



Australian Government

Department of the Environment and Heritage

Assessment of the
Tasmanian *Scalaris* Abalone Fishery

February 2005

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This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Part 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

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**Assessment of the ecological sustainability of management arrangements for the Tasmanian
Scalaris Abalone Fishery**

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EXECUTIVE SUMMARY

Background

The Department of Primary Industries, Water and Environment (DPIWE) has submitted a document for assessment under Part 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Application for Declaration as an Approved Wildlife Trade Operation under the Environment Protection and Biodiversity Conservation Act 1999: Export of Scalaris Abalone (Haliotis scalaris) from Tasmanian Waters* (the submission) was received by the Department of the Environment and Heritage (DEH) in December 2004. The submission was released for a thirty-day public comment period that expired on 8 February 2005. One public comment was received. DPIWE provided a response to the issues raised. No changes were made to the submission as a result of public comment.

The submission reports on the Tasmanian *Scalaris Abalone* Fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents, public comments and DPIWE response to the comments.

Table 1: Summary of the Tasmanian *Scalaris Abalone* Fishery

Area	Waters of north west and north east Tasmania and the Bass Strait Islands.
Fishery status	The target species is considered underfished.
Target species	<i>Scalaris Abalone (Haliotis scalaris)</i> .
By-product species	No byproduct species permitted.
Gear	Hand harvest with the use of hookah.
Season	Not restricted (year round).
Commercial harvest 2003/04	1.159 tonnes.
Value of commercial harvest 2003/04	Figures are confidential.
Recreational harvest	No recreational or indigenous harvest recorded.
Commercial permits issued	1 permit issued.
Management arrangements	Output controlled through a Total Allowable Catch (TAC) of 10 tonnes. Input controlled through: <ul style="list-style-type: none"> • Limited entry (one licence, with additional divers authorised); and • Closed zones (including abalone research areas)
Export	Exported after processing to Asia.
Bycatch	Bycatch is minimal, limited to invertebrate species attached to the abalone shell.
Interaction with threatened species	Negligible.

The area of the fishery includes waters of north west and north east Tasmania and the Bass Strait Islands. The fishery targets *scalaris abalone (Haliotis scalaris)*. No byproduct is permitted to be taken in the fishery.

Scalaris abalone is one of three species of abalone found in Tasmanian waters. *Scalaris* is similar to the blacklip abalone but smaller in size, growing to approximately 90-100 mm in length. *Scalaris* are characterised by broad spiral ridges on the upper margin of the respiratory pores and are

typically found under boulders or in narrow crevices (Edgar Graham, 2000). In common with other abalone species, scalaris abalone has larvae with a very short pelagic phase, with larval transport over comparatively short distances only. Within the range of the species in Tasmanian waters, there is a strong possibility that there are several distinct local populations, with local recruitment and limited genetic exchange between populations, and limited capacity for locally depleted areas to be recolonised by larvae from more distant areas. Shepherd (cited as *pers com* in Tarbath 1997) considered that scalaris abalone is both a feeder on drift algae and a grazer where necessary.

A total of 1.159 tonnes of scalaris were harvested in the Tasmanian Scalaris Abalone Fishery in 2003/04. In 2000 the Minister for Primary Industry and Fisheries approved the development of the scalaris fishery by a single industry proponent in conjunction with a five-year research program to assess the long-term viability of this fishery. A single 12-month permit was issued allowing the take of 10 tonnes of scalaris by diving from northwestern Tasmania. The permit has been renewed four times since its initial approval. A supporting permit is also issued to a processor nominated by the permit holder to receive and process the abalone. The five year research program has been slow in obtaining data as fishing effort to date has been low. The low quantity of scalaris harvested to date has so far yielded limited information on the biology of the species on which to base any long term management decisions. The developmental status of the fishery will be reviewed in October 2005 when the existing permit is due to expire.

Scalaris abalone are marketed after processing to Asian markets. Demand for scalaris has been sporadic to date due to market competition from abalone aquaculture operations and general international unrest (including the impact of the Sudden Acute Respiratory Syndrome virus), which have caused the price of scalaris to drop substantially from approximately \$50 per kilogram to \$35 per kilogram.

