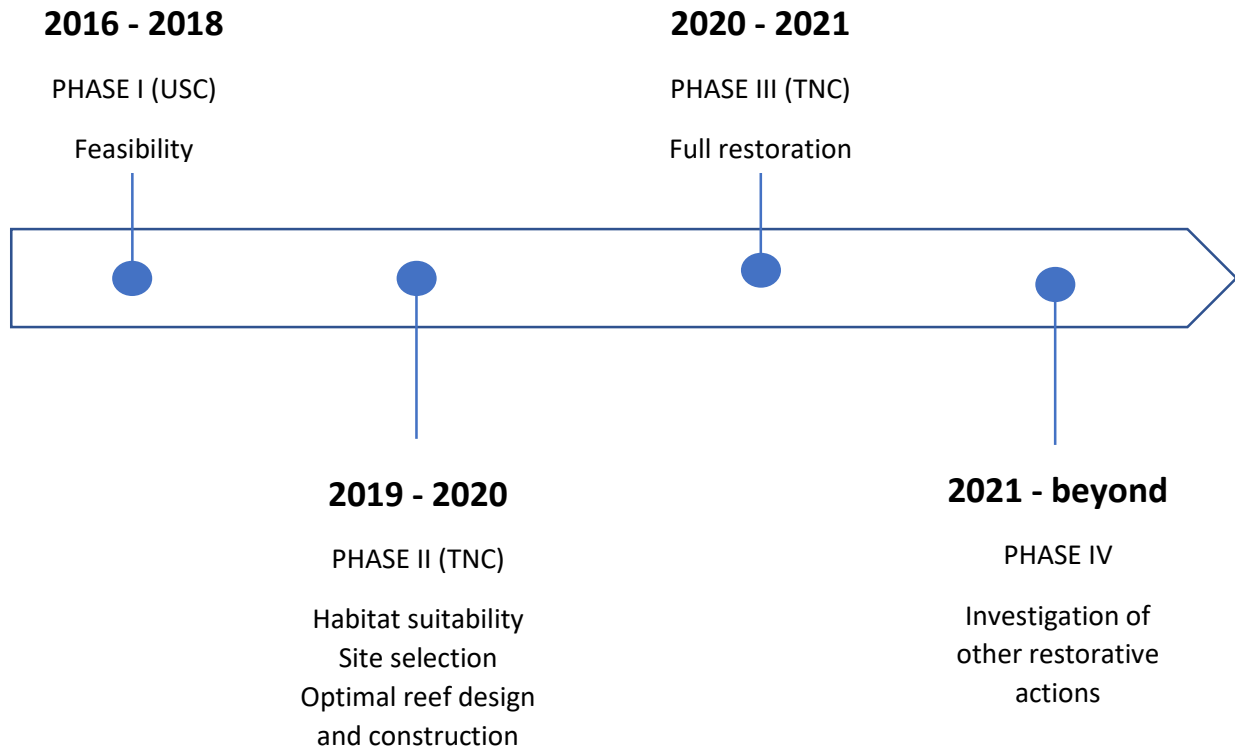


Figure 1. TNC’s phased approach to determining optimal sites and methods for restoration.

## 6.2. Critical Assumptions

Our critical Theory of Change assumptions are:

- 1) That the community will advocate for and support oyster reef restoration if the environmental, social and economic benefits and outcomes of the project are clearly articulated and they are included in key decision points;
- 2) That private and philanthropic investors will invest in PHASE II and PHASE III if a clear business and/or philanthropic (ecological, social, economic) return on investment proposition is presented;
- 3) That partners and stakeholders will continue to support and invest in similar natural infrastructure projects as a result of capacity building and improved confidence after the completion of *this project*.
- 4) That oyster reefs will persist and thrive if a sufficient population of native rock oysters is established through ecological restoration and their main threats managed sufficient to sustain oyster populations.

### 6.3. Assessment of Options

A mix of qualitative and quantitative assessments of different construction options are provided in the table below:

Option	Benefit	Cost	Risk	Response
<b>Construct reefs in staged approach over two phases</b>	Reef construction method can be improved over time (adaptive management). Possible improved oyster survival/ enhanced biodiversity for reefs established in later years	Requires multiple barge or other plant equipment mobilization/ demobilization costs. Depending on size of barge required this could be up to an additional \$100k per deployment.	Unlikely to result in complete reef failure but may result in need to deploy oysters over several time periods. This is still likely to be cheaper (\$20-50k) than multiple barge mobilization costs.	Undertake staged approach to restoration. Incorporate pilot project lessons into reef design. Work with local coastal engineers to optimize final reef design for location to minimize threats.
<b>Use recycled shell as reef base</b>	Lower cost compared to using rock as reef base. Likely results in greater reef extent and cost effectiveness	Requires sufficient recycled shell material to be available, biosecurity protocols and permits in place.	May result in slumping/ spreading/ smothering of reef base due to lightweight nature of materials and lower reef profile.	Work with local coastal engineers and ecologists to optimize final reef design and materials for locations.
<b>Use only natural recruitment as means of populating oysters</b>	Lower cost compared to hatchery produced oysters. Does not require translocation permit or broodstock harvest.	Requires sufficient natural spat recruitment and minimal biofouling during time of recruitment	Recruitment is less than required to form oyster reef/sustain population	Assess the need for hatchery produced oysters in Phase II and monitor natural recruitment over time with view to move away from hatchery produced oysters if natural recruitment sufficient



The final construction design and material specifications will consider the tradeoffs amongst the reef material, barge size, barge availability and timing of deployment (listed in the above table) to optimize the efficient use of resources against the primary objective of creating the maximum amount of oyster reef. This can only be completed once the full-time Project Manager is in place, who will investigate opportunities to save costs through local partnerships, donations and in kind support.

