



Australian Government

Great Barrier Reef
Marine Park Authority

POSITION STATEMENT

**Great Barrier Reef Marine Park Authority
Position Statement on the translocation
of species in the Great Barrier Reef
Marine Park**



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1. Overview

This document outlines the Great Barrier Reef Marine Park Authority's (the Authority's) position on the translocation of species in the Great Barrier Reef Marine Park (the Marine Park) including Commonwealth Islands. For the purposes of this position statement, *translocation* as defined in the National Translocation Policy is: *'the movement of live aquatic[†] material (including all stages of the organisms' lifecycle and any derived, viable genetic material):*

- *beyond its accepted distribution*
- *to areas which contain genetically distinct populations, or*
- *to areas with superior parasite or disease status^{*}.*

[†]For the purpose of this position statement, movement of terrestrial material is also considered relevant for Commonwealth Islands.

^{*}This addresses the possibility of the assisted movement of organisms within their natural range, but between waters that may have different disease or parasite states (i.e. infected with versus free of a particular disease or parasite).

The Authority recognises that translocation of a species in the Marine Park may have potential social, cultural, economic or conservation benefit, but also recognises that translocation of species can involve serious risk for the receiving ecosystem, human health and industry. Interactions between species and the marine environment are complex and it should be acknowledged that the ecological implications of species translocated between locations are not fully known¹. In order to manage and mitigate the impacts from these activities a well-structured risk-based approach is necessary.

This position statement implements the intent of the *National Policy for the Translocation of Live Aquatic Organisms - Issues, Principles and Guidelines for Implementation*² (National Translocation Policy) and aims to complement the Queensland Department of Primary Industries and Fisheries *Aquaculture Policy – Management arrangements for translocation of live aquatic organisms (transport between bioregions) for aquaculture*.³

The desired outcome of this position statement is to reduce the risks associated with translocation-related activities in the Marine Park through a process of risk management, including a case-by-case activity risk assessment and requiring the development of a translocation proposal for each relevant permit application.

This position statement will be reviewed if additional information about the level of risk associated with each hazard becomes available in order to further refine the risk assessment and potential mitigation strategies.

DISCLAIMER

*This position statement should be read in conjunction with, and subject to, the **Great Barrier Reef Marine Park Act 1975** and to the extent relevant, all instruments made thereunder including the following appendices to this document:*

- Appendix A – Supporting information
- Appendix B – Risk assessment
- Appendix C – Translocation proposal
- Appendix D – Translocation checklist for permit assessors

2. Scope

The Authority's position on translocation of species within the Marine Park has been developed following a risk-based assessment of the activities likely to involve translocation (both intentional and incidental translocation) and the hazards associated with each activity (Appendix A). The risks associated with intentional translocation can be pro-actively assessed through the permit process. Incidental translocation is harder to identify and manage and it can often result in higher levels of risk, as mitigation strategies are not often considered. Management strategies recommended in this position statement deal primarily with intentional translocation but also consider, to some extent, incidental translocation.

The primary issues associated with the translocation of marine species are the action and the repercussions. This position statement considers the effects of translocation on:

- Translocated individual(s)
- The environment from which the species is translocated from (i.e. donor environment)
- The environment from which the species is translocated to (i.e. receiving environment)
- Social, cultural and economic considerations
- Overall ecosystem impact.

The risk assessment matrix (Appendix B) assesses seven activity types that may involve translocation. These activities are defined in Appendix A.

- Open and semi-open flow through systems
- Release of specimens (for example excess stock released from aquaria)
- Reseeding and restocking
- Shipping and the relocation of structures
- Take and return of specimens (for example research programmes collecting specimens for aquaria experiments and then returning them to the wild)
- Targeted translocation of species
- Translocation of problem animals (for example those that pose a threat to human safety).

The hazards described in Appendix A and identified in the risk assessment matrix at Appendix B are broad and provide a generalised, preliminary level of risk and likelihood of the activity being considered in its current form without mitigation strategies in place. A detailed risk assessment of the activity can only be undertaken once an application is received. Additional information that will be required to complete the risk assessment include:

- Life history traits of the species
- Details of donor and receiving environment
- Methodology for transfer and containment including the transport media
- Number to be translocated
- Distance to be translocated.

Generally, the greater the distance of an intended translocation or the greater number of specimens involved or the less containment of individual specimens results in a higher risk of undesirable outcomes. Life history traits are also important when

determining the likelihood of a species proliferating at a site (for example fast growth rates, high fecundity, reproductive mode). There may also be aspects of the species that are unknown (for example disease status) that have the potential to cause negative effects if translocated. In all cases the precautionary approach should be applied.

3. Position Statements

- 3.1. The Authority does not support the use of translocation as a substitute for the protection of high quality natural areas and conservation of wild populations *in situ*.
- 3.2. The Authority will not grant a permission for an activity involving the translocation of a species, if that activity is assessed as a medium or high risk. However, the Authority will consider a medium or high risk activity further if adequate mitigation strategies can be implemented to reduce all risk levels to low.
- 3.3. If the level of risk associated with the translocation of a species is uncertain, then the precautionary approach must be applied with an initial high risk allocation.
- 3.4. All permit applications for activities involving translocation must be accompanied by a completed translocation proposal (Appendix C).
- 3.5. The Authority will ensure that all translocation proposals undergo an adequate and balanced risk assessment process, that includes consideration of hazards such as impact on amenity, chemical release, environmental and economic impacts, pest and disease potential, genetic shift and lethal/sublethal impacts.
- 3.6. The Authority will only consider translocation activities for re-stocking in cases where the conservation reasons are exceptionally strong.
- 3.7. The Authority will only consider granting a permission for a research programme that involves the translocation of marine organisms if the risk is low.

4. Assessment Protocols

- 4.1. The Authority will only permit the translocation of species in the Marine Park if such activities are consistent with the objectives and use or entry provisions for each zone type as outlined in the *Great Barrier Reef Marine Park Zoning Plan 2003*.
- 4.2. Prior to a permit assessor registering a permit application, a translocation triage checklist (Appendix D) should be completed to identify whether translocation of a species (both intentional and incidental) is likely.
- 4.3. A permission issued by the Authority to undertake the translocation of a species in the Marine Park must be undertaken in accordance with an Authority approved translocation proposal that incorporates best practices for translocation. The Authority will arrange for each translocation proposal to be peer-reviewed by at least two experts; at least one of these experts will be from outside the Authority and the proponent's organisation. Prior to granting a permission for the translocation of a species, the Authority will give consideration to the adequacy of the translocation proposal, the experts review on the translocation proposal, the conservation benefits and the environmental, social, cultural and economic consequences of the translocation proposal.

