

# AAWS Education and Training Stocktake Aquatic Animals

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Disclaimer: This Education and Training Stocktake has been prepared by Scarlet Consulting and CM Communications to inform the Australian Animal Welfare Strategy (AAWS). The stocktake is a snapshot in time of the main opportunities for and approaches taken in Australia to education and training about animal welfare in each of the six AAWS sectors. It is not a complete and exhaustive list. It has primarily been developed through desktop research and consultation with AAWS stakeholders. The websites accessed for information were current at the time of final reporting in January 2008. This report does not reflect the views of AAWS or the Australian Government Department of Agriculture, Fisheries & Forestry. All care has been taken in the preparation of this report by the consultants but they do not guarantee complete accuracy for your particular purpose and therefore disclaim all liability for any error, loss or other consequence that may arise from you relying on it.

## Introduction

In line with the AAWS *Review of Current Welfare Arrangements for Finfish in Australia* (Panaquatic® Health Solutions, September 2006), this Education and Training Stocktake is confined to vertebrate fish species. It does not include invertebrates such as crab, lobster, mollusc etc.

When addressing the welfare of aquatic animals, there are four key fish sectors in Australia to review:

1. aquaculture
2. ornamental
3. recreational and
4. wild catch.

The movement and handling of live fish for human consumption is also relevant to consider, as is the harvesting of tropical fish.

## Welfare of Finfish

Defining what constitutes fish welfare is difficult. Broadly, animal welfare deals with the humane treatment of animals and most of the principles of animal welfare have emerged primarily through terrestrial animals. Fish on the other hand are complex and importantly are poikilothermic - their internal body temperature is not maintained at a constant temperature as in terrestrial animals. Fish also occupy a diverse range of habitats and ecological niches.<sup>1</sup>

The gross value of fisheries production, which covers both aquaculture and wildcatch (including finfish and crustaceans and molluscs) generates more than \$2 billion<sup>2</sup> for the Australian economy each year.

In respect to the aquaculture and wild catch commercial fishing industries animal welfare issues are primarily addressed by existing quality control practices. In many cases animal welfare is covered through industry quality assurance programs and welfare guidelines or codes of practice.

## Welfare Guidelines and the Aquatic Animals Sector

During 2007 workshops were held to progress the development of consistent welfare guidelines (Codes of Practice) for the aquaculture, ornamental and commercial wild catch sectors. The workshop reports<sup>3</sup> include recommendations developed with each sector on directions and strategies for the way forward to establish national welfare guidelines, codes or standards.

The aquaculture sector is aiming to progress fish welfare through the development of a document at the individual industry and individual farm level that includes 'Core Welfare Principles' and Welfare 'Best Practice Guidelines'. Core Welfare Principles would be considered minimum welfare principles by this sector and would not be negotiable. Given the current differences in jurisdictional legislation and the lack of commercial drivers, regulatory standards are not considered appropriate for this sector at this time.

In the ornamental sector, the primary process for progressing fish welfare is through working with the existing Pet Industry Association of Australia (PIAA) National Code of Practice. PIAA has a National Code of Practice, first produced in 2005. This Code is reviewed every three years, with the first review due in October 2008.

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<sup>1</sup> A Review of Current Welfare Arrangements for Finfish in Australia, Panaquatic® Health Solutions Pty Ltd, 19 September, 2006.

<sup>2</sup> *Australian Fisheries Statistics 2006*, ABARE

<sup>3</sup> Development of Welfare Codes and Standards in the Aquatic Animal Sector, Report on Workshops for the Finfish Sectors, Panaquatic® Health Solutions Pty Ltd, 28 October, 2007

In the commercial wild catch sector, the primary process for progressing fish welfare is to establish a generic set of Overarching Welfare Principles applicable to all wild capture fishing industries. Different industries within the sector would then use these Overarching Welfare Principles to check for consistency in documentation and practices with any welfare provisions within their respective industries.

In 1995 Recfish Australia - Australia's peak Recreational fishing body - developed a National Code of Practice for Recreational and Sport Fishing in which a significant section is devoted to welfare issues. Recfish Australia is currently undertaking a major, separately funded review of its National Code.