Scalaris abalone is harvested by hand with the use of hookah equipment. Fishery management arrangements include limited entry (to one permit holder), spatial closures, a TAC of 10 tonnes and a limit on the number of divers permitted to assist the primary permit holder (currently limited to two).

No bycatch is taken in the fishery (apart from commensal invertebrates living on the scalaris shell) due to the highly selective hand harvest of specimens. No interaction with any listed protected species under the Commonwealth EPBC Act has been reported. Interactions are unlikely given the highly selective nature of harvest and limited participation in the fishery. Possible interactions are assessed under Principle Two of this report.

No recreational fishing for scalaris occurs as scalaris abalone does not grow above the recreational size limit and is therefore not permitted. DPIWE advise that no permits have been issued for indigenous harvest of scalaris to date.

Permits allowing the harvest and possession of scalaris abalone are issued through DPIWE under Section 14 of the *Living Marine Resources Management Act 1995*. There is currently no management plan for the fishery due to its small size and value.

Overall assessment

The material submitted by DPIWE demonstrates that the management arrangements for the Tasmanian Scalaris Abalone Fishery meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*.

While the fishery is relatively well managed, DEH has identified a number of risks that must be managed to ensure that their impacts are minimised:

- limited information on critical elements of the target species biology and ecology;
- the possibility of localised depletion of the target species in heavily harvested areas; and
- limited management arrangements to measure the performance of the fishery.

Recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. Through the implementation of the recommendations and the continuation of a responsible attitude to the management of the fishery, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

The Tasmanian *Scalaris* Abalone Fishery is in a developmental stage and has made progress in developing sound management arrangements. The management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. On balance, the fishery is being managed in an ecologically sustainable manner and is working to address existing problems and minimise environmental risks.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. Given the precautionary management arrangements in place for the fishery and limited harvest, DEH considers that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. DEH therefore recommends that the fishery be declared an approved Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by DPIWE to contain the environmental risks in the long term. DEH considers that the fishery, as managed in accordance with the management regime is not likely to cause serious or irreversible ecological damage over the period of the export decision. Specifically, the WTO declaration would allow the export of product from the fishery for a period of 3 years. The WTO declaration will require annual reporting on the progress of implementing the recommendations of this report and other managerial commitments. The implementation of the recommendations will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

Recommendations

1. DPIWE to advise DEH of any material change to the Tasmanian *Scalaris* Abalone Fishery's management arrangements that could affect the criteria on which EPBC decisions are based, within 3 months of that change being made.
2. DPIWE to ensure that all interested stakeholders, including conservation groups and research organisations, are consulted about all relevant aspects of the fishery's management.
3. By the end of 2006 DPIWE to develop performance indicators and performance measures for the fishery objectives relating to the ecologically sustainable management of the fishery as outlined in the management regime for the Tasmanian *Scalaris* Abalone Fishery.
4. DPIWE to progressively implement the research program developed for the fishery and, if the fishery progresses beyond the developmental phase, develop a detailed timeline for the formal implementation of the research program.
5. DPIWE to analyse the risk of localised depletion in the fishery and, if significant risk is detected, develop and implement management measures to mitigate the impacts of localised depletion.

PART I - MANAGEMENT ARRANGEMENTS

The Tasmanian *Scalaris Abalone* Fishery is managed by DPIWE.

The management regime is described in the following documents, all of which are, or will be publicly available:

- the *Living Marine Resources Management Act 1995*;
- *Permit issued under Section 14 – Taking Possession and Sale of Scalaris Abalone* (the permit);
- annual reports provided to DEH; and
- relevant Gazetted notices and permit conditions.

A number of other documents, including research reports, scientific literature and discussion papers are integral to the management of the fishery.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Because of the importance of the management plan and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of the assessment and decisions stemming from it. Decisions resulting from this assessment relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime, including the progress of the fishery beyond the developmental phase, and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision.