- 4.4. The Authority will consider, as part of its assessment, the translocation of species into enclosures, open and semi-open systems in a manner similar to the translocation of species into a natural system.
- 4.5. The Authority requires that translocation programmes be consistent with the principles of ecologically sustainable use.

5. Management Strategies

- 5.1. The Authority will undertake auditing and inspections of the mitigation strategies employed by the permitted translocation activities (where required) via the Authority's environmental site supervision requirements, compliance checks and surveillance.
- 5.2. The Authority may require monitoring programmes to be conducted on a case-by-case basis at cost to the applicant.
- 5.3. The Authority will, where required, undertake community awareness and education about the risks associated with translocating species through educational programmes (for example Reef Ed, Reef Guardian Schools), press releases and a communication plan.
- 5.4. The Authority may develop guidelines for specific activities that occur in the Marine Park to provide greater detail about their translocation hazards and potential mitigation strategies.

¹ Haugom GP, Behrens HL, and Andersen AB (2002) Risk based methodology to assess invasive aquatic species in ballast water. In Leppakoski et al. (Eds) *Invasive Aquatic Species of Europe* pp: 467-476.

² National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.

³ Aquaculture Policy FAMOP015 – Management arrangements for translocation of live aquatic organisms (transport between bioregions) for aquaculture, Department of Primary Industries and Fisheries, September 2006.

Appendix A

Supporting information for the Position Statement on the translocation of species in the Great Barrier Reef Marine Park

1. Background

Intentional, incidental and accidental translocations of species are not new phenomena in Australia. Aquatic organisms have been introduced intentionally through a desire to establish 'familiar' aquatic flora and fauna, through unintentional introductions from shipping (for example hull fouling and ballast water), through accidental and negligent release of legally imported aquarium species, and more recently through commercial aquaculture purposes. However, the potential impacts and the need for controls on translocation of species have only recently been recognised, as has the cost of removal of unwanted species (for example the black-striped mussel that invaded three marinas in Darwin in 1999 cost \$3 million to eradicate in order to protect industries worth hundreds of millions of dollars). The main reasons for controlling the translocation of species are to protect the biodiversity, social, cultural, economic and World Heritage values of the Marine Park through the control of pests and spread of disease.

The Authority's fundamental obligation is to protect the Marine Park ensuring the maintenance of natural systems. Subsidiary objectives include providing for a range of uses consistent with the principles of ecologically sustainable use. Activities that occur, or are likely to be requested to occur in the Marine Park that involve the translocation of species may include:

- Open and semi-open flow through systems
- Release of specimens
- Reseeding and restocking
- Shipping and the relocation of structures (including ballast water exchange and hull fouling)
- Take and return of species
- Targeted translocation of species (intentional)
- Translocation of problem marine animals.

Some of the main hazards associated with these activities include:

- Amenity
- Chemical release
- Disease and parasites
- Environmental impacts (donor and receiving site)
- Economic impacts
- Feral/pest populations
- Genetic shift
- Lethal and sublethal impacts
- Translocation of associated species.

It is important to acknowledge that successful control of the translocation of species can only be achieved when enforcement of controls is possible. Unfortunately, a major component of the translocation problem is accidental, incidental or malicious

translocations. In these cases, public education about the risks and hazards can assist in controlling these impacts.

2. National System

The Australian Government Department of Agriculture, Fisheries and Forestry is working with state and territory government agencies, marine industries, researchers and conservation representatives, to develop a *National System for the Prevention and Management of Marine Pest Incursions* (the National System). The objectives of the National System are to:

1. Prevent the introduction to Australia of exotic marine species
2. Prevent the translocation within Australia of exotic marine species
3. Provide emergency preparedness and response capacity to respond to and where feasible eradicate, outbreaks of exotic marine species
4. Manage and control exotic marine species where eradication is not feasible.

As part of the National System, the Ministerial Council on Forestry, Fisheries and Aquaculture endorsed the National Translocation Policy in September 1999. All state and territory fisheries agencies have agreed to use this policy as a basis from which to develop translocation policies and guidelines specific to their jurisdictions. The Queensland Department of Primary Industries and Fisheries implemented their *Aquaculture Policy – Management arrangements for translocation of live aquatic organisms (transport between bioregions) for aquaculture* in September 2006. State environment agencies may also develop translocation policies. There are expected benefits in harmonising the approach between these documents as far as possible. The Authority process will provide a consistent framework to assess the potential risks associated with all proposals for translocation of species in the Marine Park.

Various species of plants and animals have become pests in the marine environment across the world. In the Australian marine environment, crabs, mussels, seastars, tubeworms, dinoflagellates and seaweeds have all become pests in the marine environment. Pest species in the marine environment can cause enormous costs to the nation, impacting on human health, fisheries and aquaculture, shipping and ports, tourism and environmental values. By damaging marine habitats, pests can reduce all Australians' enjoyment of coastal and marine environments.⁴

Potential modes of transport, or vectors, for pests in the marine environment include:

- Aquaculture operations
- Aquarium imports
- Ballast water (water carried by commercial ships to ensure stability, trim and structural integrity)
- Biofouling (marine organisms that attach to objects immersed in salt water such as vessels' hulls, ropes, anchors and other equipment)
- Marine debris
- Ocean current movements.

3. Activities (in alphabetical order)

Activities that already occur, or are likely to be requested to occur in the Marine Park, that involve intentional and/or incidental translocation of species may include:

3.1. Open and semi-open flow through systems

Activities that may involve translocation through open systems include aquaculture, use of live or uncooked (green) bait, live seafood trade, and aquarium facilities for research or display. Some of these activities (for example aquaculture, aquarium facilities) may occur in Queensland jurisdiction, but could also potentially impact on the Marine Park and World Heritage values.

