



**Australian Government**  
**Department of Agriculture**

# **National Policy Guidelines for Translocation of Domestic Bait and Berley**



**Published May 2015**

The National Policy Guidelines for Translocation of Domestic Bait and Berley were produced by the Sub-Committee on Aquatic Animal Health and endorsed by the Animal Health Committee in December 2014.

© Commonwealth of Australia 2015

### **Ownership of intellectual property rights**

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

### **Creative Commons licence**

All material in this publication is licensed under a Creative Commons Attribution 3.0 Australia Licence, save for content supplied by third parties, logos and the Commonwealth Coat of Arms.

Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, distribute, transmit and adapt this publication provided you attribute the work. A summary of the licence terms is available from [creativecommons.org/licenses/by/3.0/au/deed.en](http://creativecommons.org/licenses/by/3.0/au/deed.en). The full licence terms are available from [creativecommons.org/licenses/by/3.0/au/legalcode](http://creativecommons.org/licenses/by/3.0/au/legalcode).

### **Cataloguing data**

This publication (and any material sourced from it) should be attributed as:

Department of Agriculture 2015, *National Policy Guidelines for Translocation of Domestic Bait and Berley*, Canberra. CC BY 3.0.

### **Internet**

*National Policy Guidelines for Translocation of Domestic Bait and Berley* is available at:

[agriculture.gov.au/animal/aquatic/guidelines-and-resources](http://agriculture.gov.au/animal/aquatic/guidelines-and-resources)

### **Contact**

Department of Agriculture

Postal address GPO Box 858 Canberra ACT 2601

Switchboard +61 2 6272 3933

Web [agriculture.gov.au/about/contactus](http://agriculture.gov.au/about/contactus)

Inquiries regarding the licence and any use of this document should be sent to [copyright@agriculture.gov.au](mailto:copyright@agriculture.gov.au).

The Australian Government acting through the Department of Agriculture has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, its employees and advisers disclaim all liability, including liability for negligence, for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon any of the information or data in this publication to the maximum extent permitted by law.

# Table of Contents

Summary .....	1
1. Introduction .....	2
1.1. Scope.....	3
1.2. National context.....	3
1.3. International context .....	4
2. Bait and Berley Products .....	6
2.1. Live bait.....	7
2.2. Fresh dead bait.....	8
2.3. Frozen bait .....	9
2.4. Processed bait.....	9
3. Disease Risks.....	10
3.1. Hazard identification .....	10
3.2. Risk assessment .....	11
3.2.1. Release assessment.....	11
3.2.2. Exposure assessment .....	11
3.2.3. Consequence assessment .....	12
3.2.4. Risk estimation.....	12
3.2.5. Outcomes of combined risk assessments .....	12
3.3. Environmental and ecological issues .....	13
4. Policy Framework.....	14
4.1. Policy principles.....	14
4.2. Recommendations from the National Risk Analysis.....	15
4.2.1. Controls on the use of particular high risk commodities.....	15
4.2.2. Controls on use of aquaculture commodities as bait.....	15
4.2.3. Control on translocation of live bait .....	16
4.2.4. Compulsory freezing or freeze drying of non-live bait commodities .....	16
4.2.5. Increased surveillance of bait commodities.....	16
4.2.6. Educating fishers to the risks of translocating bait and berley.....	17
5. Policy Implementation.....	18
5.1. Possible Instruments .....	18
5.1.1. State and territory legislation.....	18
5.1.2. License conditions.....	18
5.1.3. Voluntary guidelines.....	18

5.1.4.	<i>Education</i> .....	18
5.1.5.	<i>Compliance</i> .....	18
5.1.6.	<i>Research activities</i> .....	19
6.	Staged risk assessment and implementation example.....	20
7.	Appendix 1: Jurisdictional policy on the use of domestic bait and berley .....	21
8.	Appendix 2: Summary of disease risks posed by common bait and berley commodities	23
9.	References.....	25
10.	Acronyms and definitions.....	26

## Summary

Bait and berley products are used by fishers to attract a target species towards hooks, nets or cages/pots for capture. Bait and berley is integral to the success of commercial and recreational fisheries. The benefits provided to Australia's economy through capture commercial and recreational fisheries are significant, employing over 7300 people directly and supporting many other businesses (Skirtun et al. 2012).

While essential for commercial and recreational fisheries, bait and berley may present an unacceptable risk for transmission of aquatic animal diseases. Diseases may impact on productivity and sustainability of commercial and recreational fisheries, and could threaten aquatic ecosystems and endangered species. A risk analysis on aquatic animal diseases associated with translocation of domestic bait and berley (Diggles 2011) has found that there are several unacceptable disease risks associated with bait and berley translocation within Australia.

The Sub-Committee on Aquatic Animal Health (SCAAH) reviewed measures applied by Australian states and territories to manage the aquatic animal disease risks associated with bait and berley translocation. The committee found that measures were insufficient to manage aquatic animal disease risks associated with translocation of bait and that national policy guidelines were warranted.

The National Policy Guidelines for Translocation of Domestic Bait and Berley aim to provide a national framework for the development of bait translocation policies in Australia's states and territories. Such policies are necessary to manage disease risks associated with domestic bait and berley use. The national policy guidelines provide information on bait and berley products, the nature of disease risks, principles for policy development, possible instruments for managing identified risks, and a staged approach for policy development.

The scope of these policy guidelines extends to bait and berley for commercial and recreational fisheries, but not for other uses such as aquaculture feed. The policy guidelines do not consider imported aquatic animal products. Any risks associated with imported products are assessed by the Australian Government Department of Agriculture and any risk management measures implemented in accordance with the *Quarantine Act 1908*.

# 1. Introduction

Bait and berley are widely used by fishers in Australia to attract target aquatic animal species towards hooks, nets, cages or pots for capture. Bait and berley are integral to the success of commercial and recreational fisheries. The benefits provided to Australia's economy through capture fisheries and recreational fishing are significant. These sectors employ more than 7300 people and support many other businesses (Skirtun et al. 2012).

Numerous species are used as bait or berley in Australia. Bait and berley are essential for commercial and recreational fisheries, however, the translocation of bait and berley of aquatic animal origin may present risks for transmission of aquatic animal diseases. These diseases may impact on the productivity and sustainability of commercial fisheries, recreational fisheries, and aquaculture; and could threaten aquatic ecosystems and endangered species. Terrestrial animal or plant products may also be used as bait and berley but are unlikely to carry pathogens that are infectious to aquatic animals.

A risk assessment on aquatic animal diseases associated with translocation of domestic bait and berley was completed in 2011, *A National Risk Analysis–Aquatic Animal Diseases Associated with Domestic Bait Translocation* (FRDC Project 2009/072; Diggles 2011). The risk assessment found that there are several unacceptable disease risks associated with translocation of domestically sourced bait and berley within Australia.

Examples of disease emergence associated with translocation of bait and berley products in Australia and internationally include:

- Epizootic Ulcerative Syndrome (EUS) introduced to new waterways in Australia with movements of live mullet (Mugilidae).
- Viral Haemorrhagic Septicaemia Virus (VHSV) spread through the Great Lakes in North America, attributed to transfer of live bait fish.
- Crayfish plague (*Aphanomyces astaci*) could potentially be transferred to new crayfish populations via the consumption and subsequent transfer of viable pathogen within the digestive system of live finfish (Oidtmann et al. 2002).