Recommendation 1: *DPIWE to advise DEH of any material change to the Tasmanian *Scalaris Abalone* Fishery's management arrangements that could affect the criteria on which EPBC decisions are based, within 3 months of that change being made.*

The *Living Marine Resources Management Act 1995* describes the consultative process that must be undertaken if the Minister for Primary Industries and Fisheries intends to issue a permit for the development of fisheries. The Tasmanian Abalone Council was consulted in the development of the fishery, as were the Marine Police, scientists from the Tasmanian Aquaculture and Fisheries Institute (TAFI) and local community representatives, including other abalone harvesters and processors. TAFI scientists continue to provide scientific advice on the fishery and act as consultants in setting research objectives and methodologies. Advice is ongoing in an ad hoc manner.

Management of the fishery to date has incorporated a sound range of consultative mechanisms and a clear commitment to effective consultation with a variety of stakeholders. DEH considers that the level of consultation in the initial development of the fishery has been adequate. However, DEH considers that the consultative process would need to be expanded if the fishery progresses beyond the developmental phase to ensure that all interested parties are consulted.

Recommendation 2: *DPIWE to ensure that all interested stakeholders, including conservation groups and research organisations, are consulted about all relevant aspects of the fishery's management.*

The fishery is managed according to management objectives for the fishery, which are complementary to the state resource management and planning objectives in Schedule 1 of the *Living Marine Resources Management Act 1995*. The objectives are summarised in Table 2 below.

Table 2 - Objectives for the Tasmanian *Scalaris* Fishery (relevant to the ecologically sustainable management of the fishery)

Research Objectives	<ul style="list-style-type: none"> To obtain information on patterns of distribution and abundance by taking representative population samples from selected locations.
	<ul style="list-style-type: none"> To obtain from these samples information on morphometrics and reproductive development.
	<ul style="list-style-type: none"> To determine 50% size at first sexual maturity for the purpose of deriving a commercial minimum size limit.
	<ul style="list-style-type: none"> To assess the productivity of <i>scalaris</i> abalone by determining growth and ageing parameters both within and between individual populations.
Developmental fishery management objectives	<ul style="list-style-type: none"> Assess the development potential for establishing a <i>scalaris</i> abalone fishery in Tasmania using the information collected in the research program.
	<ul style="list-style-type: none"> Limit the number of participants in fishery by restricting permit issue (1 permit holder).
	<ul style="list-style-type: none"> Limit total <i>scalaris</i> abalone catch by permit condition.
	<ul style="list-style-type: none"> Restrict fishing methods used in <i>scalaris</i> abalone harvest.
	<ul style="list-style-type: none"> Monitor performance of <i>scalaris</i> abalone fishery, primarily through catch, in sufficient detail to recommend alteration to management methods if necessary.
Environmental impact management objectives	<ul style="list-style-type: none"> Minimise any environmental impact of <i>scalaris</i> abalone fishing methods by specifying hand selection by diving as the fishing method, particularly in areas of ecological significance.
	<ul style="list-style-type: none"> Minimise any bycatch of non-target species.
Compliance and enforcement objectives	<ul style="list-style-type: none"> Prevent persons who are not authorised under the <i>Living Marine Resources Management Act 1995</i> from taking <i>scalaris</i> abalone.
	<ul style="list-style-type: none"> Prevent any breach of <i>scalaris</i> abalone permit conditions by permit holders.
	<ul style="list-style-type: none"> Monitor the harvest of <i>scalaris</i> abalone monthly to restrict or adjust management controls where necessary.

Modified from – *Application for Declaration as an Approved Wildlife Trade Operation under the Environment Protection and Biodiversity Act 1999 – Export of Scalaris Abalone (Haliotis scalaris) from Tasmanian waters.*

Progress on achieving these objectives is reported in yearly reports provided to DEH as a condition of the previous WTO declaration for the fishery. DEH notes that no performance measures or indicators have been developed for the fishery and considers that although general fishery progress is reported annually, performance measures and indicators, against which to measure performance and progress, should be developed.

Recommendation 3: *By the end of 2006 DPIWE to develop performance indicators and performance measures for the fishery objectives relating to the ecologically sustainable management of the fishery as outlined in the management regime for the Tasmanian *Scalaris* Abalone Fishery.*

Management of the fishery is based on a mixture of input and output controls including:

- a TAC of 10 tonnes;
- limited entry with 1 permit current;
- limited participation under the single permit to two divers who must hold abalone permits; and
- closed zones.