Open systems are characterised by minimal or no containment with contact between the organisms and the Marine Park. Mature fish, juveniles, gametes and zygotes, associated species and chemicals may all be released into the natural environment. Semi-open systems may provide some level of containment but still allow organisms or wastewaters to enter the natural environment. Both systems may involve large numbers of stock thus increasing the risk of release and translocation.

3.2. Release of Specimens

The release of specimens into the Marine Park (or connected habitats) that were not collected from the local area is considered a translocation event. Release of specimens includes plants and/or animals no longer required by aquarium tank holders or other users of specimens (for example for research, broodstock in hatcheries/aquaculture facilities, excess stock from captive breeding programmes).

Past situations where release of specimens was requested include the release of excess captive bred sharks and seahorses from public aquaria (Note: these requests were not permitted). While relatively small numbers of individuals are likely to be involved in any particular release, the number of small-scale unauthorised releases is unknown (for example dumping or release of specimens such as *Caulerpa taxifolia* by aquarium tank holders).

3.3. Reseeding and re-stocking

Definitions of reseeded, sea ranching and re-stocking are as follows:

Reseeding

Stock released for the public good without the intention of benefiting an exclusive user group including:

- Compensation for depletion of a natural resource (restocking)
- Compensation for loss of habitat
- Genuine addition of new stock.

Sea Ranching

Identifiable stock released with the intention of being harvested by the releasing agency. This implies a cost-benefit analysis based on comparing the harvested value with the cost of production, release and harvesting and any associated environmental impact.

Re-stocking

Addition of individuals to an existing population of the same species. Re-stocking may be useful where the natural recovery of a small population is so slow as to leave the population vulnerable, to counter the adverse effects of inbreeding or to maintain genetic exchange between small isolated populations.

The organisms being stocked into an area can range from larvae to adult brood stock and may not be endemic to the area. A position statement on aquaculture within the Marine Park can be found at: http://www.gbrmpa.gov.au/corp_site/about_us/policies

3.4. Shipping and the Relocation of Structures (including foreign fishing vessels)

Shipping and structures, commercial and recreational vessels all provide surfaces for fouling, areas for the retention of ballast and vectors for translocation. Extensive fouling (usually composed of sedentary organisms) and the surfaces of sedentary organisms may support secondary free-living species (for example crustaceans, holothurians etc). Ballast water is used to alter the draft, trim and stability of a ship during its voyage, cargo loading and unloading operations at port and at sea. Organisms or their reproductive material may be retained inside the structure and escape or be released at a later time and place.

Even antifouled vessels and stationary structures (for example pontoons) may carry fouling organisms in uncoated areas around rudders, intake grates, entangled in deck gear, and/or secreted in damp or fluid-filled spaces such as niche areas, anchor lockers, bilges, sea chests or internal seawater systems. In addition, recreational craft such as yachts may also prove a vector for marine pests as they can foul rapidly when stationary for a period of time. Most vessels are likely to obtain some level of fouling on them however the following structures/vessels are believed to pose the greatest risk⁵:

- Foreign fishing vessels
- Pontoons, barges, platforms, abandoned and damaged stationary vessels
- Poorly maintained merchant vessels
- Stationary recreational vessels in marinas
- Vessels nearing the end of their docking cycle
- Vessels with long docking cycles that do not undertake regular in-water cleaning of unprotected equipment.

Structure placement and relocation within the Marine Park is managed by a joint-permit issued by the Authority and the Environmental Protection Agency (EPA). Shipping on the other hand may not require permission from or be managed by the Authority and the EPA as it crosses many jurisdictional boundaries. The Department of Agriculture, Fisheries and Forestry and the Australian Quarantine and Inspection Service (AQIS) undertake the day-to-day management of shipping. At the international level, the International Maritime Organisation is developing a new international convention for the control and management of ships' ballast water. Australia is signatory to this Convention. To address the ecological problems caused by marine pests, the National Introduced Marine Pests Co-ordination Group (NIMPCG) has developed a national framework aimed at developing a single management regime for the prevention and management of marine pest incursions in Australia. The AQIS has developed voluntary biofouling protocols⁶, which are hoped to become mandatory in the near future and mandatory ballast water management requirements⁷ also exist.

3.5. Take and return of specimens

This activity involves the temporary removal of whole or part of an organism from the Marine Park, manipulation/observation of that organism in an aquaria system and

subsequent return of that specimen into its original habitat in the Marine Park. This is normally a stationary operation, composed of land-based aquaria, but could also include vessel-based aquaria. Depending on where the aquaria are situated, seawater often flows freely from the Marine Park through the aquaria and back into the Marine Park.

3.6. Targeted translocation of species

Introduction

Introduction for the purpose of conservation is the release of an organism outside its historically known range but within an appropriate habitat and bio-climatic region. Introduction may be appropriate where the translocated species is to fill a niche role (where such a role is crucial to the proper functioning or sustainability of the host environment) or is the last resort to save a species from extinction and the potential benefits to the species outweigh any potential adverse impacts on the host environment⁸. Introductions are considered high risk and unlikely to be permitted unless conservation reasons for the introduction are exceptionally strong and mitigation strategies can reduce the hazards to a low risk level.

Re-introduction

Re-introduction is the release of an organism into part of its historically known range from which it has become extinct. Re-introduction to establish new populations may be a very important precaution against the possible extinction of a species that is confined to a small number of isolated populations subject to continuing decline, ongoing threats or a restricted area of suitable habitat. Re-introduction may also be used for restoring a species to its historical range where it is unable or unlikely to disperse naturally and for biodiversity reconstruction programmes.

Research

Research projects involving the translocation of species are proposed from time to time and may include resilience of species related to climate change, aquaculture and evolutionary studies.

3.6.1. Translocation of protected species

Protected species conservation in the Marine Park will typically require one or more management strategies. Four examples for the translocation of protected species are detailed below:

Species recovery

Species recovery translocation programmes may be considered an appropriate part of a broader recovery strategy directed towards the recovery of a protected species in the wild.

Biodiversity reconstruction

A biodiversity reconstruction programme may be considered an appropriate part of Marine Park management. Biodiversity reconstruction programmes may involve several species and are aimed at re-establishing the species that historically occupied an area, thereby extending their current range. The primary purpose of such a programme would be for biodiversity conservation outcomes, not aesthetics or 'beautifying' of a site.