Some pathogens (e.g. VHS and EUS) can spread rapidly to new hosts in multiple environments (marine, estuary, freshwater) so may present a risk over a wider area than pathogens that are more host-specific or have narrower environmental tolerances. The likelihood of disease spread will depend on the nature of translocation pathways and the distribution of susceptible hosts. However, risk is a product of both likelihood and consequence—with a high likelihood of disease spread, the overall risk of disease may remain low if the consequences of disease establishment are low.

SCAAH reviewed existing measures applied by Australian jurisdictions to manage the aquatic animal disease risks associated with bait and berley translocations (June 2013). The committee found that measures were insufficient to manage aquatic animal disease risks and that these risks are significant. The committee agreed there is a need for national policy guidelines to provide a consistent national framework for the development of bait translocation policies by Australia's states and territories. The risk assessment (Diggles 2011) provides the scientific basis for recommendations included in these national policy guidelines.

The need for managing risks associated with translocation of bait and berley have been recognised for some time. The *National Policy for the Translocation of Live Aquatic Organisms—Issues, Principles and Guidelines for Implementation* (1999) made recommendations to manage the risks associated with the translocation of live bait. The recommendations include:

- Treating live bait production facilities in the same manner as closed aquaculture facilities
- Educating anglers and bait suppliers on the implications of unwanted translocations
- Prohibiting the sale and use of high risk species—including exotic species—as live bait
- Restricting ornamental fish retailers from selling fish for a bait end-use through imposed licensing conditions.

Any policies proposed to manage the disease risks associated with translocation of bait and berley may impact on the activities of commercial and recreational fisheries, or directly impact the bait industry. Therefore, bait translocation policies should be based on scientific demonstration of risk, should propose measures that are the least restrictive to adequately manage the risks, and the benefits of any measures should outweigh the costs.

## 1.1. Scope

For the purposes of these guidelines, bait and berley includes any product of aquatic animal origin used to attract aquatic animals for the purposes of capture by commercial or recreational fishers. Bait and berley of terrestrial animal origin are not considered in these guidelines because they are unlikely to contain disease agents that are infectious to aquatic animals.

These policy guidelines consider bait and berley products of Australian origin. They do not consider bait or berley species that have been imported from other countries. Import Risk Analyses (enforced under the *Quarantine Act 1908*) are conducted by the Department of Agriculture on incoming species labelled to be used as bait or berley. Import conditions for seafood intended for human consumption excludes the use of this product as bait. However, diversion of seafood intended for human consumption for use as bait may present a disease risk and represents an enforcement issue. Similar to seafood, the diversion of imported live ornamental fish for use as bait also presents a disease risk. This risk is addressed through relevant controls and education campaigns and is out of scope in these guidelines.

Aquatic animals and their products used for other purposes, such as aquaculture feed, are not considered in these guidelines. The aquatic animal disease risks associated with aquaculture feeds present a different risk profile and different control measures. Guidance on the control of aquatic animal health hazards in aquatic animal feeds can be found in Chapter 6.1 of the OIE Aquatic Animal Health Code.

These guidelines do not include other potential impacts of translocating live bait, such as aquatic animal welfare and noxious species translocation.

## 1.2. National context

The translocation of bait and berley products presents risks for the introduction and establishment of aquatic animal disease into waterways where a disease is absent. Translocated bait and berley may provide a direct pathway to naïve populations of susceptible species

because they are intentionally placed in waterways and it is expected that they will be ingested by aquatic animals. Some significant aquatic animal diseases occur in parts of Australia, and there are clear benefits in controlling their spread to unaffected areas. This is particularly important because the spread of disease in open aquatic environments is difficult to manage and often irreversible.

Translocation of bait and berley products in Australia occurs on a local, regional and interstate scale. These policy guidelines are intended to address policy at any of these scales. Trade between Australian states and territories occurs through interstate sales, and through the movement of fishers. The level of risk associated with translocations will depend on many factors including the:

- disease status at the origin of the bait products
- disease status at the area of intended use
- species of aquatic animal used as bait and its susceptibility to the pathogen(s) of concern
- level of processing and nature of the bait product
- presence of susceptible species at the site of use
- potential consequences of establishment of the disease.

These issues are described further in section 2 of these guidelines.

Each jurisdiction is responsible for managing aquatic animal health within its borders. Jurisdictions have controls in place to manage aquatic animal health risks associated with bait translocation; however, the controls are not comprehensive or consistent between jurisdictions. Many state and territory controls on live bait have been implemented to manage pest and population genetics issues, although, these controls may also mitigate disease risks.

Existing jurisdictional controls on the use of domestic bait and berley in Australia are summarised in Appendix 1.

The most commonly shared interstate legislative controls are bans on the use of abalone viscera as bait, however, it is important to note the controls were not implemented until *after* the detection of Abalone Viral Ganglioneuritis (AVG) in Victoria in 2005. By the time the controls were implemented, the virus had already had a significant impact.

These national policy guidelines are intended to provide a consistent framework for jurisdictions to undertake risk assessments and develop appropriate policy to manage any identified disease risks associated with translocation of bait and berley products. Nationally harmonised bait and berley translocation policy guidelines will minimise the potential for spread of aquatic animal diseases and improve Australia's biosecurity, protect industry productivity and maintain ecological sustainability.

### **1.3. International context**

Australia is a member of the World Trade Organisation and is bound by the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The World Organisation for Animal Health (OIE) is recognised by the WTO as the standard setting organisation for aquatic animal sanitary measures. The OIE's objectives include ensuring transparency in the



global animal disease and zoonosis situation, and publishing health standards for trade in animals and animal products. Australia is a member of the OIE and has established and maintained animal disease reporting and surveillance programs which demonstrate Australia's disease status and informs international trading conditions. It is important to ensure that within Australia, the domestic measures in place for bait and berley translocations are not inconsistent with the measures applied at Australia's border.

A coordinated national approach to managing disease risks through controls on translocation of bait and berley products will meet Australia's national biosecurity requirements, and support international trading negotiations and declarations of disease freedom.

Risk assessments provide a scientific basis for policy recommendations and decisions and legislative amendments. Risk assessments can estimate the likelihood of pathogens being present in bait or berley products, their viability throughout translocation, likelihood of release from the product, and likelihood of establishment in a new location through interaction with a susceptible species, and the estimated consequences of the aquatic animal pathogens establishing in a new area or population. Risk assessments help prioritise resource allocation.

## 2. Bait and Berley Products

Many species of aquatic animals and their products are used for bait or berley in Australia by recreational and commercial fishers as outlined in Tables 1–4. The risk assessment (Diggles 2011) identified a number of these bait and berley products with potential to contain aquatic pathogens.

