

Ecologically sustainable development (ESD) risk assessment of proposed activity to harvest marine macroalgae, and beachcast seagrass and macroalgae wrack on the western coastline of Eyre Peninsula

PIRSA Fisheries and Aquaculture

October 28, 2022

Proposed Exploratory Activity

Exploratory Fishing Permit Application: EP0022
Proposed location: Refer appendix 1
Method of collection: Hand collection (Knife /scissors)
Proposed species: Refer appendix 2

The Department of Primary Industries & Regions (PIRSA) is assessing an application for an Exploratory Fishing Permit to harvest marine algae and aquatic plant species from the coastline of the western Eyre Peninsula in Coffin Bay and North-West to Scele Bay. While harvest of marine algae is conducted across South Australia, the proposed area and some species (Including seagrass) are new and is therefore considered to be an exploratory fishing activity.

The applicant runs an eco-tourism business including a licensed gin distillery and is seeking to develop the business and client awareness of native Australian aquatic species in their alcohol distilling process. The aquatic plant material is proposed to be used in the process of gin distilling, as well as potential for use in food preparation for their eco-tourism business subject to business development.

The proposed collection includes both live harvest (deeper than 2 metres water) of marine macroalgae species and beach-cast material of marine macroalgae and aquatic plant species.

The area of the proposed activity includes coastal beach and marine waters on the western side of Eyre Peninsula (Appendix 2). The species and proposed quantity is outlined in Appendix 1.

Method and interpretation

The ecologically sustainable development (ESD) risk assessment for this application is summarised in Table 5. Table 5 should be read in conjunction with the PIRSA Fisheries and Aquaculture Division's Ecologically Sustainable Development (ESD) Risk Assessment Guidelines, which provides explanations of each of the risks addressed. The primary aim of this assessment is to evaluate the potential ecological risks to the sustainable development of South Australia's resources from the approval of the proposed application.

The risk assessment method is based on the Australia and New Zealand standard for risk management AS/NZS ISO 31000:2009. Each identified risk is assigned a risk ranking. To assign a risk ranking to an issue, two factors are determined – the likelihood that the particular event will occur and the potential consequence arising from that event. It is noteworthy that the likelihood and the consequence of a particular event are considered independently. The combination of likelihood and consequence produces a risk value, which in turn is used to determine the risk ranking, associated with a particular issue.

The likelihood and consequence levels or categories outlined in the National ESD framework are used in this assessment (Tables 1 and 2, respectively). A risk value for each risk event is then derived by combining the likelihood of occurrence with the corresponding level of consequence using a risk matrix (Table 3). Finally, the risk value is used to determine the risk ranking (Table 4).

The risk assessment considered direct and indirect risks at species, habitat and environmental levels (Trophic impacts).

RISK ASSESSMENT PARTICIPANTS

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EXPLORATORY OR DEVELOPMENTAL FISHING PERMIT APPLICATION ESD RISK ASSESSMENT PRINCIPLES:

- Consider relevant literature to support risk ratings
- Consider the benthic environment relevant to the activities proposed
- Consider potential social implications relevant to the activities proposed
- Maintain emphasis on the scale of risk event justifications to site or regional level
- Legislation of management controls put in place by PIRSA Fisheries & Aquaculture
- Utilise the current PIRSA ESD Guidelines for the assessment of risk events.

Table 1: Standard likelihood levels

Level	Descriptor
Remote (1)	The consequence has never been heard of in these circumstances, but it is not impossible within the time frame (Probability of <5%)
Unlikely (2)	The consequence is not expected to occur in the timeframe but it has been known to occur elsewhere under special circumstances (Probability of 5 - <20%)
Possible (3)	Evidence to suggest this consequence level is possible and may occur in some circumstances within the timeframe. (Probability of 20 - <50%)
Likely (4)	A particular consequence level is expected to occur in the timeframe (Probability of ≥50%)

Table 2: Standard consequence levels

Level	As defined for target species
Minor (1)	Harvest impacts either not detectable against background variability for the population; or if detectable, minimal impact on population
Moderate (2)	Fishery operating at maximum acceptable level of depletion / harvest
Severe (3)	Level of depletion unacceptable but still not affecting recruitment (regeneration) levels of stock
Major (4)	Level of depletion is already affecting (or will definitely affect) future regeneration potential/ levels of stock