Management controls are enforced by permit condition. At present, only one permit has been issued with a fixed catch allocation. Additionally, harvest is prohibited from a number of zones, including abalone research areas. The conditions of the permit are reviewed yearly, while the developmental status of the fishery will be reviewed at the end of the 5-year developmental framework for the fishery prior to the expiry of the current permit in October 2005.

Recreational fishing for scalaris abalone does not occur, as scalaris do not grow above the enforced recreational size limit. DPIWE advise that no permits have been issued for indigenous harvest of scalaris.

Stringent reporting requirements have been imposed on the permit holder to minimise the risk of illegal fishing and to maximise opportunity to detect breaches. The permit holder must report to police and DPIWE prior to fishing activity. Approved logbooks must be completed and provided to the fishery manager within 24 hours of landing. A three-monthly report is forwarded to DPIWE containing complete fishery, processing and marketing details.

Only one processor, nominated by the permit holder, is permitted to hold and process scalaris abalone. The processor must only receive scalaris taken by the permit holder and ensure that it is stored separately to other species of abalone. The weight of scalaris taken, the number processed and average sale price must be accurately recorded and provided to DPIWE. This data is then compared with catch data provided by the permit holder.

Compliance checks are carried out by Tasmanian Marine police officers as required including during fishing, at the landing site and the processing facility. No compliance issues have been recorded to date. Wild Fisheries Management staff from DPIWE have also monitored fishing activities in person. Departmental officers have assisted in data collection and monitored progress by the permit holder.

DEH considers that these compliance measures contain the means of enforcing critical aspects of the management arrangements for the fishery.

The current permit issued for the fishery is reviewed on an annual basis. The review includes consideration of stock levels, impact on fish stocks and the environment, a review of management, research or compliance costs, product handling and marketing. There will be a final assessment of the developmental status of the fishery prior to the expiry of the current permit in October 2005.

DEH considers that an annual review of permit conditions as well as a five year developmental review of the entire fishery is suitable while DPIWE continues to closely monitor the progress of the fishery. The annual reviews are discussed more fully in Part II of this report.

Fishery dependent data relating to the target species are collected on a regular basis in the fishery. Some fishery independent information is also collected. Discussion of the information collection system can be found in Part II of this report.

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle 2 of this report.

The management arrangements for the Tasmanian Scalaris Abalone Fishery do not take into account management arrangements in other jurisdictions, as the stock is not shared across any jurisdictions.

DEH considers that the current management arrangements comply with all relevant threat abatement plans. There is no bycatch taken in the fishery (apart from minor amounts of commensal organisms), therefore bycatch action strategies and the National Policy for Bycatch Reduction are not relevant to this fishery. DEH expects that DPIWE will ensure compliance with any future plans or policies as they are developed.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea. The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the submission, the fishery's compliance with their requirements can be assessed by examination of Part II of this report.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

Conclusion

DEH considers that the Tasmanian *Scalaris* Abalone Fishery management regime is documented, publicly available and transparent. The management arrangements are adaptable and underpinned by appropriate objectives.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements.

The management regime adheres to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

Stock Status and Recovery

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

Maintain ecologically viable stocks

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

Information requirements

Fishery dependent data are obtained through compulsory daily logbooks. Data entry occurs within 24 hours of fishing and must include information on harvest date, dive start and finish times, GPS coordinates, weight and number of scalaris abalone taken, fishing site details, substrate details, exposure details, history (whether previously fished and when) and block number. The size composition of the catch is also recorded for each fishing trip undertaken (obtained from measuring 20% of the daily catch, or a minimum of 100 abalone from one site, whichever is the greatest, after each fishing trip). DEH believes that data reliability for target species is reasonable and that compliance and enforcement activities have the capacity to ensure the ongoing reliability of data in the fishery.

A range of fishery dependent data is also collected through the research program established for the fishery. Information collected on each component of scalaris biology has been limited to date and collected in an ad hoc fashion due to minimal harvest and low temporal spread of fishing effort.