**Table 1: Live bait and berley products and their uses in various fishing activities**

Live bait/berley	Line fishing (Recreational)	Longlines and droplines (Commercial)	Pots and traps
Finfish	many species	not used	not used
Crustaceans	prawns, crabs, crayfish	not used	sometimes used to attract other animals
Molluscs	oysters, other bivalves, abalone, squid	not used	not used
Annelids	oligochaetes, polychaetes	not used	not used

**Table 2: Fresh dead bait/berley products and their uses in various fishing activities**

Fresh dead bait/berley	Line fishing (Recreational)	Longlines and droplines (Commercial)	Pots and traps
Finfish	many species	many species	recreational and commercial; lobster and crab fisheries
Crustaceans	prawns, crabs, crayfish	not used	not generally used
Molluscs	oysters, other bivalves, abalone, squid, octopus, cuttlefish	not used	not generally used
Annelids	oligochaetes, polychaetes	not used	not generally used

**Table 3: Frozen bait/berley products and their uses in various fishing activities**

Frozen bait/berley	Line fishing (Recreational)	Longlines and droplines (Commercial)	Pots and traps
Finfish	many species	many species	commercial and recreational; heads, guts
Crustaceans	prawns, crabs, crayfish	not generally used	not generally used
Molluscs	other bivalves, abalone, squid, octopus, cuttlefish	squid and octopus	not generally used
Annelids	not generally used	not generally used	not generally used

**Table 4: Processed bait/berley products and their uses in various fishing activities**

<b>Processed bait/berley</b>	<b>Line fishing (Recreational)</b>	<b>Longlines and droplines (Commercial)</b>	<b>Pots and traps</b>
Finfish	potentially used in berley products	not generally used	potentially used in berley products
Crustaceans	potentially used in berley products	not generally used	potentially used in berley products
Molluscs	potentially used in berley products	not generally used	potentially used in berley products
Annelids	potentially used in berley products	not generally used	potentially used in berley products

As highlighted in Tables 1–4, bait and berley products in Australia are available in a variety of forms and preservation methods. The products come from a wide variety of sources ranging from invertebrates (e.g. annelids, molluscs, crustaceans and echinoderms), to aquatic vertebrates (e.g. goldfish and pilchards), to insects and terrestrial vertebrates. Bait and berley can be uncooked, live, chilled or frozen. The form of bait product may affect the likelihood of it containing viable pathogens and the likelihood that the pathogens will be transferred to susceptible hosts. Each jurisdiction has its own unique circumstances and risks based on the fishing activities undertaken in that jurisdiction. The types of aquatic bait and berley with the potential to transfer disease are discussed in the next sections.

A national survey of bait and berley use by recreational fishers was completed in 2002 (Kewagama Research, 2002). This work provided a comprehensive survey of over 8000 Australian homes. There were large variations in the type and method of bait and berley use between jurisdictions. The most commonly used bait and berley as reported by recreational fishers was prawns, saltwater fish and squid/cuttlefish/octopus in order of decreasing usage. The use of annelids was not reported in this survey. The source of the bait/berley in this survey was separated into: “sold as bait”, “sold as seafood” and “personally caught”. The form in which bait was used was also recorded. In general prawns/shrimp were used “whole dead” (67%) or with “head off” (21%). The most commonly used saltwater fish for bait and berley was pilchards (73%) then mullet (28%) then whitebait. Saltwater fish were most commonly purchased (dead) and on average 37% were caught by the fisher. There was little data available on cephalopod usage patterns.

## **2.1. Live bait**

In Australia, live finfish, crustaceans, molluscs, and annelids are used as bait. Live bait presents a higher exposure risk compared to other bait categories because the animals may escape or be released into the receiving waterway, remain alive, and expose aquatic animal populations to pathogens of concern over an extended period. The viability of a potential pathogen is more likely to be higher in a living host when compared with a host that has been frozen or dead for some time. However in Australia there is no significant commercial industry for the supply of live bait (Kewagama Research, 2002). It is likely that live annelid use is commonly practiced; however, data on patterns of use are lacking. For live bait fish, it is likely that animals are not translocated large distances.

There are many overseas examples where diseases of finfish have been translocated, or suspected to have been translocated, with movements of live fish (Diggles 2011). In the United

States, translocations of live baitfish are considered likely to pose significant risks for the spread of the notifiable pathogens Spring Viraemia of Carp (SVCV) and Viral Haemorrhagic Septicaemia (VHSV), as well as other less pathogenic agents such as aquareoviruses like Golden Shiner Virus (GSV) (Goodwin et al. 2004 cited in Diggles 2011).

Crustacea are a popular source of bait and are known to harbour a range of viral, bacterial and other diseases (Diggles 2011). It is believed that the use of the penaeid prawn as bait may have been responsible for the introduction of WSSV into the Gulf of Mexico and Texas (Hasson et al 2006 cited in Diggles 2011). The fungi that causes crayfish plague *Aphanomyces astaci* would cause extreme mortalities in Australian species of crayfish if it should enter our waters but shows no clinical signs in North American crayfish. European recreational fishers were implicated in spread of this disease through European waters by the movement of infected crayfish (Oidtmann 2002 cited in Diggles 2011). There are a range of protozoa that can be spread when the crustacean host is translocated live. There is often a resistant spore stage of the protozoan lifecycle that can survive harsh conditions such as freezing and drying. Those protozoa with direct lifecycles can readily transfer to new populations in new areas. It is speculated that some microsporidia have been spread through the use of yabbies as live bait in Western Australia and as a response zoning has been introduced to minimise further spread (Diggles 2011).

Molluscs, particularly cephalopods and bivalves can carry a range of viral, bacterial and parasitic diseases. There are well documented instances where disease transfer occurs when molluscs are moved as part of an aquaculture operation, but there is much less documented evidence when molluscs are translocated as bait. Movement of cultured abalone infected with abalone herpesvirus in Australia has been responsible for transfer of disease. The use of infected abalone for bait is a plausible pathway for disease spread and this risk is reflected in legislative controls over abalone use for bait in some jurisdictions in Australia. It is believed that the rickettsiales – like organism that causes withering syndrome was introduced into Thailand following the translocation of live abalone from the US (Wetchateng et al 2010 cited in Diggles 2011). Microcell organisms such as *Bonamia sp* with a direct life cycle are a risk for translocation into new geographic areas along with their molluscan hosts.

Annelids (Phylum Annelida) are very popular baits for marine fishing (e.g. polychaetes) and for freshwater fishing (oligochaetes). Anecdotally it can be assumed that annelids are used live when caught by fishers or purchased live however there is little data in this area. Annelids can be infected by a range of protozoan and metazoan parasites and can also act as a mechanical vector for bacteria, viruses and fungi (Diggles 2011). A study conducted in India found that up to 75% of polychaetes worms were mechanical vectors for WSSV (Vijayan et al. 2005 cited in Diggles 2011). The use of these worms for conditioning broodstock was probably responsible for the spread of the virus in the aquaculture industry in India. Protozoan parasites from the genus *Marteillia* found in sediment dwelling annelids suggests the worms act as either mechanical vectors or intermediate hosts (Cribb 2010 cited in Diggles 2011).

## **2.2. Fresh dead bait**

Finfish and invertebrates are widely used as bait throughout Australia, where they are used on hooks as live, fresh dead or cut baits to attract a wide variety of predatory and scavenging species of fish. Only small quantities of fresh, unfrozen fish are generally available from

commercial fishing co-operatives for local use as bait. However, this category also includes the regional movement of bait at a local scale by fishers collecting their own bait (for example, collecting bivalves, such as cockles and pipis, in one location for use as bait in another location). The risk of pathogen survival (and in some cases multiplication) would appear to be higher in freshly dead whole bait than frozen bait (Goodwin et al cited in Diggles 2011). Fresh dead fish and invertebrates may have extremely high titres of disease agents in their tissues (Diggles 2011) and pose a moderate to high likelihood of disease transmission. For example, mullet, whiting and bream are commonly used as live or fresh dead bait, which poses a high risk of spreading EUS. Because most fresh dead bait is collected by fishers for their own use, data on use patterns and volumes is limited and quantifying risks may involve higher uncertainties.

### **2.3. Frozen bait**

The vast majority of bait and berley that is translocated throughout the country is frozen whole or processed invertebrates and marine fish (Kewagama Research, 2002). Commonly used commercially available frozen whole bait includes prawns, pilchards, mullet, squid and bivalve molluscs. Individuals may use a range of baits or berley frozen for personal use, from a wide variety of sources, usually local. The disease risks associated with frozen commodities depend on the ability of a pathogen to withstand low temperatures; however Goodwin et al. (cited in Diggles 2011) identified a range of viral pathogens and parasites of finfish that routinely survived freezing.