Emergency transfer

An emergency transfer programme aims to remove a protected species from a demonstrably life-threatening situation in the wild. These programmes are usually concerned with the welfare of individual protected species but may also address the conservation of a species as a whole.

Research

Scientific research as part of translocation proposals justified under the above examples is encouraged. In addition, there may be species for which the factors causing local extinction are unknown but there is a case for re-introduction as part of a research programme that aims to investigate these factors. These research programmes however, must demonstrate a conservation benefit to the species.

In all cases the precautionary approach¹ must be applied to the translocation of species as the release of individuals may result in their death, injury or damage to the host environment. At the time of release, translocation individuals may be particularly vulnerable to predation, injury or stress in their new environment. Examples of possible damage to the receiving environment include habitat degradation and predation on other individuals from the translocated species. In some cases, an option may be to re-release organisms into the donor environment following threat abatement or habitat rehabilitation.

3.6.2. Translocation of coral

From time to time there may be a need for shorter than natural periods of coral recovery to support site-based tourism operations. In those instances, managed coral transplantation may be considered a reasonable activity. Such transplantation projects would be small-scale, based on balancing the impacts of transplantation with the impacts of relocating the tourism operation. Coral collection that occurs from within the same reef or reef complex does not constitute translocation.

Guidelines on coral transplantation can be found at:

http://www.gbrmpa.gov.au/corp_site/about_us/policies

3.7. Translocation of problem animals

Translocation of problem animals may arise when there is a animal in an area used by humans (for example beaches, dive sites, boat ramps, jetties, designated swimming holes or slipways) that displays aggressive behaviour towards humans with the potential to cause injury or harm. Aggressive behaviour toward humans may be due to a number of factors, such as territoriality, illness/injury or feeding instinct (i.e. may have been fed previously by humans and associates them with food). There is also the question of seasonal behavioural changes, as animals may become more aggressive during the breeding season or when protecting their offspring.

¹ Defined in the *Intergovernmental Agreement on the Environment* (1992), which states that in the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- (ii) an assessment of the risk-weighted consequences of various options.

Past situations where translocation has been considered as an option in the Marine Park include:

- Large grouper displaying aggressive behaviour towards divers at popular dive site
- Large crocodiles (greater than two metres in length) repeatedly spotted swimming within 200 metres of popular swimming beach.

In these situations, translocation may involve the capturing, moving and either releasing the problem animal in a new location with similar habitat that is less frequented by humans, or removing it from the wild and placing it in a captive holding facility, for example aquarium or crocodile farm.

The take of a protected species from the Marine Park requires the written permission of the Authority. Guidance as to when this might be suitable can be found in the *Policy on Managing Activities that Include the Direct Take of a Protected Species from the Great Barrier Reef Marine Park* available at: http://www.gbrmpa.gov.au/corp_site/about_us/policies

4. Hazards to be considered (in alphabetical order)

The translocation of species is likely to involve one or more hazards. A summary of potential hazards is outlined below. Consideration of the relevant hazards in a case-by-case risk assessment will assist with addressing the cumulative impacts of them.

4.1. Amenity

The term 'amenity' relates to the qualities, characteristics and attributes people value about the Marine Park and which contribute to their quality of life. Activities involving the translocation of species may affect amenity values for other Marine Park stakeholders. For example, the un-checked spread of a mussel or seastar may change the appearance of an area and impact on the amenity values.

4.2. Chemical release

Aquacultured marine species and specimens used for research may be exposed to pharmaceuticals and other chemicals. Many of these substances have adverse environmental and marketing consequences. The risk from translocation arises when undesirable chemicals are transported either in the transport medium or as residues in the stock itself. Concerns surrounding appropriate management of the use of chemicals, and potential risks from their release to the environment are largely the responsibility of local and state governments, universities and research stations⁹, however this hazard should be included in any risk assessment and translocation proposal.

4.3. Disease and parasites

A major concern of translocating species is the possible introduction of an exotic pathogen (bacteria, viruses, ecto- and endo-parasites) into the Marine Park and the subsequent infection of existing species. This includes the translocation of endemic pathogens to new areas. A common response by a population exposed to a new pathogen is mass mortality. The effects may be increased if the population is already stressed (for example through habitat degradation or overfishing). There is often a time lag between introducing a pathogen and the appearance of clinical disease. It is also important to note that some species may not be susceptible to the introduced

pathogen but may act as carriers, helping to establish the pathogen without becoming diseased.¹⁰

4.4. Ecosystem impact – donor site

The collection of a species for a translocation-related activity has the potential to adversely affect the donor area or population. Marine habitats or other species present in the donor area could be affected by the collection activity, for example as a result of physical damage. The donor population could be significantly affected by removal of individuals of the translocated species. Additionally, reasonable use of the donor site by other Marine Park stakeholders could be disrupted by collection activities. Removal of individuals of the translocated species from the donor site could also impact on Indigenous values if the site is of significance to Traditional Owners.

4.5. Ecosystem impact – receiving site

Translocated species may cause environmental impacts on the receiving site such as competition, displacement, predation and habitat alteration. In many cases, endemic species will be at greater risk to the translocated species as no predator-prey coevolution has occurred between the species and the translocated species may out-compete the endemic species.¹¹ Movement of individuals of the translocated species to the receiving site could also impact on Indigenous values if the site is of significance to Traditional Owners.

4.6. Economic impact

Activities involving the translocation of species may have negative economic impacts for other Marine Park stakeholders. For example, reduced accessibility or impacts on established industries from translocated species (for example disease outbreak, chemical release, ecosystem impacts) might make the receiving area less suitable for other stakeholders.

4.7. Establishment of feral populations

Feral populations are defined as populations that successfully establish as a result of the escape or release of non-endemic or exotic organisms. This includes not only the primary translocated species, but also secondary organisms translocated with the primary organism. Feral populations can have a range of adverse environmental impacts on endemic communities including competition, predation and environmental modification.¹²

4.8. Genetic shift in wild populations

Translocated species that escape or are deliberately released into the wild may breed with other genetically distinct populations of the same species, possibly resulting in a genetic shift in the local population and/or possible extinction of a genetic group¹³. Hybridisation may occur between endemic species and translocated species where there is genetic compatibility. This is a particular risk associated with inappropriate re-stocking of native species.¹⁴

4.9. Lethal and sublethal effects on the translocated species

Translocated individuals may not survive the translocation activity due to stress from handling, competition, predation or unsuitable conditions in the receiving environment. The translocated species may experience sub-lethal effects such as reduced reproductive output or fitness. Translocated individuals that become injured

or stressed during the translocation activity may also be more susceptible to diseases¹⁵. For example, in corals, 100 percent of injured fragments collected became infected with black-band disease compared to no infection in un-injured fragments¹⁶.