DPIWE closely monitors information collected from the fishery in an effort to counteract the lack of fishery independent data. The Wild Fisheries Management Branch of DPIWE validates data from the fishery with the assistance of the Quota Audit Unit. Fishing operations are also monitored in person, depending on the frequency of fishing.

Fishery dependent data is also collected from each new site fished, in cooperation with the single permit holder. When a new site is fished, a sample of 300 scalaris is taken and information collected on length, total weight, meat weight and the viscera preserved from 50 large individuals. The shells are labelled and retained for ageing. Population information is collected by taking a sample of 300 scalaris from previously commercially harvested areas, measuring and then returning them. When harvesting is occurring, a sample is taken every 3 months in an area regularly fished and a sample every 6 months from infrequently fished areas. This length frequency data is compiled by DPIWE and forms the basis of the length frequency compositions reported in previous reports. Information to determine the size at first maturity for scalaris is gained by taking samples of 30 scalaris each month when fishing occurs during the spawning period (around October to February). Collection of data has been limited to date and irregularly collected due to the limited harvest by the permit holder.

Overall, given the range of fishery dependent data gathered for the fishery and the means of regularly reviewing data requirements, DEH considers that there is a reliable information collection system in place appropriate to the scale of the fishery. Continuation of existing data collections and the research program will be important for the future management of the fishery.

Assessment

No stock assessment has been carried out for the fishery due to the small size and value of the harvest. A research program has been put in place (as outlined above), however progress has been slow to date due to limited fishing effort in the fishery. DEH considers that the research program is a vital component in ensuring the ongoing sustainability of the fishery and should continue to be implemented when harvesting occurs under permit. Further, DEH considers that the research program should be more formally implemented, regardless of the level of fishing effort, if the fishery progresses beyond the developmental phase post October 2005.

Recommendation 4: *DPIWE to progressively implement the research program developed for the fishery and, if the fishery progresses beyond the developmental phase, develop a detailed timeline for the formal implementation of the research program.*

Because the fishery has developed relatively recently and is considered not to be a high value fishery, research into the distribution and spatial structure of the stock has not been extensive. As outlined above, the research program established for the fishery was aimed in part at determining the spatial structure of stocks, however progress has been slow to date. DEH considers that further research into the distribution and spatial structure of stocks will be essential to the future management of the fishery and research in this area should continue (Recommendation 4).

Management response

The current Tasmanian *Scalaris* Abalone management regime aims to maintain ecologically viable stock levels through a range of input and output controls. These measures are outlined in Table 1 and Part I of this report.

The primary management tool for the fishery is an annual TAC. An annual performance assessment of the fishery is conducted and provided to DEH as a condition of the previous WTO declaration for the fishery.

While the precautionary TAC set for the fishery is likely to sufficiently protect the target stock, there is some possibility of localised depletion due to the focus of harvest efforts in one area and the limited ability of *scalaris* abalone to spawn across a large area. DEH therefore recommends that DPIWE analyse the risk of localised depletion in the fishery and, if significant risk is detected, develop and implement management measures to mitigate the impacts of localised depletion.

Recommendation 5: *DPIWE to analyse the risk of localised depletion in the fishery, and if significant risk is detected, develop and implement management measures to mitigate the impacts of localised depletion.*

DEH considers that the combination of input and output controls, including limited entry and precautionary TAC should ensure adequate protection of the target stocks but notes that further research on *scalaris* biology and ecology is needed to ensure the ongoing sustainability of the fishery.

The Tasmanian *Scalaris* Abalone Fishery management regime contains a range of objectives (as outlined in Part I). No performance indicators are currently in place, however DEH has recommended that they be developed to ensure appropriate management action be undertaken if any fishery objectives are not met (Recommendation 3).

DPIWE advises that their Minister has the power to revoke permits if significant impacts to the target stock or wider ecosystem are detected. DEH considers that the development of performance indicators for the fishery (Recommendation 3) and continued annual monitoring of the fishery should ensure that management will respond in a timely manner if a significant impact is detected in the fishery.

The harvest of byproduct is not permitted in the fishery. Due to the highly selective nature of harvest and limited effort in the fishery, it is unlikely that any species would be taken as bycatch.