### **2.4. Processed bait**

Parts of fish and invertebrates may be used as bait or berley. Mullet gut, pilchard fillets and prawn tails are commonly used for bait and all parts of fish can be used for berley. Processed baits are usually sold frozen but are sometimes preserved by other methods; for example, salting.

For frozen processed baits disease risks will be similar to those identified for frozen whole animals. However, the risk profile may differ if processed baits do not contain the tissues or organs in which pathogens normally occur. The main risks associated with translocating frozen parts of bait are translocating viruses, many of which can survive freezing. Many fish viruses are concentrated in either nervous or haematopoietic tissues (e.g. kidney, spleen) and may pose a higher risk due to higher potential levels of virus in these tissues. Furthermore, grinding or chopping of these tissues for use as berley may increase liberation of virus particles into the water. As described previously, some bacteria and parasites can survive freezing and pose a risk when used as bait or berley.

### 3. Disease Risks

Disease risk assessment is the evaluation of the likelihood and the biological and economic consequences of entry, establishment, or spread of a pathogenic agent within an area (water body, region, or state or territory). This process can be used to identify risks associated with particular bait commodities and uses, and provides a sound approach to the development of bait translocation policy.

There are a variety of approaches that can be used for disease risk assessment. This section presents an approach that is consistent with the recommendations of the OIE Aquatic Animal Health Code 2014. This approach has been applied successfully to the assessment of risks associated with the translocation of bait and berley products in Australia (Diggles 2011).

Disease risk assessments are based on the following procedures:

- 1) Hazard identification
- 2) Risk assessment (incorporating: release assessment, exposure assessment, consequence assessment and risk estimation)
- 3) Risk management
- 4) Risk communication.

The procedures for hazard identification and risk assessment are described in this section. Risk management and risk communication are considered in sections 4 and 5.

#### 3.1. Hazard identification

The first step is a hazard analysis to identify diseases of concern. To determine hazardous aquatic animal diseases, a number of questions could be considered for each disease:

- Could the bait or berley product potentially introduce the pathogen?
- Is the pathogen 'under official control' by its listing in state or national lists of reportable diseases?
- Is the pathogen restricted in its distribution and/or could it cause a detrimental impact to industry or the environment if it were spread?

To determine whether an aquatic animal pathogen should be classified as a 'disease of concern' and require a detailed risk assessment, a further series of questions could be considered:

- Would a disease be expected to cause a distinct pathological effect in an infected population?
- Would it be expected to cause economic harm (e.g. increased mortality, reduced growth rates, decreased product quality, loss of market access, increased costs)?
- Would it be expected to cause damage to the environment and/or endemic species? (Defined as either native species that occur naturally in Australian waters or species that were introduced to Australia and are now considered to be acclimatised but not classed as feral).

The Diggles (2011) risk analysis used this method and identified 44 diseases of concern. These diseases of concern may provide a convenient starting point for a hazard analysis relevant to the circumstances of a state or territory.

## 3.2. Risk assessment

Risk assessment involves a staged approach that includes:

- *Release assessment*: to determine the likelihood that a viable disease would be translocated via bait or berley into a previously disease - free waterway.
- *Exposure assessment*: to determine the likelihood that wild aquatic animals are exposed to the aquatic animal pathogen via infected bait or berley, and the likelihood of the establishment of the pathogen.
- *Consequence assessment*: to determine the likely magnitude of the consequences of establishment and/or spread of a pathogen into a new area, and the possible effects of the pathogen on aquatic animals, the environment, industry and the economy.
- *Risk estimation*: to determine whether the extent of the unrestricted risks (estimated risk if bait and berley are translocated with no risk management) presented by each pathogen to aquatic animals, environment, industries and community of Australia is sufficient to require risk management.

### 3.2.1. Release assessment

The translocation of infected bait or berley potentially presents a direct transmission pathway for introduction and establishment of a new pathogen (or strain of pathogen) into previously disease free waterways. Release assessment determines the likelihood of viable and infective pathogens being released into an uninfected jurisdiction via bait and berley products. The key factor is that the bait or berley must be infected with viable pathogen(s).

Live or fresh dead fish and invertebrates may have extremely high titres of pathogens in their tissues. However, prevalence and intensity of infection in bait and berley may vary and would also be subject to processing and environmental conditions which may or may not promote the proliferation of potential pathogens. These may include freezing, thawing, preservation and long-term storage.

### 3.2.2. Exposure assessment

The exposure assessment examines the likelihood that wild aquatic animals in an uninfected population being exposed to an infectious hazard (pathogen) via infected and released bait or berley products, and the likelihood of the establishment of the hazard. Likelihood of exposure will depend on several factors: the capacity of the pathogen to survive in the environment in an infective form, the availability of susceptible hosts, the ease of infection of susceptible hosts and the likelihood of subsequent transmission of infection to other hosts within a population. To determine the likelihood of exposure of susceptible hosts, the following key factors are considered relevant:

- *Route of infection*: The bait containing viable pathogens must be *ingested* by a susceptible host or otherwise *come into contact* with susceptible fish or invertebrate species.
- *Infective Dose*: There must be *sufficient quantities* of viable pathogen to induce an infection following ingestion or contact with the infected bait/berley.

### 3.2.3. Consequence assessment

The consequence assessment estimates the likely magnitude of the consequences of establishment and/or spread of a hazard (disease) into a new catchment area, and the possible effects of the pathogen on aquatic animals, the environment, industry and the economy. For each disease, two main outbreak scenarios could be considered:

- The pathogen *becomes established and spreads* throughout populations of susceptible host species in a new region of Australia – assuming that an agent would eventually spread to its natural geographical limits.
- An index case occurs and infection may spread to co-habiting animals, but the agent does not persist in the environment.

### 3.2.4. Risk estimation

Risk is estimated by using a risk estimation matrix which combines the likelihood of establishment and spread and the consequences of establishment and spread (Table 5). Risk estimation can be used to determine whether the risk presented by a hazard is sufficient to require risk management. This is also known as the appropriate level of protection (ALOP). The ALOP is user determined and will differ between jurisdictions for each disease.

**Table 5: Risk estimation matrix. The appropriate level of protection is dependent on the user. If the appropriate level of protection is when risk is reduced to a very low level but not to zero, any diseases which fall above “very low risk” will require additional risk management (red font).**

<b>Likelihood of establishment and spread</b>	<b>High</b>	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
	<b>Moderate</b>	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
	<b>Low</b>	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk	High risk
	<b>Very low</b>	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk
	<b>Extremely low</b>	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk
	<b>Negligible</b>	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk
		<b>Negligible</b>	<b>Very low</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Extreme</b>
<b>Consequences of establishment and spread</b>							

### 3.2.5. Outcomes of combined risk assessments

The Diggles (2011) risk assessment identified a need to mitigate the risk associated with 21 out of the 44 diseases assessed. Appendix 2 summarises the generic risk associated with these diseases being translocated through common types of bait and berley commodities used in Australia. However, it is important to note that these are generic risks that may not apply to the circumstances of particular jurisdictions. For example, diseases may be present, susceptible host species might not occur, likelihood of transmission may differ due to patterns of bait use or environmental conditions, and consequences may vary due to the value placed on susceptible populations. The table should be used as a guide only and jurisdictions should conduct risk assessments based on their own circumstances.