## Welfare issues for Aquatic Animals

Overview of relevant current and potential training & education activities

Issue	Training / Education Resources	Details	Limitations	Opportunities	Potential impact on animal welfare outcomes
<b>Aquaculture</b>	National Aquaculture Council	Aquatic Animal Welfare Guidelines	Excellent document; Unsure of status – aim is to be a framework for other codes to be developed	Development of other specific codes	High level impact especially if other codes have been developed
	VET Sector Training	Relevant training courses	Adaptation of livestock animal welfare competencies (RTE units)	Development of specific recognised animal welfare competencies based on existing codes to make SFI rather than RTE units; Adequate PD and resources for teachers.	Moderate impact as already being used but AQTF does not recognise as industry specific
	QA programs	Information on QA programs not readily available	Need to know which guidelines are actually used as basis for QA audits		High level impact
	Various Association websites	Various information - guidelines, fact sheets etc	Not all sites have animal welfare information	Increase access to AW info by including AW guidelines on all relevant sites	High level impact
<b>Ornamental fish</b>	Pet Industry Association of Australia (PIAA)	National Code of Practice	Welfare aspects could be expanded; only members of PIAA comply	Greater promotion to non-PIAA members and/or legal status	High level impact
	Petalia	Beginners Guide to Keeping Fish	Only basic but good starting point	Good that this is available on the net; not sure how much info is provided by pet shops – not mandatory for them to supply information to customers	Moderate level depending on access rate
	Marine Aquarium Council (MAC)	Certification program	Standards only apply to certified operators	Greater promotion of certification standards to customers & public to increase uptake	Moderate level depending on number of certified operators
	Various websites	Various fact sheets on keeping & welfare of fish	Unsure of level of use/access	Promotion of specific materials through pet shops which don't have their own info materials	Moderate level especially if all fish suppliers provided information on fish care

Issue	Training / Education Resources	Details	Limitations	Opportunities	Potential impact on animal welfare outcomes
<b>Recreational fishing</b>	Recfish	National Code of Practice	Main focus is catch and release aspects; however unsure of distribution & promotion	Welfare aspects other than just catch and release focus could be promoted through various channels eg TV programs, mags, radio, stickers etc & current schools programs	High level impact especially if other welfare issues included eg humane killing
	Various fishing organisations both government & non-government	Public Education and Schools Programs mainly on quotas, and catch & release	Relies on volunteers or paid educators but excellent work being done	Incorporate other welfare messages into public education programs (eg Fishcare etc) & kids programs eg 'Get Hooked, its fun to fish' etc	Significant level impact
<b>Commercial fishing</b>	Government/ Industry	Welfare code being developed	-	Will provide an important emphasis on welfare	High level impact if well distributed & adopted
	Ocean Watch	Advancing sustainable fisheries program	Mainly environmental issues	Potential to integrate welfare aspects	High level impact if well distributed & adopted
	Universities, VET sector etc	Aquaculture & marine studies courses	Unsure if welfare is covered	Once codes are developed, incorporation into these courses will be helpful	High level impact as graduates an important part of the industry

## 1. Aquaculture

The Food and Agriculture Organisation of the United Nations predicts that increases in global seafood demand will be met by aquaculture resources and not by wild-catch fisheries. Aquaculture sources are expected to dominate global fish supplies by 2030, with less than half of the fish consumed coming from wild catch fisheries.<sup>4</sup>

Aquaculture (combined vertebrate and invertebrate species) accounts for more than 30% of the Australian seafood industry and is set to continue to grow.

Last year the production in the aquaculture sector rose by 7500 tonnes (16%), while production in Commonwealth and state wildcatch fisheries fell by 9500 tonnes (13%) and 35,200 tonnes (21%) respectively. Despite this decline, the total gross value of production increased by 1% (\$27.6 million) to \$2.13 billion. This increase was the result of an 18% (\$114 million) increase in the value of aquaculture production, which compensated for declining production values in the Commonwealth and state wildcatch sectors. The gross value of production in the Commonwealth sector fell from \$330 million to \$278 million (16%), while the value of production from state wildcatch fisheries fell from \$1.18 billion to \$1.14 billion (3%). (ABARE 2007)

### Welfare issues related to Aquaculture

Until recently fish welfare attracted little attention, but international and national legislation and standards of fish welfare are now emerging in response to research that indicates that vertebrate fish feel pain. A 2007 study by Lund *et al*<sup>5</sup> discusses the efforts that need to be made to understand what fish welfare means in practical fish farming. This involves the development of research and education, greater accountability and transparency, compliance with and control of policies, and quality assurance schemes.

The National Aquaculture Council (see below) has developed the Aquatic Animal Welfare Guidelines (2005). The guidelines cover aquaculture welfare issues including:

- Water quality and water temperature
- Stocking density
- Husbandry practices
- Disease prevention and management
- Nutrition and feeding
- Equipment
- Harvesting (handling) and slaughter.

The industry states that these issues can be addressed through quality assurance programs and guidelines. A National Code of Practice for Welfare in Finfish Aquaculture is currently being developed, which will also guide the industry in its operations so as to help ensure finfish welfare.