Conclusion

DEH considers that the management regime in the Tasmanian *Scalaris* Abalone Fishery is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system and management arrangements generally are sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

Promote recovery to ecologically viable stock levels

Objective 2: *'Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes'*

This objective is not applicable to the fishery at present. The fishery has strict management controls in place to avoid the risk of overfishing *scalaris* abalone stocks, including closed zones, a TAC and limited entry.

Conclusion

DEH considers that the *scalaris* abalone stock is not below a defined reference point but should that occur in the future, the fishery is conducted such that there is a high degree of probability the stock would recover to ecologically viable stock levels within nominated timeframes.

Ecosystem impacts

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

Bycatch protection

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

Information requirements

No information on bycatch is collected for the fishery, due to the highly selective nature of harvest and low harvest levels. Bycatch is limited to commensal organisms living on the shell of the *scalaris* abalone, however the impact on these organisms is likely to be negligible due to the precautionary TAC, limited entry and limited level of harvest to date.

Assessment

No specific risk assessment on bycatch species has been conducted due to the highly specific nature of harvest and limited harvest levels to date. DEH concurs that such a risk assessment is not warranted at this time.

Management response

No bycatch species are taken in this fishery, other than commensal organisms. Accordingly, no management measures, other than a TAC for scalaris abalone, are imposed in the fishery. DEH considers that possible impacts to bycatch species are minimal and that the current management measures in place are being effectively implemented.

No specific indicator group of bycatch has been identified due to there being no bycatch species taken in the fishery. Monitoring the effects of harvesting on the target species and associated ecosystem will continue in the fishery.

Conclusion

DEH considers that there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or new information indicate otherwise, DEH expects that DPIWE would undertake appropriate actions to ensure that the fishery does not pose a significant threat to bycatch species.

Protected species and threatened ecological community protection

Objective 2: *'The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities'*

Information requirements

No information on protected species interactions is available for the fishery, apart from fisher observations and the observations of DPIWE staff accompanying the permit holder to obtain biological data on scalaris abalone for the research program.

Assessment

No interactions with endangered, threatened or protected species have been reported in the fishery to date. Such interactions are unlikely due to the highly selective nature of harvest (by hand only), limited entry to the fishery and low level of harvesting activity to date. While there is some potential for interactions during vessel transit through the fishery area, the potential risk is likely to be negligible as only one boat operates in the fishery.

There are no listed ecological communities in the fishery area.

Management response

Harvesting in the fishery is restricted to hand collection with the use of Hookah. The fishery is limited to one permit holder who is permitted to operate two vessel with two divers. These

requirements significantly limit the potential for interactions, particularly given the low participation in the fishery to date.

DPIWE advises that the *Living Marine Resources Management Act 1995* provides for emergency responses that could be used to protect a threatened, endangered or listed species should interactions occur in the future. DEH notes that the logbooks currently do not provide for recording of any interactions with endangered, threatened or protected species. While the potential for interactions is low, DEH encourages DPIWE to incorporate a reporting requirement in the fishery logbooks to ensure any interactions, however unlikely, are reported to DPIWE.

Conclusion

DEH notes that interactions with protected species in this fishery are negligible and considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities. Should this situation change, or new information indicate otherwise, DEH expects that appropriate actions will be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

Minimising ecological impacts of fishing operations

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

Information requirements

No information is collected in relation to the fishery's impact on the ecosystem due to the small scale and limited activity in the fishery. Some research into other commercial abalone species in Tasmania and the impacts of commercial harvesting on the wider habitat has been pursued by TAFI. Monitoring of abalone research areas and other closed zones is also providing data for comparisons of fished and unfished areas.

DEH notes the lack of information collection and research covering the fishery's impact on the ecosystem and environment generally. However, DEH understands that this lack of information is the case across a range of Australian and International fisheries and until appropriate research techniques and programs are developed and implemented this will continue to be the case. DEH strongly supports research in this area.

Assessment

As in most harvest fisheries, the potential for the Tasmanian *Scalaris* Abalone Fishery to impact unacceptably and unsustainably on the environment generally is considered to be low. As a consequence DPIWE has not conducted a risk assessment of these issues in this fishery.