Table 3: Risk rating

Consequence × Likelihood Risk Matrix		Likelihood			
		Remote (1)	Unlikely (2)	Possible (3)	Likely (4)
Consequence	Minor (1)	Negligible	Negligible	Low	Low
	Moderate (2)	Negligible	Low	Medium	Medium
	High (3)	Low	Medium	High	High
	Major (4)	Low	Medium	Severe	Severe

Table 4: Risk rankings and associated required levels of management

Risk Levels	Description	Likely Reporting & Monitoring Requirements	Likely Management Action
1 Negligible	Acceptable; Not an issue	Brief justification – no monitoring	Nil
2 Low	Acceptable; No specific control measures needed	Full justification needed – periodic monitoring	None specific
3 Medium	Acceptable; With current risk control measures in place (no new management required)	Full Performance Report – regular monitoring	Specific management and/or monitoring required
4 High	Not desirable; Continue strong management actions OR new / further risk control measures to be introduced in the near future	Full Performance Report – regular monitoring	Increased management activities needed
5 Severe	Unacceptable; If not already introduced, major changes required to management in immediate future	Recovery strategy and detailed monitoring	Increased management activities needed urgently

**Table 5: Ecologically Sustainable Development (ESD) risk assessment report for
Exploratory or Developmental Fishing Permit Application EP0022**

Risk event	Likelihood x Consequence = Risk rating	Explanation and management strategies (Implemented through permit conditions)	Likelihood x Consequence with management strategies = Residual Risk ranking
Harvest of Target Species: Live Harvest (in situ)			
Codium Genus	2 x 3 = 6 (moderate)	<p>Discussion</p> <ul style="list-style-type: none"> • Limited knowledge of species or abundance in the area • Taking 400kg from a small area may cause localised depletion • Proposed activity is hand collection only • No currently known depletion or risks • Need for a conservative approach given the uncertainty of abundance or effect of removal • Ensure only plant material taken and holdfast is not removed to allow regrowth • Important to collect data to build knowledge and for future management applications • Seasonality may affect species harvest <p>Management Strategies</p> <ul style="list-style-type: none"> • Limit quantity from area (no more than 10% from 2 sq. m) • Limited daily and / or monthly harvest to be considered 	1 x 3 MEDIUM

		<ul style="list-style-type: none"> • Harvest permitted in Macroalgae Management Areas 3 and 4 only • No removal of Holdfast • 200kg limit per annum (2 year permit) 	
Posidonia Genus	Not requested for live harvest		
Amphibolis antarctica	Live harvest request removed from application (11/11/22)		
Ecklonia Radiata	1 x 4 = 4 (High)	<p>Discussion</p> <ul style="list-style-type: none"> • Species fairly abundant - 400kg not considered a significant volume over the proposed area • Lower consequences as it is not defined as an aquatic plant • Fast growing species • Most abundance of species shallower than 2 m depth • Recommend keep risk rating at low to enable management arrangements to be implemented • Seasonality may affect species harvest but is generally present all year round (Possibly more abundant over winter) <p>Management strategies</p>	1 x 2 LOW

		<ul style="list-style-type: none"> • Harvest permitted only in MMAs 3 and 4 • 200kg per annum • 10% take from 2 square metres • Only 50% of fronds from one plant • No harvest of holdfast or stipe 	
Ulvaceae Genus	1 x 4 = 4 (High)	<p>Discussion</p> <ul style="list-style-type: none"> • Coffin Bay has high abundance due to high nutrients in the area but species may not be in as high abundance deeper than 2 metres and outside of the bay. More likely to be found in shallow rock pools • Lower risk than Codium species as it is faster growing • Seasonality may affect species harvest <p>Management Strategies</p> <ul style="list-style-type: none"> • Limited harvest area • 200kg per annum • Only 50% of material from one plant • Maximum 10% harvest per 2 square metres • No harvest of holdfast or stipe • Prohibit any harvest <2 metres (Applies to all live harvest due to intertidal reef regulations) 	1 x 2 LOW