### 3.3. Environmental and ecological issues

The spread or introduction of pathogens via the translocation of bait and berley species also presents issues for the conservation and maintenance of biodiversity including:

- *Establishment of disease in a previously disease free area:* this could endanger wild susceptible host species. Naïve species may also be at risk of infection.
- *Sustained effects on ecosystem structure:* the infection of new species with a disease can disrupt the competitiveness of the species or remove dominant elements of the ecosystem (e.g. some oysters). This can have sustained temporal effects on the structure of the ecosystem.
- *Impacts on existing diseases:* novel disease transfer may perpetuate or aggravate existing diseases by increasing or decreasing their incidence, virulence, potency and frequency; recombination in bacteria may also change virulence.

## 4. Policy Framework

In accordance with the Australian Constitution, states and territories have responsibility for managing aquatic animal health within their borders. Each state and territory determines the specific policies and policy instruments (including guidelines, and legislation) required to manage risks.

Coordinated policy development through the use of these policy guidelines will provide a consistent, science-based approach to bait and berley translocation policies in Australia. It is expected that improved bait and berley risk management will contribute to and complement broader aquatic animal health management measures implemented within and among the states and territories.

These policy guidelines consider gaps in current state and territory legislation (as of June 2014) for managing disease risks through bait and berley translocation, and recommend approaches to strengthening risk management.

### 4.1. Policy principles

The following generic policy principles should be applied to the development of policies to manage the disease risks associated with bait and berley translocation. The degree to which each of these principles is applied will depend on the circumstances of the jurisdiction, the breadth of the proposed policy, the expected costs and the impacts on stakeholders.

- 1) Any bait translocation policy should be based on scientific demonstration of aquatic animal disease risks determined through an accepted risk assessment methodology.
- 2) A bait translocation policy may only be warranted if unacceptable disease risks are identified by the risk assessment. Mitigating these risks should be the purpose of any proposed policy.
- 3) Any policy should propose only the least restrictive measures to adequately mitigate identified disease risks. Policy instruments should be chosen following consideration of the circumstances of the disease risks, pathways, impact on stakeholders, feasibility and cost.
- 4) The impact of any proposed policy on stakeholders and disruption to existing trade should be assessed. If regulation is to be imposed, a regulation impact statement may be necessary in accordance with the jurisdiction's requirements.
- 5) The benefits of any measures to manage disease risks should outweigh the costs.
- 6) Unintended consequences for the policy should be considered; for example, changes in trade to alternative high disease risk pathways.
- 7) Meaningful consultation should be undertaken with affected businesses, community organisations and individuals.
- 8) Measures to manage translocation of bait and berley should be consistent with Australia's international obligations.
- 9) An effective stakeholder communication strategy should be developed to facilitate policy implementation.

- 10) The bait translocation policy should be periodically reviewed to ensure it continues to satisfy these policy principles.

## **4.2. Recommendations from the National Risk Analysis**

The following recommendations and identified gaps have been provided as a guide only. Jurisdictions should consider the applicability of these recommendations to the outcomes of their individual risk assessments and the circumstances of their jurisdiction.

### **4.2.1. Controls on the use of particular high risk commodities**

The risk assessment (Diggles 2011) classified two diseases as high risk: Epizootic Haematopoietic Necrosis Virus (EHNv) of finfish and abalone viral ganglioneuritis (AVG) of abalone.

#### **Recommendations:**

- Control the movement of aquatic species susceptible to AVG of abalone and EHNv of finfish.
- Consistent jurisdiction controls on use of abalone meat and viscera for bait are recommended to mitigate the risk of translocating AVG in jurisdictions with wild abalone populations. Jurisdiction's licensing conditions to sell bait could incorporate further risk mitigation controls for high risk commodities such as abalone viscera.
- NSW, WA and Tasmania already have specific restrictions on the use of abalone (Appendix 1). Other Australian jurisdictions may have broad restrictions that could include abalone or other high risk commodities, although these are not specifically mentioned. In this case, wording to specify abalone viscera as prohibited for use as bait is needed to avoid ambiguity and maintain consistency across jurisdictions.
- EHNv of finfish poses a greater challenge as there are only two jurisdictions with legislation restricting the use of "noxious species" such as redfin perch that are implicated in movement of the disease. Such legislation prohibiting the use of redfin perch as bait would substantially lower the risk of this disease being spread via bait or berley. The causative virus for this disease is resistant to freezing which removes one possible mechanism to reduce the risk of transfer. Many jurisdictions have requirements prohibiting feeding of fresh fish for bait/berley.

### **4.2.2. Controls on use of aquaculture commodities as bait**

To reduce the risk of disease transfer from aquaculture facilities, control and/or testing of aquaculture products for bait is recommended.

#### **Recommendations:**

- If risks are identified through the sale of aquaculture commodities for a bait end use, each state and territory would be advised to investigate options to mitigate the risks (legislation, licensing restrictions etc). QLD and SA are the only jurisdictions to specifically ban the use of aquaculture product as bait. No jurisdiction refers to testing of aquaculture product in the materials provided. It is likely that the most pragmatic approach is to regulate the supply of bait from aquaculture facilities. In Queensland this is part of the conditions of an aquaculture or fish processor's

licence, although sale of a few species assessed to be of low risk is permitted. The [Queensland policy](#) also has the risk assessment process laid out clearly which could be used for guidance in developing policy in other jurisdictions.

#### **4.2.3. Control on translocation of live bait**

The risk assessment (Diggles 2011) recommends control over the translocation of live bait to reduce the risk of the spread of pathogens of concern. This recommendation may be partially covered in national and jurisdiction translocation policy.

##### **Recommendations:**

- Given the high risks associated with the translocation of live bait, regulations on the movement of live species intended for bait should be developed and adapted to be relevant to specific state and territory situations. In many cases, movement of live fish, particularly noxious fish, is prohibited wholly or partially by state legislation or regulations. For example in the Northern Territory fishing regulations prohibit the movement of live fish or their use for bait from within a water catchment area to a different water catchment area. Realistically, enforcement of translocation regulations or policies for live bait purposes may not be feasible. The existing gaps in state and territory mitigation measures in place for translocation of live aquatic organisms may be best addressed through education and awareness campaigns (see Appendix 2: Diggles 2011). Movement of live bait between jurisdictions and between geographic regions would be the highest risk profiles.

#### **4.2.4. Compulsory freezing or freeze drying of non-live bait commodities**

The risk assessment recommends compulsory freezing or freeze drying of bait to reduce the risk of transfer of those pathogens rendered inactive by such treatment. It should be noted that the vast majority of bait and berley product is already sold frozen for practical reasons. To apply legislative controls over this recommendation could potentially be difficult to implement and regulate.

##### **Recommendations:**

- Education and engagement will play a significant role in addressing identified gaps. The practicality of storing and transporting bait products lends itself to freezing for commercial reasons, with disease control an associated benefit.

#### **4.2.5. Increased surveillance of bait commodities**

The risk assessment (Diggles 2011) recommends increased surveillance of bait commodities, particularly those where data gaps were identified (e.g. pipis, cockles, bait crabs, marine yabbies, cephalopod molluscs, annelids, echinoderms, and ascidians). It was recommended that disease surveillance should also be undertaken in the early stages of development of fisheries for new species likely to be used as bait, and/or whenever significant quantities of bait are being translocated to a new geographical region.