Impacts on ecological communities

Due to the highly selective nature of the fishery, there are minimal direct impacts on related, associated or dependent benthic organisms however, DPIWE notes that there may be some indirect impacts on the density of sea urchins as a consequence of the removal of *scalaris* abalone. Currently quantitative data on this impact is limited, but such impacts are likely to be minimal given the small size of harvest and limited entry to the fishery.

Impacts on water column communities are likely to be minimal. *Scalaris abalone* are feeders of drift algae and grazers where necessary, however the fishery is unlikely to have a significant impact upon water column communities due to the low level of harvest and limited entry to the fishery. Impacts to the spawning capacity of the species is minimised by the precautionary TAC and the low harvest levels to date. Some impacts to spawning biomass may occur on a localised level, however the implementation of Recommendation 5 is likely to mitigate this risk.

Structure Productivity/flows

The fishery is unlikely to have a significant impact on the structure of the food web of the ecosystem in the area, as there are no specialised predators of these *scalaris abalone* (ie the predators of *scalaris abalone* are generalist and unlikely to be adversely affected by a decrease in *scalaris abalone* numbers).

No research has been carried out on the possible impacts of the fishery to either benthic or water column food webs associated with *scalaris abalone* in Tasmania. The further implementation of the research program may assist in providing information on this.

Physical habitat

Public comment raised concern that because *scalaris abalone* are generally found under boulders and in crevices, divers in the fishery may cause significant disturbance to the surrounding physical habitat by turning over boulders to look for specimens. This would be a particular problem if further permits are issued for harvest in the fishery in the future. DPIWE state that information is already collected on the type of substrate that *scalaris abalone* is harvested from and that data collected indicates that much of the harvest is taken from exposed aspects of boulders and crevices. DEH considers that the fishery is unlikely to pose a significant risk to the physical environment given the small scale of the fishery and limited harvest to date and the evidence collected from logbook data. DEH acknowledges that further research is needed in this area and considers that the implementation of Recommendation 4 will assist in establishing any significant impacts of harvesting on the physical environment.

Water quality

A possible impact to water quality arising from this fishery is vessel discharge. The impacts arising from vessel discharge or pollution are unlikely to be significant given that the two small boats utilised by the permit holder must comply with the *Transport Operations (Marine Pollution) Act 1995*, which requires all vessels to be maintained and not discharge any materials into the water. The Tasmanian Department of Transport is responsible for checking vessel maintenance and safety through annual survey inspections. Vessels are inspected both wharf side and at sea for compliance and sea worthiness.

Management response

DPIWE has implemented a range of precautionary management measures in the fishery. Most of these measures were established to protect the target species, however some measures may indirectly protect the wider ecosystem.

As discussed under Principle 1 of this report, the Tasmanian *Scalaris Abalone* Fishery is being managed in a precautionary manner, with strict measures applied to the permit holder, including a precautionary TAC, limitations on divers and limited entry. As discussed above, there may be some risk of localised depletion in the fishery due to the concentration of effort in particular zones and the limited ability of *scalaris abalone* to recolonise an area that has been overfished. Localised depletion

may have an effect on the wider ecosystem, however DEH believes that the implementation of Recommendation 5 will mitigate this risk.

Further research into the role of scalaris abalone in the ecosystem and potential impacts of the fishery on the wider environment is needed and DEH has recommended that DPIWE continue to implement the research program for the fishery, particularly if it progresses beyond the developmental phase.

DEH is confident that the fishery will continue to be managed in a manner that aims to minimise ecosystem and broader environmental impacts.

Conclusion

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. Recommendations have been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

REFERENCES

Edgar Graham J (2000) – *Australian Marine Life: The Plants and Animals of Temperate Waters* (Revised Edition), pp 228-229

Tarbath David (1997) – *Resource Assessment of Haliotis scalaris in Northern Tasmania – Interim Report*. Marine Research Laboratories, Taroona, Department of Primary Industries and Fisheries Tasmania.

LIST OF ACRONYMS

DEH	Department of the Environment and Heritage
DPIWE	Tasmanian Department of Primary Industries, Water and Environment
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
TAC	Total Allowable Catch
TAFI	Tasmanian Aquaculture and Fisheries Institute
WTO	Wildlife Trade Operation