4.10. Translocation of associated species

There may be a risk of associated species being moved with the target organisms during the translocation process. This could include species that are similar in appearance to the target species or on or in the target organisms and/or the transport medium (for example live rock, water).¹⁷

5. Activity based risk assessment

The risk assessment process outlined in Appendix B is intended to deal with proposals for the intentional translocation of species in the Marine Park. Accidental or malicious translocations should be minimised through appropriate legislation, compliance, penalties, eradication/control and education programmes. The risk assessment process outlined in the position statement is consistent with that set out in the Australia Standard for Risk Management (AS 4360 – 2004). The Authority's Environmental Impact Management Unit may amend the risk assessment criteria, from time to time.

A broad risk assessment has been undertaken for activities outlined in the position statement, however a complete risk assessment that is tailored to the species can only be completed once an application is received. Following a case-by-case permit assessment and the implementation of mitigation strategies the risk for each activity may be sufficiently reduced (to low risk) to enable the activity to be permitted.

The Authority will not grant a permission for the translocation of a species activity that is assessed as high or medium risk. However, the Authority will consider a medium or high risk activity further if mitigation strategies can be implemented to reduce the risk to low.

6. Mitigation strategies

It should be acknowledged that the ecological properties of species translocated between locations are not fully known, and therefore, further interactions between species and the environment are complex^{7,18}. Therefore, in order to manage and mitigate the impacts from these activities, a well-structured risk-based approach is necessary.

The mitigation strategies listed below may assist in reducing the risk of an activity listed in the risk assessment matrix (Appendix B). The list is not exhaustive and additional, relevant mitigation strategies should be considered when an application is received.

6.1. Amenity

- Species composition at the donor or receiving environment should not be increased or decreased from what is expected naturally in the area
- Total translocation impact must be within the natural variability of the site and must not significantly reduce the donor area species composition or density
- Donor area collections should not affect reasonable use of the area or Indigenous heritage by other reef users. Public advertising of the application may be required to assess this.

- Monitoring of the success of the translocation may be required
- Community awareness, education and involvement (for example educational programmes, press releases)
- Reconsider the suitability of fish feeding activities at site if a resident animal begins to show signs of aggression or of becoming a problem animal.

6.2. Chemical release

- Community awareness, education and involvement (for example educational programmes, press releases)
- Do not allow the release of organisms that have been treated with, and are capable of emitting, radioactive compounds into the Marine Park
- Consult the Material Safety Data Sheet (MSDS) for unknown chemicals and undertake a risk assessment to determine how it is retained (in other words, in what part of the skeleton/body tissue); what effects it will have on (if sublethal effects, will they affect the health of the organism post release) the species and whether these are likely to be issues for human health if consumption is likely to occur
- If the organism is a vertebrate or cephalopod, procure a copy of the Ethics Approval
- Transport specimens in water from the receiving environment rather than from the donor environment.

6.3. Disease and parasites

- Community awareness, education and involvement (for example educational programmes, press releases)
- Educate aquarium tank holders to not release unwanted or diseased plants and animals into the environment. Promote alternative ways of disposing of unwanted specimens
- Do not allow return of organisms showing visible signs of disease (for example may be represented by emaciated, floatation problems, tissue loss, colour changes and stressful behaviour)
- Certification of disease and parasite status if available, if not monitoring and surveillance to certify status of stock, inspection, quarantine procedures
- Avoid returning organisms to a stressed receiving environment until after the stressor has abated (for example coral bleaching event, oil spill)
- Do not retain the organism in aquaria for longer than is necessary (preferably less than 24 hours)
- Where possible organisms that are being held in captivity for later release should be held in seawater that originates from the Marine Park to reduce the risks of contamination and if possible species should be transported in water from the receiving environment
- Feed that is used to sustain the organism in temporary captivity must be composed entirely of Australian based produce
- Organisms that are exposed to disease must not be returned to the Marine Park unless they undergo quarantine measures and are certified disease free
- Avoid using imported food intended for human consumption as bait. Follow Biosecurity Australia guidelines.

6.4. Ecosystem impact – donor site

- A pilot study may be required to confirm the suitability of the extraction methods at the intended sites
- Reef organisms relocated to avoid damage during facility/structure installation may be considered for relocation back to their original location if this does not place them at risk of damage from movement of the mooring tackle or from additional handling
- Best practice/education for maintaining aquaria to minimise need to replace specimens that are diseased or no longer required
- Scientific evidence detailing species genetic range is within the translocation area
- Scientific information on the life history traits of the species to be translocated
- Reconsider the suitability of fish feeding activities at site if a resident animal begins to show signs of aggression or of becoming a problem animal.

6.5. Ecosystem impact – receiving site

- To evaluate potential of species to interact with the receiving environment - need thorough knowledge of the translocated species, its ecology and the ecology of the receiving waters
- Need to evaluate the reversibility of an introduction and any possible effects
- Transport organisms in media taken from the receiving areas. Depuration and or transport to fresh media before release. Ensure transport media and containers are disposed of appropriately outside the Marine Park
- Species should only be released into their natural habitat type (for example depth, substrata, topography, reef zone, orientation)
- Scientific evidence detailing species genetic range is within the translocation area
- Scientific information on the life history traits of the species to be translocated.

6.6. Economic impact

- Community awareness, education and involvement (for example educational programmes, press releases)
- A pilot study may be required to confirm the suitability of the methods at the intended sites
- Scientific evidence detailing species genetic range is within the translocation area
- Scientific information on the life history traits of the species to be translocated
- Economic impacts can be estimated through the interaction of all other predicted impacts and then quantified.

6.7. Establishment of feral populations

- Educate aquarium tank holders to not release unwanted or diseased plants and animals into the environment. Promote alternative ways of disposing of unwanted specimens
- Scientific evidence detailing species genetic range is within the translocation area
- Scientific information on the life history traits of the species to be translocated.