Hormosira banksii	Not requested for live harvest		
Plocamium Genus	1 x 4 = 4 (High)	<p>Discussion</p> <ul style="list-style-type: none"> • Mixed in with macroalgae assemblages • Fairly abundant and fast growing • Need to consider Asparagopsis limitations in South Australia • Seasonality may affect species harvest <p>Management Strategies</p> <ul style="list-style-type: none"> • Limit harvest to MMAs 3 and 4 • Maximum 50kg per annum • Only 50% of fronds from one plant • No harvest of holdfast • Maximum 10% harvest per square metre 	1 x 2 LOW
Gracilaria Genus	2 x 3 = 6 (Moderate)	<p>Discussion</p> <ul style="list-style-type: none"> • Similar risk to Codium • Red Algae species • Seasonality may affect species harvest <p>Management Strategies</p>	1 x 3 MEDIUM

		<ul style="list-style-type: none"> • Limit quantity from area (no more than 10% from 2 sq. m) • Consider daily and / or monthly harvest limits • Permit harvest only in MMAs 3 & 4 • No removal of holdfast or stipe • 200kg limit per annum 	
Inadvertent By-catch species)	2 x 2 = 4 (High)	<p>Discussion</p> <ul style="list-style-type: none"> • Proposed activity is hand collection only, it is possible to remove unintended species but unlikely • Possible interactions with Syngnathidae Family (Sea horse) • Harvest method (selective harvest by hand) will mitigate risk significantly • Other algae species may be growing on different species as well as small invertebrates • There is a possibility of misidentification, taking wrong algae/seaweed • <i>Ecklonia</i> may have urchins and turbos attached. These can be removed and returned to the water • Most animals will fall off upon harvest <p>Management Strategies</p> <ul style="list-style-type: none"> • All non-permitted species must be immediately returned • Threatened, Endangered, Protected Species (TEPS) interaction reporting requirements as per other permits 	1 x 2 Low

Ecosystem / Non retained species				
Threatened, Endangered and Protected Species	1 x 1 = 1 (Negligible)	<p>Discussion</p> <ul style="list-style-type: none"> No appreciable ecosystem impacts on TEPS by removing algae or aquatic plants <p>Management Strategies</p> <ul style="list-style-type: none"> No conditions in addition to those proposed required 	1 x 1 Negligible	
Habitat / Environment				
Removal of plant material / habitat	1 x 1 = 1 (Negligible)	<p>Discussion</p> <ul style="list-style-type: none"> Hand collection unlikely to disturb habitat or affect water quality In terms of nutrient cycling, the fraction of biomass taken won't be able to be measured against any impacts No introduction of disease likely Habitat for inveterate and fish unlikely to be affected <p>Management Strategies</p> <ul style="list-style-type: none"> Maximum 10% harvest per square metre 		
Pollution	1 x 1 = 1 (Negligible)	<p>Discussion</p> <ul style="list-style-type: none"> No appreciable pollution given proposed activities 		

		Management Strategies <ul style="list-style-type: none"> No additional conditions necessary 	
Harvest of Target Species: Beach Wrack			
Codium Genus	1 x 1 = 1 (Negligible)	Discussion <ul style="list-style-type: none"> Limited impact, it is possible to remove unintended species but is considered unlikely Broader permit conditions re: beach wrack harvest TEPS reporting requirements Consider freshness of wrack - Not considerable given limited scale, either fresh or established wrack should be permitted Abundance of beach wrack will vary with season and weather Management Strategies <ul style="list-style-type: none"> Hand collection only Permitted harvest from Macroalgae Management Areas 3 and 4 only Immediate replacement of non-permitted species Harvest weight limits to be within live harvest limits 	1 x 1 Negligible
Posidonia Genus			
Ecklonia Radiata			
Amphibolis antarctica			
Ulvaceae Genus			
Hormosira banksii			
Plocamium Genus			

Gracilaria Genus			
Inadvertent By-Catch: Beach Wrack (All Species)	1 x 4 = 4 (Low)	<p>Discussion</p> <ul style="list-style-type: none"> • Insects, invertebrates included in possible inadvertent bycatch • Birds and other organisms rely on the wrack to nest • Harvest not considered significant enough to prevent accumulation / build up for nesting / habitat purposes <p>Management Strategies</p> <ul style="list-style-type: none"> • Harvest only permitted in Macroalgae Management Areas 3 and 4 • TEPS reporting requirements • Immediate return of non-permitted species 	1 x 2 Low
Ecosystem / non-retained species			
Threatened, Endangered and Protected Species	1 x 1 = 1 (Remote)	<p>Discussion</p> <ul style="list-style-type: none"> • Primary consideration to birds (some birds are considered to be Threatened, Endangered, Protected Species (TEPS) but considered in separate assessment below) • No other specific TEPS considered <p>Management Options</p>	1 x 1 Negligible