##### **Recommendations:**

- Where states and territories are approached for approvals (through licensing arrangements) to allow trade in new or emerging bait commodities, a risk

assessment is recommended. This may include surveillance of wild populations and the process would examine existing and future risks associated with movements of a new bait commodities. This component does not require a legislative approach and could be best addressed through research applications dealing with new products. At the time of writing (June 2014) it is unlikely that states are in a position to put resources towards direct surveillance, but may be able to conduct a qualitative risk analysis based on known facts about the fisheries and industries in the state, and the likely use of the bait commodity in question.

#### ***4.2.6. Educating fishers to the risks of translocating bait and berley***

An education and engagement program to address disease translocation risks where other risk mitigation measures aren't feasible.

##### **Recommendations:**

- Each jurisdiction will have its own suite of risks to address and would be best placed to provide advice on education and awareness campaigns targeting specific groups about high risk bait and berley products. If a national body could be engaged (for example, Recfish Australia), this would be of benefit to oversee a coordinated rollout in line with national policy guidelines. Additionally, some generic awareness materials could be provided from a central government source to supplement state and territory work in this area. Examples of education and extension could include: posters erected in tackle shops, pet shops, fishing co-ops, or boat ramps, educational pamphlets distributed with fishing or boating licenses or at tackle shows, and even signage at retail points of sale for seafood encouraging consumers not to use at risk types of seafood as bait or berley. A good example is provided in Appendix 2 of Diggles 2011.

## 5. Policy Implementation

### 5.1. Possible Instruments

The possible instruments to manage identified risks may be applied after careful consideration of the particular species involved, diseases likely to be translocated, current industry activities unique to each jurisdiction and resources available. Priority should be given to addressing any large gaps clearly identifiable within jurisdictions for high risk products as identified in the risk analysis. These instruments should take into account the 'best practice' approach that is least disruptive to industry. The options for implementation include:

#### 5.1.1. State and territory legislation

- Descriptions of current regulations are listed at Appendix 1.
- Regulations should be 'best practice' to ensuring that policy principles are upheld around Australia.
- Consistent, specific controls of bait and berley could be used for high risk aquatic diseases (e.g. abalone viscera for AVG and live freshwater fish for EHNV).

#### 5.1.2. License conditions

- Bait industry regulation or contact points could be obtained through licensing. Bait providers could be provided with information about selling lower risk bait. Or this could be part of bait licence conditions.
- Aquaculture farms selling aquatic animals/ products as bait or berley could be stipulated in permits for aquaculture (as done by Queensland)
- Recreational fishing licences could have information in the conditions of using bait and berley especially relating to live bait, whole fish and molluscs.

#### 5.1.3. Voluntary guidelines

- Codes of practice/best practice for fishing industry members.
- Recreational fishing codes (through membership of national fishing bodies etc).
- Re-enforce at all fishing competitions.

#### 5.1.4. Education

- Public awareness, education in schools, information on bait packaging, live bait tanks, cast nets, fishing tackle stores (particularly if not licensed) etc.
- Program to be headed or led by a national body (e.g. Recfish Australia)/agency or the Australian government (Department of Agriculture) and developed and implemented in states and territories with information specific to risks of each jurisdiction. This could involve a poster campaign to be displayed in tackle and bait shops and on jetties and wharves.

#### 5.1.5. Compliance

- Fishing inspectors.
- Regulators of fishing bait and tackle retailer activities.

- Imposed fines/penalties for breaches.

#### **5.1.6. Research activities**

- Support universities and research institutions to assess disease risks of existing and novel bait and berley products.
- Some of the proposed control options are not easily manageable. Further research to identify ways to manage these options could be considered.

## 6. Staged risk assessment and implementation example

*(Use information provided in the Diggles risk assessment (2011) for guidance).*

1. **Provide a rationale** for why a policy has been developed to manage the translocation of domestic bait and berley. This can be a short paragraph or two. For example, pathogens can be moved with live bait in particular, but also unprocessed material. The introduction of new pathogens into a naïve population puts the whole fishery and ecology of an area at risk with potentially significant social and economic effects. Measures to minimise the risk of moving pathogens with bait and berley are necessary.
2. **What existing information is available?** This includes risk assessments for bait, aquaculture policy, response plans for specific diseases and the Diggles (2011) report. Jurisdictions will need to be consistent with existing policies and legislation relevant to their own circumstances. A list of references is provided at the end of these guidelines.
3. **Consider bait use and proposed bait use patterns.** Information will need to be gathered about bait products and patterns of use for each jurisdiction to facilitate a risk assessment and implementation. This information may be available from published sources, state authorities or local fishing organisations.
4. **Qualitative Risk assessment.** Direction on how to undertake a qualitative risk assessment is provided in Section 3 in this document.
5. **Consider if current controls are adequate to manage risk.** Current controls that impact upon domestic bait translocation may be found in a range of legislation and may not appear directly related to the movement of bait per se but can nonetheless be used to manage risk. For example legislation directed at environmental control may also be used in the management of bait movement. In Victoria the use of live carp for bait is prohibited for reasons of noxious species control under fisheries legislation. This provision can clearly be also used for bait translocation control. A sound knowledge of the full suite of current controls existing in each jurisdiction will assist greatly with this process.
6. **Evaluate possible control measures.** The possible instruments to be used are outlined in section 5. When considering these instruments in an individual jurisdiction the following should be contemplated: would the measures be effective; are the measures feasible to implement and are they practical.
7. **Aim for the lowest possible impact on industry (bait and fishing).** Any proposed control should be created with consideration of impacts on trade, socio-economic impacts, and any potential economic impacts. However the controls need to be practical and of value to manage any potential identified risks.
8. **Summary statement.** A summary statement of the policy and conditions to be met, practices that are not permitted and conditions of sale should be created. This should be clear and succinct.
9. **Education program.** An education program that outlines the risks involved with transfer of disease (and pests) via the translocation of bait should be developed. This is aimed at encouraging the community not to use high risk seafood commodities as bait or berley. This will help ensure the bait industry and fishers are aware of any changes and the benefits of safeguarding aquatic resources for all to use sustainably.