6.8. Genetic shift in wild populations

- Educate aquarium tank holders to not release unwanted or diseased plants and animals into the environment. Promote alternative ways of disposing of unwanted specimens
- Do not allow the exposure of any specimen that is to be returned to the Marine Park to any organism that does not occur naturally in the Marine Park

- Live rock and habitat for aquaria must be sourced from the same location as the other organism(s) held in aquaria
- Scientific evidence detailing species genetic range is within the translocation area and ensure that the populations are not Evolutionary Significant Units
- Scientific information on the life history traits of the species to be translocated.

6.9. Lethal and sublethal effects on the translocated species

- Educate aquarium tank holders to not release unwanted or diseased plants and animals into the environment. Promote alternative ways of disposing of unwanted specimens
- When dealing with translocations resulting from imminent impacts from structures, organisms that are being moved should be relocated to sites (within the vicinity of their original location) such that their depth and orientation are as similar as practicable to their original circumstances, and so that they are stable and do not require ongoing maintenance to avoid damage
- Species should only be released into their natural habitat type (for example depth, substrata, topography, reef zone, orientation)
- Organisms to be returned should be held in clean aquaria with optimal water quality and preferably the water should be from the receiving environment
- Collection techniques (for example barbless hook, diluted clove oil) that minimise impacts, such as abrasion/lesions on the organism, should be used to facilitate healthy return
- Coral colonies that are collected should be cemented to the substratum rather than cable tied (see Guidelines on coral transplantation)
- Organisms that originated on the Reef must not be returned by release from the beach unless that is their natural habitat, nor from the side of a vessel unless they are pelagic
- Organisms that form monogamous pairs must not be collected and separated (in other words, collect the pair together rather than separation) nor returned separately
- Additional measures include returning the animal to a location with similar habitat and protective zoning to that from which it was removed and that the animal should be released within its genetic range and as close as possible to the collection site
- Any animals moved and released should be tagged with all relevant information recorded, and a monitoring programme should be developed to assess the effectiveness of the translocation
- Reconsider the suitability of fish feeding activities at site if a resident animal begins to show signs of aggression or of becoming a problem animal.

6.10. Pest Potential

- Structures to be relocated should be appropriately inspected, cleaned and treated prior to relocation. Specifically: *Prior to any facility/structure being moved into or relocated within the Marine Park, the applicant must provide a written statement from Biosecurity Queensland or the Queensland Department of Primary Industries and Fisheries (or the appropriate agency) to the Authority stating that the facility/structure is cleaned of Introduced Marine Pests; unless otherwise advised by the Authority in writing that the written statement is not required.* In particular, marine pests should, as far as possible, be identified and appropriately managed before any relocation

- A requirement for a hull and niche area inspection report prior to the structure entering Marine Park waters in line with the 'Draft Guidelines for the Prevention of Biofouling on Commercial Vessels' as issued by the National Introduced Marine Pests Co-ordination Group (NIMPCG) that detail management practices for areas of the ship
- If a hull and niche area inspection is not possible prior to entering Marine Park waters, an inspection of the hull must be undertaken within an Australian port, at cost to the permittee. If marine pests are identified the ship will be ordered to leave Australian waters or to go to dry dock for cleaning
- No part of the ship's hull treated with biocidal antifouling paint is to be cleaned in Australian waters. Permission to clean hulls painted with biocidal antifouling paints will only be granted by the State/Territory authority in exceptional circumstances
Note: Prior to undertaking in-water cleaning, approval from the relevant State/Territory authority must be granted and conditions may be imposed in line with the Australian and New Zealand Environment and Conservation Council (ANZECC) Code of Practice for Antifouling and In-Water Hull Cleaning and Maintenance.
- Apparatus and equipment can be treated simply and effectively by a combination of measures including, air-drying, UV treatment (sun drying or artificial UV), chemical bath (for example chlorine) and freshwater bath.
- Scientific evidence detailing species genetic range is within the translocation area
- Scientific information on the life history traits of the species to be translocated

6.11. Translocation of associated species

- Educate aquarium tank holders to not release unwanted or diseased plants and animals into the environment. Promote alternative ways of disposing of unwanted specimens
- Broodstock/stock from local populations preferred
- Appropriate containment of all life stages, treatment and disposal of wastewater and appropriate contingency plans
- Preventing escapees from entering any water bodies by siting the facility away from any water bodies and using appropriate containment methods
- Only release any live seafood or aquarium species at original collection site

7. Further information

Please contact the Species Conservation Unit at the Great Barrier Reef Marine Park Authority on 1800 990 177 or visit www.gbrmpa.gov.au

8. Definitions

Biofouling is the accumulation of marine organisms (plants or animals) that attach to objects immersed in salt water (such as vessels' hulls, ropes, anchors and other equipment).

Fouling is the growth of animals and plants on the surface of submerged objects.

Ecologically sustainable use of natural resources means the use of the natural resource within their capacity to sustain natural processes while maintaining the life-support systems of nature and ensuring that the benefit of the use to the present generation does not diminish the potential to meet the needs and aspirations of future generations.

Evolutionary Significant Unit (ESU) is a population of organisms that is considered distinct for purposes of conservation. This term can apply to any species, subspecies, geographic race, or population. Often the term 'species' is used rather than ESU, even when an ESU is better considered a subspecies or variety, rather than a biological species. In marine animals the term stock is often used.

Definitions of an ESU generally include at least one of the following criteria:

1. Current geographic separation
2. Genetic differentiation at neutral markers among ESUs caused by past restriction of gene flow
3. Locally adapted phenotypic traits caused by differences in selection.

Gamete is a mature male or female reproductive cell (sperm or ovum).

Introduction is the release of an organism outside its historically known range.

Marine pest any exotic marine species that may pose a threat to Australia's marine environment or industry, if introduced, established or translocated. Where exotic marine species is defined as any species not normally considered to occur and that may or may not be present in Australia's marine environment.

Niche area a protected or refuge area of relatively constant conditions in which marine organisms can escape detection or drying out. Also areas that are not coated in antifouling paint or areas where antifouling coating breakdown is common enabling the settlement of marine organisms.

Donor environment is the environment from which individuals are collected for the purposes of translocation.

Donor population is the population from which individuals are to be taken for translocation.