		<ul style="list-style-type: none"> No additional conditions required 	
Birds	1 x 4 = 4 (Low)	<p>Discussion</p> <ul style="list-style-type: none"> Increased foot activities increase potential for fox interactions – risk considered low as they are not adding significantly more foot traffic. No vehicular access required Alarm flights and habitat disturbance considered, unintended interactions, removal of food source Coastal raptors – protected from parks perspective- guidelines, part of permit conditions – limited knowledge of habitat areas (DEW only advise some people) – mainly cliff areas so foot access should pose very little risk. Refer to Shorebird list (EPBC) for individual classifications Identification of nests can be difficult PIRSA has standard conditions already in place with respect to bird interactions DEW have a bird identification training program to assist in identification of nests and areas of activity. <p>Management Strategies</p> <ul style="list-style-type: none"> 100 metre Buffer zone to nests or brooding areas Bird ID book required Report all interactions regardless of outcome DEW training program 	1 x 2 Low

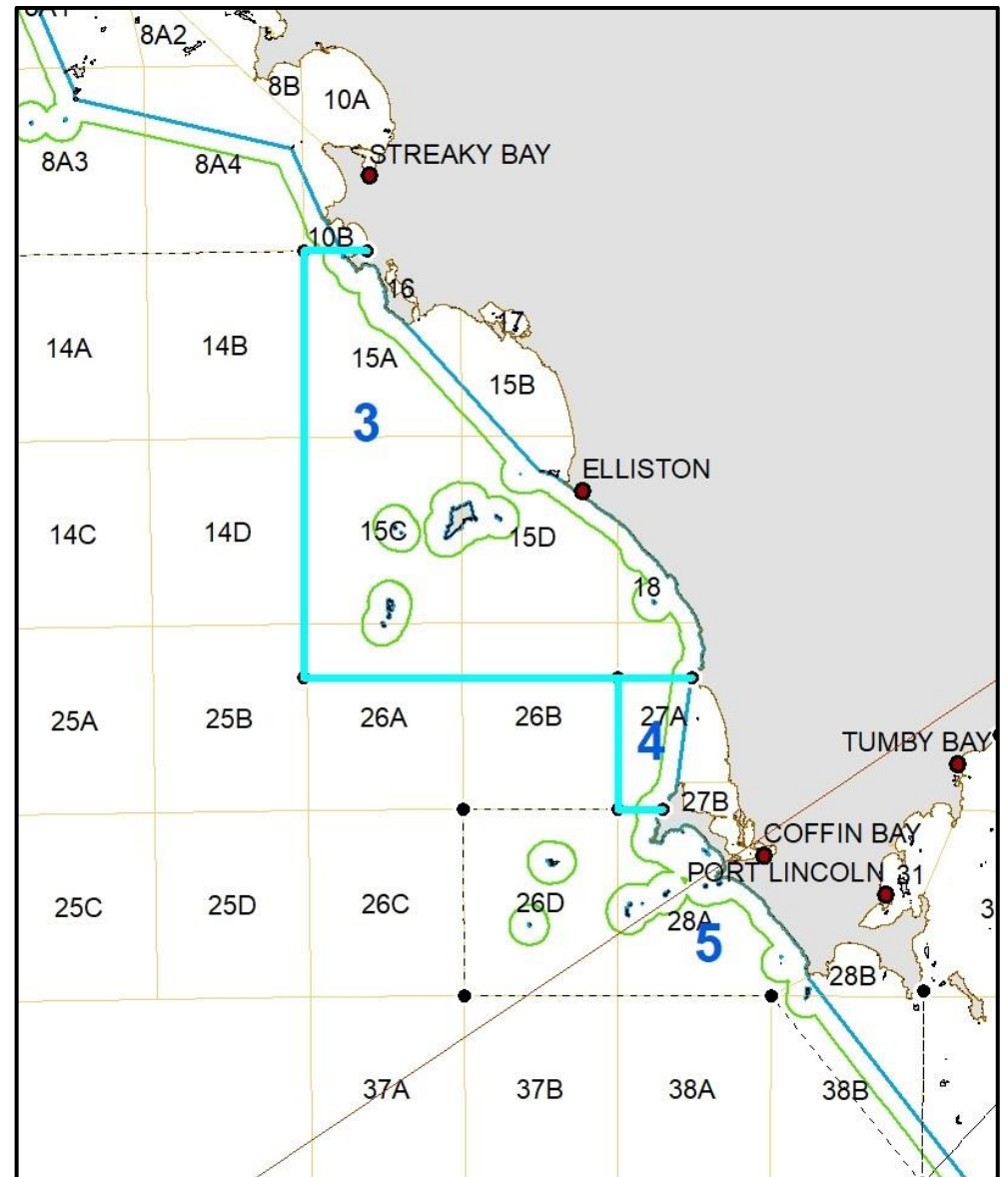
Reptiles	1 x 1 = 1 Remote	<p>Discussion</p> <ul style="list-style-type: none"> • Contact is possible but would be very limited • Interactions may include Snakes, Shinglebacks, Peninsula Dragons, Skink species • Consider TEPS status of species <p>Management Strategies</p> <ul style="list-style-type: none"> • No additional conditions required 	1 x 1 Negligible
Invertebrates	1 x 1 = 1 Remote	<p>Discussion</p> <ul style="list-style-type: none"> • Plausible impact on invertebrates though removal of habitat • Worms, insects, crabs possible species impacted • Given the scale of activity, not a notable risk <p>Management Strategies</p> <ul style="list-style-type: none"> • No additional conditions required 	1 x 1 Negligible
Habitat / Environment			
Erosion	1 x 1 = 1 Remote	<p>Discussion</p> <ul style="list-style-type: none"> • Removing wrack could impact sand dunes however given the scale of activity, this is very remote • Proposal is foot access only • Vehicle access to beach not required 	1 x 1 Negligible