## 7. Appendix 1: Jurisdictional policy on the use of domestic bait and berley

**Table 6: Jurisdictional policy on the use of domestic bait and berley (December 2014)**

State	Regulations	Summary
NSW	<ul style="list-style-type: none"> <li>The Director-General of the Department of Industry and Investment pursuant to sections 8, 227 and 228 of the <i>NSW Fisheries Management Act 1994</i> by notification prohibits the taking of all species of fish using abalone viscera as bait or berley, by all persons and in all waters.</li> <li>Pursuant to Section 216 of the <i>Fisheries Management Act 1994</i> a person must not release into any waters any live fish except under the authority of a permit issued by the Minister or an aquaculture permit.</li> <li>Pursuant to Section 209D of the <i>Fisheries Management Act 1994</i> a person must not release into any waters any live fish except under the authority of a permit issued by the Minister or an aquaculture permit.</li> <li>Pursuant to Section 90 subsection 2b of the <i>Fisheries Management Regulation 2010</i> a person must not take any fish from inland waters with a lure or bait that is any fish or any part of a fish not native to the waters of New South Wales (other than dead carp).</li> <li>Pursuant to Section 90 subsection 3 of the <i>Fisheries Management Regulation 2010</i> a person must not take Atlantic salmon or trout with any lure or bait other than natural flies or insects, or their larvae, or worms, shrimps, yabbies or mussels, or artificial lures or baits, or plant matter.</li> </ul>	<ul style="list-style-type: none"> <li>Ban on use of abalone viscera as bait.</li> <li>Restriction on using live fish as bait in inland waters.</li> <li>Restriction on using non-native fish (or parts of fish) as bait (except for dead carp).</li> <li>Restrictions on the type of bait used for taking Atlantic salmon or trout (no fish allowed in this).</li> <li>Restrictions on releasing live fish into waterways.</li> </ul>
QLD	<ul style="list-style-type: none"> <li>Pursuant to the Queensland DPI Aquaculture Policy FAMOP001 Part 5.3.1 all aquaculture product (dead or alive), unless otherwise exempt, must not knowingly and intentionally be used as bait.</li> </ul>	<ul style="list-style-type: none"> <li>No specific regulations in Queensland that deal with bait and berley translocation/inputs.</li> <li>Condition on the Queensland aquaculture development approvals (i.e. aquaculture licences) which bans farms from selling live or dead aquaculture product for bait.</li> </ul>
WA	<ul style="list-style-type: none"> <li>Pursuant to Regulation 38F of the <i>Fish Resources Management Regulations 1995</i> a person must not fish for any fish using as bait any abalone material.</li> <li>Pursuant to Regulation 31A of the <i>Fish Resources Management Regulations 1995</i> a person must not fish for rock lobster using as bait any lobster material.</li> <li>Pursuant to Section 92A subsection 2 (unless exempt under subsection 4) the CEO may require a MEMP to be prepared with reference to the matters that the CEO considers relevant, including translocation.</li> </ul>	<ul style="list-style-type: none"> <li>Abalone material not allowed to be used as bait.</li> <li>Lobster material cannot be used as bait for rock lobster.</li> <li>No other restrictions aside from movement of live fish which is covered as a translocation but is not specifically related to bait.</li> </ul>

State	Regulations	Summary
SA	<ul style="list-style-type: none"> <li>• Fishery Management (General) Regulations 2007 under the <i>Fisheries Management Act 2007</i>. Pursuant to Regulation 23 subsection 1 a person must not use blood, bone, meat, offal or skin of an animal as berley (otherwise than in a rock lobster pot or other fish trap) within 2 nautical miles of the mainland of the State or any island or reef that forms part of the State and is exposed at the low water mark.</li> <li>• Pursuant to Section 78 subsection 2 of the <i>Fisheries Management Act 2007</i> a person must not, except as authorised by a permit issued by the Minister release or permit to escape into any waters exotic fish, aquaculture fish or fish that have been kept apart from their natural habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Animals (including aquatic animals) cannot be used as berley within 2 nm of land, although use in rock lobster pots and fish traps is exempt.</li> <li>• Exotic or noxious (e.g. carp, redbfin perch) species and aquaculture species cannot be deposited into any waters.</li> <li>• The Minister has the ability to control the use of aquatic resources that may be affected by disease.</li> </ul>
NT	<ul style="list-style-type: none"> <li>• Pursuant to Section 15 subsection 1a of the <i>Fisheries Act 1988</i> a person shall not bring into, or release in, the Territory any live aquatic life, live fish, or any live eggs, fry, spat, or larva of fish; unless the person does so under and in accordance with a permit.</li> <li>• Pursuant to Clause 10(1)(b) of the <i>Fisheries Act 1988</i> a person shall not farm, breed, culture, or keep live fish or aquatic life for sale or the purposes of aquaculture (whether they are sold or used live or dead) or for the purpose of exhibiting any of them for profit; unless the person does so under and in accordance with a licence.</li> <li>• Pursuant to Clause 24 of the <i>Fisheries Regulations 1993</i> a person shall not import or have possession of a noxious fish</li> </ul>	<ul style="list-style-type: none"> <li>• Live bait use restricted to body of water from which the animal was caught. Translocation restrictions apply for movement of live aquatic animals.</li> <li>• Capture of bait in commercial quantities is regulated by legislation.</li> <li>• Ornamental fish only to be used for aquarium purposes (although licensee has no control over this).</li> <li>• No restrictions except for noxious species on importation of dead fish from outside NT for use as bait and berley.</li> </ul>
Vic	<ul style="list-style-type: none"> <li>• Pursuant to section 102 subsection 1 of the <i>Fisheries Regulations 2009</i> a person must not use live fish as bait in Seven Creeks or in any tributary to that system upstream from the Galls Gap Road Bridge which crosses Seven Creeks downstream from its junction with Watchbox Creek.</li> <li>• Pursuant to section 102 subsection 2 of the <i>Fisheries Regulations 2009</i> a person must not use live carp as bait.</li> <li>• Pursuant to section 102 subsection 3 of the <i>Fisheries Regulations 2009</i> a person must not use trout or salmon ova, or any form of uncooked trout or salmon, as bait or berley to take or attempt to take fish of any species.</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted use of live bait in the “Seven Creeks” system.</li> <li>• No use of live carp as bait.</li> <li>• No use of uncooked salmon/trout or ova of salmon/trout as bait or berley.</li> </ul>
Tas	<ul style="list-style-type: none"> <li>• Pursuant to section 18 subsection 2 of the <i>Fisheries (Abalone) Rules 1997</i> a person must not have possession of, or use, abalone or part of abalone as bait unless authorised under a licence.</li> </ul>	<ul style="list-style-type: none"> <li>• Abalone cannot be used as bait.</li> <li>• There are declared finfish products that may not be brought into Tasmania and may not enter the aquatic environment (as a general disease control measure).</li> </ul>

## 8. Appendix 2: Summary of disease risks posed by common bait and berley commodities

(\* adapted from Diggles 2011)

**Table 7: Disease risks posed by common live bait and berley commodities**

Live	Potential disease risks	Susceptible species or groups
<b>Finfish</b>	EHN, EUS, VER, GUD, microsporidians, myxosporeans, digeneans, cestodes, nematodes, copepods	Fish
<b>Prawns</b>	GAV, SMV, WTD*; microsporidians;	Freshwater and marine prawns and crayfish.
	<i>Hematodinium</i> spp., <i>Sacculina</i> spp.	Crabs ( <i>Hematodinium</i> , <i>Sacculina</i> )
<b>Crayfish &amp; lobsters</b>	Viruses of freshwater crayfish, SMV, microsporidians	Crayfish, prawns
<b>Crabs</b>	Microsporidians, <i>Hematodinium</i> spp., <i>Sacculina</i> spp.	Crabs
<b>Molluscs</b>	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters ( <i>Perkinsus olseni</i> )
	Haplosporidians,	Haplosporidians affect edible oysters in particular (e.g. <i>Bonamia</i> spp)
	Digeneans	Fish (Digenea use molluscs as intermediate hosts for parasites of fish)
<b>Oysters</b>	<i>Perkinsus olseni</i> , <i>Bonamia</i> spp.	Abalone clams, pearl oysters ( <i>Perkinsus olseni</i> )
	<i>Marteilia sydneyi</i> , haplosporidians	Haplosporidians affect edible oysters in particular (e.g. <i>Bonamia</i> spp)
	Digeneans	Fish (Digenea use molluscs as intermediate hosts for parasites of fish)
<b>Abalone</b>	AVG	Abalone, particularly greenlip and blacklip
	<i>Perkinsus olseni</i>	Abalone clams, pearl oysters ( <i>Perkinsus olseni</i> )
	Haplosporidians,	Haplosporidians affect edible oysters in particular (e.g. <i>Bonamia</i> spp)
	Digeneans	Fish (Digenea use molluscs as intermediate hosts for parasites of fish)
<b>Annelids</b>	<i>Marteilia sydneyi</i> , myxosporeans	Edible oysters (some annelids - not those commonly used for bait) are intermediate hosts for this parasite of oysters