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<sup>4</sup> State of World Fisheries and Aquaculture 2000, FAO Fisheries Department, Rome

<sup>5</sup> Lund *et al*, 'Expanding the moral circle: farmed fish as objects of moral concern', *Diseases of Aquatic Organisms*, Vol 75:109-118, 2007

## Informal Education – Industry

### National Aquaculture Council (NAC)

[www.australian-aquacultureportal.com/nac/index.html](http://www.australian-aquacultureportal.com/nac/index.html)

The National Aquaculture Council (NAC) is the peak body representing the aquaculture industry across Australia. NAC is implementing key recommendations resulting from the Aquaculture Industry Action Agenda.

NAC is particularly involved with:

- **Aquatic Animal Health**  
Promotion and Implementation of AQUAPLAN and its programs; NAC provides a representative on the Aquatic Animal Health Committee. The Action Agenda is supporting the development of the second stage of AQUAPLAN.
- **Education and Training**  
NAC is developing programs that will support various sectors. NAC will assist in the development, adoption and accreditation of education and training programs on a national basis. Most of this work can be done on a state-by-state basis with the NAC providing a consensus opinion to the Agri-food Industry Skills Council.

NAC has developed the *Aquatic Animal Welfare Guidelines* (2005) which will influence and inform the development of the proposed National Code of Practice for Welfare in Finfish Aquaculture.

### Australian Aquaculture Portal

[www.australian-aquacultureportal.com/](http://www.australian-aquacultureportal.com/)

The Australian Aquaculture Portal (managed by the National Aquaculture Council) is a centralised internet site for the growing body of information, research and business opportunities in the Australian Aquaculture industry.

The website includes the NAC's Aquatic Animal Welfare Guidelines.

An Education and Training page on the portal lists various education providers:

[www.australian-aquacultureportal.com/links/education.html](http://www.australian-aquacultureportal.com/links/education.html)

(Note: some of the links do not work or out-of-date. This is mainly due to changes to the websites of the linked organisations).

There is also a list of aquaculture associations on the portal. All state associations can be found here, only some are listed later in this review where they have a defined education role.

[www.australian-aquacultureportal.com/links/aquaculture\\_associations.html](http://www.australian-aquacultureportal.com/links/aquaculture_associations.html)

### Queensland Aquaculture Industries Federation (QAIF)

[www.aquaculturequeensland.com](http://www.aquaculturequeensland.com)

QAIF is an organisation representing the rapidly growing aquaculture industry in Queensland. All sectors of aquaculture have representative organisations aimed at assisting members and encouraging development. These industry organisations are committed to working together on common issues through QAIF.

Australia has many unique small fishes that are ideal in the home aquarium. One of the most popular species is the Australian rainbow. The QAIF website includes information about commercial breeders of the Australian rainbows and other Australian native species, as well as exotic ornamental fishes.

### **Western Australian Fishing Industry Council**

[www.wafic.org.au/](http://www.wafic.org.au/)

The Western Australian Fishing Industry Council (WAFIC) is the peak industry body representing the commercial fishing industry, pearling and aquaculture.

WAFIC is recognised by the WA Government as the Fishing and Aquaculture Industry Training Advisory Body (ITAB) and offers recognised Vocational Education Training (VET) courses from the national Seafood Industry Training Package.

### **Aquaculture Council of WA**

[www.aquaculturecouncilwa.com/](http://www.aquaculturecouncilwa.com/)

The Aquaculture Council of Western Australia (ACWA) is Western Australia's peak aquaculture industry body. Presently, ACWA's membership represents over 90% of both the current and future industry earnings of the Western Australian aquaculture industry, and consists of institutions, corporations, aquaculture sector associations and individual members.

ACWA's website includes *Guidelines on Aquatic Animal Welfare for the Western Australian Aquaculture industry* and an Aquaculture Information Gateway that is designed to provide a one-stop-shop to Western Australian aquaculture information. The main aim is to allow existing aquaculturists and soon-to-be aquaculturists find key information to assist them to better manage their farm management and research and evaluate potential business opportunities.

### **Austasia Aquaculture's Trade Directory**

[www.austasiaaquaculture.com.au](http://www.austasiaaquaculture.com.au)

Austasia's Aquaculture Trade Directory is published annually in January and has a wide range of information about the Australian aquaculture industry including education and government listings.

## **Informal Education – Government**

### **South Australian Government – Primary Industries and Resources South Australia (PIRSA)**

[www.pir.sa.gov.au/aquaculture](http://www.pir.sa.gov.au/aquaculture)

PIRSA supports the aquaculture industry in South Australia. On its website can be found information on:

- The Aquaculture Industry
- Management Policies
- Regulatory Services
- Monitoring & Assessment
- Aquatic Animal Health

PIRSA also has a range of publications available on-line.