Translocation is the movement of live aquatic material (including all stages of the organisms' lifecycle and any derived, viable genetic material):

- Beyond its accepted distribution
- To areas which contain genetically distinct populations, or
- To areas with superior parasite or disease status*.

*This addresses the possibility of the assisted movement of organisms within their natural range, but between waters that may have different disease or parasite states (that is to say, infected with versus free of a particular disease or parasite).

Translocation proposal is a document prepared in accordance with Appendix C of the position statement, prior to the commencement of the translocation programme.

Vector anything capable of introducing or translocating an exotic marine species.

Zygote is a cell arising from the union of two gametes.

⁴ http://www.daffa.gov.au/___data/assets/pdf_file/0009/5985/fs1_introducedpests.pdf

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- ⁵ Ballast Water Research Series Report 14: "Hull Fouling as a Vector for the Translocation of Marine Organisms" (2001) Department of Agriculture, Fisheries and Forestry, Australia.
- ⁶ <http://www.daff.gov.au/aqis/avm/vessels/less-25m/biofouling-protocols>
- ⁷ http://www.daff.gov.au/__data/assets/pdf_file/0005/114269/Australian_BW_Requirements.pdf
- ⁸ Policy for the translocation of threatened fauna in NSW, Policy and Procedures Statement No. 9, NSW National Parks and Wildlife Service, October 2001.
- ⁹ National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹⁰ National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹¹ National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹² National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹³ ¹¹ Hughes J, Goudkamp K, Hurwood D, Hancock M, and Bunn S (2003), Translocation causes extinction of a local population of the freshwater shrimp *Paratya australiensis*. *Conservation Biology*, 17(4): 1007-1012.
- ¹⁴ National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹⁵ Rutzler K, Santavy D and Antonius A. (1983) The black-band disease of Atlantic reef corals. III: Distribution, ecology and development. *Marine Ecology Progress Series*, 4: 329-358.
- Ballast Water Research Series Report 14: "Hull Fouling as a Vector for the Translocation of Marine Organisms" (2001) Department of Agriculture, Fisheries and Forestry, Australia.
- ¹⁶ Aeby G.S and Santavy D.L. (2006) Factors affecting susceptibility of the coral *Montastrea faveolata* to black-band disease. *Marine Ecology Progress Series*, 318: 103-110.
- ¹⁷ National Policy for the Translocation of Live Aquatic Organisms – Issues, Principles and Guidelines for Implementation 1999, Bureau of Rural Sciences, Canberra ACT.
- ¹⁸ Haugom GP, Behrens (HL) and Andersen AB (2002) Risk based methodology to assess invasive aquatic species in ballast water. In Leppakoski et al (Eds) *Invasive Aquatic Species of Europe* pp: 467-476.

Appendix B

Risk Assessment

Risk Assessment Criteria

Table 1- Likelihood

The likelihood scale for the assessment of the risk is based on the likelihood of the hazard scenario eventuating during the project, based on the following descriptions.

Frequency of Occurrence	Descriptor (in bold)
More than 5 times per year	Event experienced many times
Between > 1 and 5 times per year	Several times
Between > 0.1 and 1 times per year	Expect a single event
Between > 0.01 and 0.1 times per year	Event no more than likely
Between > 0.001 and 0.01 times per year	Event unlikely
Between > 0.0001 and 0.001 times per year	Event very unlikely
< 0.0001 per year	Event remote

Table 2- Environmental Impact Consequences

Environmental consequences were categorised according to the effects upon environmental receptors, using the qualitative 5-point scale (if 3 criteria fit then that category is chosen)

Environmental Impact Category	Impact Criteria
Extensive Damage	People: Fatality(ies) Area: >10km ² or >10km Resource: Sensitive Ecosystem: Population viability affected Longevity: >20 years
Major Damage	People: One or more individuals hospitalised Area: >5-10km ² or >5-10km Resource: Sensitive Ecosystem: Population viability could be affected Longevity: 7-20 years
Moderate Effect	People: One or more individuals require medical treatment Area: >2-5km ² or >2-5km Resource: Sensitive Ecosystem: Significant effect on population Longevity: 2-7 years
Minor Effect	People: One or more individuals require first aid treatment Area: 0.5-2km ² or >0.5-2km Resource: Not Sensitive Ecosystem: Many individuals affected Longevity: 6 months-2 years
No significant Effect	People: People able to notice but no medical effect Area: <0.5km ² or >0.5km Resource: Not Sensitive Ecosystem: Individuals only affected Longevity: 0-6 month

Table 3- Environmental Perception Consequences

Perception Category	Perception Criteria	
Extensive Damage	Media:	Negative and extensive national media attention (print and electronic)
	Cultural:	Complete destruction of valued, but commonplace, structure/area
	Operational:	Major changes to permissible operations
Major Damage	Media:	Negative and extensive national media attention (print and electronic)
	Cultural:	Complete destruction of valued, but commonplace, structure/area
	Operational:	Major changes to permissible operations
Moderate Effect	Media:	Negative national media attention
	Cultural:	Damage to valued structure/area present in limited numbers
	Operational:	Minor changes to permissible operations
Minor Effect	Media:	Negative regional media attention
	Cultural:	Damage to valued, but commonplace, structure/area
	Operational:	Increased stakeholder scrutiny likely
No Significant Effect	Media:	Potential for some negative local media attention
	Cultural:	Disturbance (but no damage) to valued structure/area
	Operational:	Minor verbal negative comments by stakeholders

Table 4. Assigning risks (using criteria from tables 1, 2 and/or 3)

		Consequences				
		Not Significant	Minor	Moderate	Major	Extensive
Frequency of Occurrence	Many	M.11	H.13	H.10	H.6	H.1
	Several	M.12	M.8	H.11	H.7	H.2
	Single	L.6	M.9	H.12	H.8	H.3
	No more than Likely	L.7	M.10	M.6	H.9	H.4
	Unlikely	L.8	L.3	M.7	M.3	H.5
	Very unlikely	L.9	L.4	L.1	M.4	M.1
	Remote	L.10	L.5	L.2	M.5	M.2