\* Freshwater prawns (*Macrobrachium* spp.) only

**Table 8: Disease risks posed by common fresh dead whole bait and berley commodities**

<b>Fresh Dead - Whole</b>	<b>Potential disease risks</b>	<b>Susceptible species or groups</b>
<b>Finfish</b>	EHN, EUS, VER, GUD, microsporidians, myxosporeans	Fish
<b>Prawns</b>	GAV, SMV, WTD*, microsporidians	Prawns, crayfish
<b>Crayfish &amp; lobsters</b>	Viruses of freshwater crayfish, microsporidians	Prawns, crayfish
<b>Crabs</b>	Microsporidians, <i>Hematodinium</i> spp.	Crabs
<b>Oysters</b>	<i>Perkinsus olseni</i> , <i>Bonamia</i> spp., <i>Marteilia sydneyi</i>	Abalone, clams, pearl oysters, edible oysters
<b>Abalone</b>	AVG	Abalone
	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters
<b>Annelids</b>	<i>Marteilia sydneyi</i> , myxosporeans	As intermediate hosts for edible oyster parasites

**Table 9: Disease risks posed by common frozen whole bait and berley commodities**

<b>Frozen - Whole</b>	<b>Potential disease risks</b>	<b>Susceptible species or groups</b>
<b>Finfish</b>	EHN, VER	Fish
<b>Prawns</b>	Viruses	Prawns
<b>Crayfish &amp; lobsters</b>	Viruses	Crayfish/lobsters
<b>Molluscs</b>	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters
<b>Oysters</b>	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters
<b>Abalone</b>	AVG	Abalone
	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters

**Table 10: Disease risks posed by common frozen portion bait and berley commodities**

<b>Frozen - Portions</b>	<b>Potential disease risks</b>	<b>Susceptible species or groups</b>
<b>Finfish Fillets</b>	EHN	Fish
<b>Finfish Heads</b>	EHN, VER	Fish
<b>Finfish offal &amp; guts</b>	EHN	Fish
<b>Prawns</b>	Viruses	Prawns
<b>Crayfish &amp; lobsters</b>	Viruses	Crayfish/lobsters
<b>Molluscs</b>	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters
<b>Abalone</b>	AVG	Abalone
	<i>Perkinsus olseni</i>	Abalone, clams, pearl oysters

## 9. References

Barlow, C.G., Hogan, A.E., and Rodgers, L.J. 1987 'Implication of translocated fishes in the apparent extinction in the wild of the Lake Eacham Rainbowfish, *Melanotaenia eachamensis*'. *Australian Journal of Marine and Freshwater Research*, vol. 38, no. 6, pp. 897–902.

Department of Agriculture 2010, 'Prawns and Prawn Products', Australian Government Department of Agriculture, [agriculture.gov.au/biosecurity/risk-analysis/ira/final-animal/prawns](http://agriculture.gov.au/biosecurity/risk-analysis/ira/final-animal/prawns).

Diggles, B.K. 2011 *Risk Analysis. Aquatic animal diseases associated with domestic bait translocation*. Final report prepared for the Australian Government Department of Agriculture, Canberra, FRDC Project No. 2009/072, pp. 296.

Kewagama Research (2002). *National Survey of Bait and Berley Use by Recreational Fishers*. Report to Biosecurity. AFFA December 2002. Kewagama Research Pty Ltd., Noosa Valley, Qld

Oidtmann B, Heitz E, Rogers D, Hoffmann RW. 2002. Transmission of crayfish plague. *Diseases of Aquatic Organisms*, vol. 52, no. 2, pp. 159–67.

Queensland Government Department of Primary Industries and Fisheries 2004, 'Management arrangements for Aquaculture Developments', Queensland Government Department of Agriculture and Fisheries, [daff.qld.gov.au/fisheries/aquaculture/management-and-policies/famop001-high-risk-activities](http://daff.qld.gov.au/fisheries/aquaculture/management-and-policies/famop001-high-risk-activities)

Skirtun, M, Sahlqvist, P, Curtotti, R, & Hobsbawn, P 2012, *Australian fisheries statistics 2011*, ABARES, Canberra.

## 10. Acronyms and definitions

- **ALOP** – appropriate level of protection, the level of protection deemed appropriate by Australia to establish a sanitary and phytosanitary measure to protect human, animal or plant life or health within Australia.
- **AVG** – abalone viral ganglioneuritis, a disease of abalone caused by abalone herpes virus. It kills abalone by destroying nervous tissue.
- ***Bonamia* spp.** – a protozoan parasite of bivalve molluscs, classified within the Haplosporidia phylum at the time of writing (June 2014). It can cause sudden and mass mortalities.
- **Cestodes** – flatworm parasites commonly known as tapeworms. Adults live in the intestine of finfish and larvae may be present in flesh or encysted in other organs. Intermediate stages occur in invertebrates.
- **Copepods** – crustacean ectoparasites of finfish, including parasites commonly known as sea lice
- **Digeneans** – flatworm parasites commonly known as flukes. Adults may colonise the gastrointestinal tract, liver, swim bladder, blood vessels and other organs of finfish. Intermediate stages occur in invertebrates.
- **EHN** – epizootic haematopoietic necrosis, a disease of fish caused by EHN virus, a member of the *Ranavirus* genus.
- **EUS** – epizootic ulcerative syndrome, a disease of finfish caused by the fungus *Aphanomyces invadans*. The disease causes ulcers and is known to have spread throughout the world with ornamental finfish.
- **GUD** – goldfish ulcer disease, a disease of finfish caused by atypical strains of the bacterium *Aeromonas salmonicida*.
- **Haplosporidians** – Microcells that mainly affect molluscs by infecting cells and may also be present in the body cavity.
- **Health status** – the status of an area in regard to pathogens present or not present. This includes strains of the same pathogen (as these may cause disease or be benign).
- ***Hematodinium* spp.** – parasitic dinoflagellates that affect crustaceans.
- ***ISKNV-like* viruses** – infections spleen and kidney necrosis viruses. A family of viruses that can cause high mortalities in finfish. There are marine and freshwater species and they have wide variety of host species. They have been spread with juvenile fish used for aquaculture, broodstock and aquarium fish.
- ***Marteilia sydneyi*** – a parasite of marine edible oysters. It can cause high mortality and losses as infected oysters are not marketable due to small size.
- ***Microsporidians*** – intracellular protozoan parasites which can infect finfish and crustaceans. The parasites have a wide host range and can cause watery flesh and discolouration.
- **Myxosporeans** – microparasites of finfish that infecting various organs and can cause flesh to be watery.

- **Nematodes** – endoparasitic worms that mainly affect finfish. They colonise the gastrointestinal tract or encyst in flesh. *Anisakis* spp are a human health concern.
- ***Perkinsus olseni*** – parasitic protozoan of molluscs that causes ulceration and can cause death, particularly in abalone, clams and some oysters.
- ***Sacculina* spp.** – parasitic barnacles of crustaceans, particularly of crabs, infection results in sterility and no growth.
- **SMV** – spawner-isolated mortality virus, a virus of prawns, caused by a parvo-like virus.
- **VER** – viral encephalopathy and retinopathy, a virus of finfish, caused by a virus in the Nodaviridae family. The virus causes brain and retina damage and mortality of juvenile fish.
- **WTD** – white tail disease or white muscle disease, a viral infection caused by *Macrobrachium rosenbergii* nodavirus and its associate extra small virus. They cause a milky whitish appearance in larvae/post larvae/early juveniles, and are responsible for large scale mortalities in *M. rosenbergii*.