## **6.0. FUNDING STRATEGY**

The Nature Conservancy will endeavor to work with Noosa Council and other partners to seek an additional \$1.2M in investments through local and federal government and private and philanthropic sources to fund the cost of Phase III construction. The Conservancy has a track record of securing private and public funding for oyster reef restoration in Australia; for instance in South Australia, The Nature Conservancy leveraged an initial \$600,000 SA State Government commitment into a \$4.1M public-private partnership; and in Victoria, The Nature Conservancy has leveraged the Victorian State Government's \$1M commitment into a \$2.5M public-private partnership.

The funding strategy and funding procurement will be led by The Nature Conservancy's Business Development Team.

## **7.0. LOCAL CONTENT AND PROCUREMENT**

The resources required to construct and monitor the reef will primarily be sourced from local suppliers, including:

- Project Coordinator based locally in Noosa
- All rock/shells required to build the reef base sourced from nearby quarries
- Local trucking companies will be hired to move rock/shells from the quarry to wharf
- Queensland based research institutions (e.g. USC, JCU, UQ), commercial divers and engineering firms given priority for sub-contractor work
- Local oyster farmers in adjacent estuaries may be paid a fee if ongoing management of juvenile oysters is required
- All small vessels used for reef integrity checks/monitoring will be hired locally
- Interstate personnel to stay locally in Noosa, contributing to local economy
- Local plant equipment hire and maritime construction companies to be given priority over interstate companies if bids are otherwise similar

The Nature Conservancy has a set of global Standard Operating Procedures which it must abide by for all procurement processes (provided on request). The Nature Conservancy will also seek to source goods and services locally where possible and align with the procurement policy of Noosa Council.

## **8.0. TRADITIONAL OWNER ENGAGEMENT**

PHASE I of this project had limited consultation with Kabbi Kabbi, the Traditional Owners of the Noosa River land and waters. This project has intent to engage Kabbi Kabbi Traditional Owners as key stakeholders from the beginning, and ideally as project partners (as defined below). Traditional ecological knowledge will be an important source of information to support restoration suitability modelling in addition to supporting education activities associated with the cultural importance of oysters, oyster middens and the Noosa River to Traditional Owners. Depending on the extent and desire for engagement by Kabbi Kabbi, additional opportunities that support the project such as Indigenous rangers, project support officers, aquaculture and tourism ventures will be explored.

## **10.0 PROJECT LEAD, PARTNERS AND STAKEHOLDER ROLES**

A brief description of the project partners, roles and governance structure is provided below. This will be finalized in the Project Plan where all parties can agree to the project governance structure, roles and responsibilities.

### **Project Lead**

The Project Lead is the principle point of contact between the project partners and has the primary responsibility and accountability for project delivery and financial spend. Specifically, the Project Lead is responsible for assembling the project team and ensuring all parties perform duties and tasks adequately, all project partners (and where appropriate project stakeholders) are consulted in major decision-making, all project partners and stakeholders are adequately kept informed of project progress, oversees a work plan with appropriate goals, timelines and budgets, makes day-to-day project decisions and develops and executes a media/communications strategy. The Project Lead is expected to have a high level understanding of all activities associated with the project.

TNC will act as the Project Lead throughout the duration of this project.

### **Project Partner**

Project Partners provide financial and organisational support and expertise to the project. They provide technical and logistical support to the Project Lead and other project partners and stakeholders required to deliver project tasks and activities. Project Partners are included in major decision-making but may not necessarily be involved in day-to-day project management. The Project Partners are responsible for various tasks and responsibilities related to the project and in some instances assisting in the execution of media and communications strategies.

### **Project Stakeholders**

Project Stakeholder(s) are any group that have an interest or may be affected (positively or negatively) by the project. They may be responsible for delivering non-core project related activities but are more likely to be involved in consultation and decision making to ensure the project does not negatively affect their operations and/or provides benefits. Examples of Project Stakeholders include:

- Local oyster growers
- Commercial fishers
- Commercial recreational fishing guides
- Foreshore residents
- Environmental community groups
- Restaurants, seafood wholesalers
- Boat and recreational equipment hire businesses
- Hotels and accommodation providers
- Sunfish and Ozfish Unlimited
- Local Member of Parliament
- Queensland Minister(s)
- Federal Ministers(s)
- State Government agencies

Project Stakeholders require regular dialogue and information to ensure they are kept informed of the project's status and outcomes and are involved in major decisions.

## **11.0 SUPPORTING DOCUMENTS**

Report to The Thomas Foundation and Noosa Parks Association on assessment of aquatic restoration and management options for Noosa Estuary and Lakes. 2015. The Nature Conservancy, January 9, 2015.

Restoration of Noosa Estuary: An Assessment of Oyster Recruitment. 2015. The Nature Conservancy and Ecological Service Professionals. July, 2015.

Historical ecology of the Noosa Estuary fisheries. Report to: Noosa Council, The Nature Conservancy and The Thomas Foundation. 2015. Thurston R. University of Queensland. 2015.

Gillies et al. 2018. Australian Shellfish Ecosystems: past distribution, current status and future management. PLoS ONE 13(2):e0190914.  
<https://doi.org/10.1371/journal.pone.0190914>

Monitoring of the Noosa River Oyster Reefs: November 2017 - November 2018. Report to Noosa Council, and Queensland Department of Agriculture and Fisheries. 2018. University of Sunshine Coast. December 2018.