Risk Assessment of each Activity and Hazard						Assessor to do once application received				
Activity	Associated Hazards	E/P	INITIAL			Mitigation Strategies	Feasible	RESIDUAL		
			Likelihood	Consequence	Risk Level			Likelihood	Consequence	Risk Level
1. Open Systems	Chemical Release	E	Several	Minor	Moderate					
	Disease and Parasites	E	Several	Major	High					
	Ecosystem Impacts - Receiving Environment	E	Several	Moderate	High					
	Ecosystem Impacts - Donor Environment	E	Several	Minor	Moderate					
	Economic Impact	P	Several	Moderate	High					
	Genetic Shift	E	Several	Major	High					
	Pest/Feral Potential	E	Several	Major	High					
	2. Release of Specimens	Disease and Parasites	E	Several	Minor	Moderate				
Ecosystem Impacts - Receiving Environment		E	Several	Moderate	High					
Lethal and Sublethal Effects		E	Many	Not significant	Moderate					
Pest/Feral Potential		E	Single	Major	High					
Translocation of associated species		E	Several	Moderate	High					
3. Reseeding and Restocking	Amenity	P	Single	Minor	Moderate					
	Disease and Parasites	E	Several	Moderate	High					
	Ecosystem Impacts - Receiving Environment	E	Many	Minor-Moderate	High					

	Ecosystem Impacts - Donor Environment	E	Several	Minor	Moderate					
	Economic Impact	P	Single	Minor	Moderate					
	Genetic Shift	E	Several	Major	High					
	Pest/Feral Potential	E	Single	Major	High					
	Translocation of associated species	E	Several	Major	High					
4. Shipping and Relocation of Structures	Amenity	P	Single	Major	High					
	Disease and Parasites	E	Many	Major	High					
	Genetic Shift	E	Single	Moderate	High					
	Ecosystem Impacts - Receiving Environment	E	Several	Major	High					
	Economic Impact	P	Several	Major	High					
	Pest/Feral Potential	E	Several	Major	High					
5. Take and Return	Chemical Release	E	Unlikely	Minor	Low					
	Disease and Parasites	E	Unlikely	Minor	Low					
	Ecosystem Impacts - Donor & Receiving Environment	E	Unlikely	Not significant	Low					
	Lethal and Sublethal Effects	E	Several	Minor	Moderate					
	Translocation of associated species	E	Single	Minor	Moderate					
6. Translocation of Marine Organisms	Disease and Parasites	E	Not more than likely	Minor	Moderate					

	Ecosystem Impacts - Receiving Environment	E	Several	Minor-Moderate	High					
	Ecosystem Impacts - Donor Environment	E	Single	Moderate	High					
	Genetic Shift	E	Single	Moderate	High					
	Lethal and Sublethal Effects	E	Several	Minor	Moderate					
	Translocation of associated species	E	Several	Moderate	High					
7. Translocation of Problem Marine Animals	Amenity	P	Not more than likely	Not significant	Low					
	Disease and Parasites	E	Not more than likely	Minor	Moderate					
	Economic Impact	P	Unlikely	Not significant	Low					
	Ecosystem Impacts - Receiving Environment	E	Unlikely	Not significant	Low					
	Ecosystem Impacts - Source Environment	E	Unlikely	Not significant	Low					
	Lethal and Sublethal Effects	E	Single	Not significant	Low					

E - Environmental Impact Consequences
P - Environmental Perception Consequences

Appendix C

Translocation Proposal

Applicant Details

Family Name

Given Names

Business Name (if applicable) and ACN

Business/Residential Address

Telephone (Work)

Telephone (Home)

Facsimile Number

Mobile Number

Email

Qualifications/Experience/Affiliation of the applicant(s) as it applies to this proposal

Please note: Failure to provide any of the information requested and/or insufficient detail may result in the application refusal

Application Details (Please answer all questions)

1. Specify the activity associated with the translocated species:

Open/Semi-open systems

Release of specimens

Reseeding/Re-stocking

Relocation of structures

Shipping associated with another permitted activity (for example dredging, cable laying)

NB: If the only activity selected is shipping please indicate the Port(s) that the vessel visited over the last six months:

(Do not complete the rest of the Translocation Proposal if shipping is the only activity specified)

Take and return of specimens

Translocation of marine organisms

Translocation of problem marine animals

Other (Please specify)

2. List the specific marine species that this application is for (Give common and scientific names – genus and species):

Mollusc Finfish Crustacean Other

3. List the legal status of the marine species throughout its range, including international, national and state legislation:

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4. Why is translocation required:
Species not available locally Other (Please specify)

5. Source of the species to be translocated:
Hatchery Wild collection Research Ornamental

Other (Please specify)

Please specify contact details of supplier:

Please specify the location from which the species is to be sourced:

6. Number and age/maturity/stage of each species:

7. Information on natural genetic range and of the species:

8. Date(s) of intended translocation:

9. Method of collection:

10. Mode of containment:

11. Mode of transport and biosecurity measures during transport including quarantine procedures:

Attach details including any requirements for on-route water changes/disposal

12. Provide full details of final destination (Name, address, telephone/fax contact details and aquaculture approval if required):

13. Please specify biosecurity measures at facility including procedures (Attach details. Prior inspection and approval by Departmental officer may be required dependant on the details of the intended translocation):

14. Supply details of quarantine procedures and protocols for the arrival of the animals (Attach details including timeframes):

15. Contingency arrangement in case of disease or death of aquatic animal (Attach details including method of disposal of both shipment and post-shipment mortality):

I certify that the information in this application is correct and accurate.

Name

Signature

Date

APPENDIX D**Translocation Checklist for Permit Assessors**

The risks associated with intentional translocation can be pro-actively assessed through the permit process. Whereas incidental translocation is harder to identify and manage, yet it can often result in higher levels of risk as mitigation strategies are not often considered. This checklist should be completed during the registration phase of all permit applications. If any boxes are ticked then the applicant will have to complete a Translocation Proposal and the permit assessor should assess the permit in accordance with the position statement on the Translocation of Species within the Great Barrier Reef Marine Park.

Does the activity being applied for include the possibility of:

- Relocation of a structure (for example mooring, pontoon, weather station, terrestrial equipment between islands)
- Shipping associated with another permitted activity (for example dredging, cable laying)
- Take and return of specimens
- Use of chemicals
- Intake/Outfall pipe
- Flow through aquaria
- Release of specimens into the Marine Park
- Aquaculture
- Collection of specimens
- Movement of species from their original habitat
- Installation of a structure

Name

Signature

Date