		Management Strategies <ul style="list-style-type: none"> No additional conditions required 	
Vehicle Access	N/A	Risk N/A	N/A
Pollution	N/A	Risk N/A	N/A


Key outcomes:

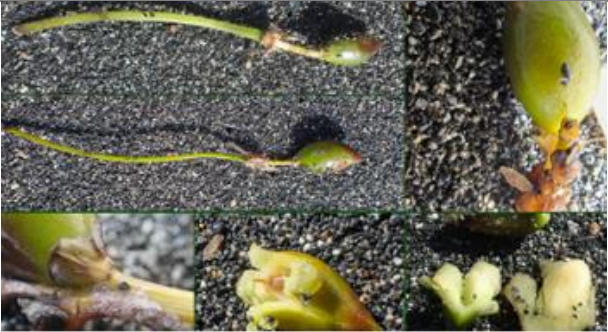

- Consideration of harvest for the proposed species in the area has not been undertaken previously
- There is a level of uncertainty regarding the abundance of some species in the area
- The Coffin Bay area is unique with high nutrient levels
- The scale of proposed harvest is considered low, and is reflected in the risk assessment ratings
- It is considered that the risks identified can be appropriately mitigated through approved harvest areas and permit conditions
- Department of Environment and Water (DEW) will continue to provide advice on further mitigation strategies in relation to shorebird interactions
- No harvest of live aquatic plants is sought with live harvest limited to marine algae species



Appendix 1: Proposed harvest area, referred to as **Macroalgae Management Areas (PIRSA 2022) 3 & 4**






Appendix 2: Proposed species

Family / Species Name	Marine (Harvest below 2 metres depth)	Beach Wrack	Biological Information	Image	Harvest weight (KG) (Note dive bag wet weight 10- 15kg)
Codium Genus	Yes	Yes	Green Algae species 'Dead Man's Finger'		400
Posidonia Genus	No	Yes	Seagrass species		100

				
<p>Amphibolis antarctica</p>	<p>No Yes</p>	<p>Seagrass species 'Wire Weed'</p>		<p>400</p>

<p>Ecklonia radiata</p>	<p>Yes</p> <p>Yes</p>	<p>Brown Algae species</p> <p>Golden Kelp</p>		<p>400</p>
<p>Ulvaceae Genus</p>	<p>Yes</p> <p>Yes</p>	<p>Green Algae species</p> <p>'Sea Lettuce'</p>		<p>400</p>

Hormosira banksii	No	Yes	Brown Algae species 'Neptune's Necklace'		300
Plocamium Genus	Yes	Yes	Red algae species		100

					
Gracilaria Genus	Yes	Yes	Red Algae species		100