### **NSW Government – Department of Primary Industries**

[www.dpi.nsw.gov.au/fisheries/aquaculture](http://www.dpi.nsw.gov.au/fisheries/aquaculture)

The NSW DPI supports the aquaculture industry in New South Wales. On its website can be found information on:

- A link to an Aquaculture electronic newsletter
- An Aquaculture Update - a biennial publication that reports industry information, including research results, policy directions, news and events.
- An Industry Directory - details of NSW aquaculture producers, along with providers of services and equipment for the aquaculture industry.
- Sustainable aquaculture strategies for Hunter & Central Coast and the NSW North Coast.

### **WA Government – Department of Fisheries**

[www.fish.wa.gov.au/sec/aqua/index.php](http://www.fish.wa.gov.au/sec/aqua/index.php)

The WA Department of Fisheries website has information on its Aquaculture Program and associated activities along the Western Australia coastline. The website also has links to the last ten years 'State of the Fisheries' - Annual Reports.

### **Victorian Government – Department of Primary Industries**

[www.dpi.vic.gov.au](http://www.dpi.vic.gov.au)

The Victorian DPI supports the aquaculture industry in Victoria. The DPI website has information on:

- Aquaculture Fisheries Reserves
- Investing in Aquaculture
- Understanding Aquaculture
- Licence Holders

### **Tasmanian Government – Department of Primary Industries and Water**

[www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH86L?open](http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH86L?open)

The DPI&W support the aquaculture industry in Tasmania. On its website can be found information on:

- Marine Farming/Aquaculture
- Marine Farming Development Plans
- Marine Farming: Benthic Monitoring 1997 - 2002
- Fish Vaccine Unit

### **Queensland Government – Department of Primary Industries and Fisheries**

[www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/28\\_141\\_ENA\\_HTML.htm](http://www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/28_141_ENA_HTML.htm)

The DPI&F support the aquaculture industry in Queensland. On its website can be found information on:

- Queensland's aquaculture industry
- Technical advice
- Licensing, approvals & policies
- Commercial fisheries
- Policy & legislation
- Research & development
- Species identification

### **Northern Territory Government – Department of Primary Industry, Fisheries and Mines**

[www.nt.gov.au/dpifm/Fisheries/index.cfm?header=Aquaculture](http://www.nt.gov.au/dpifm/Fisheries/index.cfm?header=Aquaculture)

The DPIF&M support the aquaculture industry in the Northern Territory. On its website can be found information on:

- Aboriginal Aquaculture
- Aquaculture Licensing
- Aquaculture Policy
- Aquatic Animal Health
- Darwin Aquaculture Centre
- Industry Support
- Research and Development
- Species

## 2. Ornamental Fish Sector

The ornamental aquarium fish trade in Australia is estimated to be worth approximately \$350 million annually<sup>6</sup>. This includes commercial fishbreeding facilities, wholesale traders, retail outlets and the hobby industry.

The trade is complex, with each jurisdiction having different regulatory frameworks and management regimes. Translocation of fish across borders occurs with impunity and no-one, apart from some major wholesale businesses and hobby groups, really knows which species are being traded in Australia, or the numbers of prohibited or noxious fish being bred and traded in the industry.

The ornamental sectors involves:

- Collecting of fish from the wild
- Breeding and culturing of fish
- Transporting of live fish
- Selling of fish – wholesalers to retailers and retailers to the public.

The main categories of ornamental fish are:

- Tropical fish (live in salt or freshwater - term used to describe the water temperature, i.e. warm)
- Coldwater fish (these fish like the colder water temperatures and can be salt or freshwater fish)
- Marine fish (live in seawater - most commonly used marine tanks are tropical)
- Freshwater fish (live in freshwater and are usually found in inland rivers and streams of most continents. They can be as colourful as marine fish and yet less of a management commitment. (The best-known ornamental coldwater species are goldfish or Koi carp).

A permit is required to keep some species of plants, exotic fish, algae and organisms usually kept for display in aquaria.

### Welfare issues related to Ornamental Fish

Clearly, there are significant welfare issues regarding the care and management of ornamental fish, both in commercial aquariums and in home fish tanks. Transportation of the fish is a critical issue. The education of purchasers and owners of ornamental fish is very important. Breeders of ornamental fish must also know the best ways to handle and manage their breeding operations to achieve acceptable fish welfare. Members of the public have a direct and significant impact on the welfare of ornamental fish and can also be responsible for the killing of fish so appropriate euthanasia techniques must be communicated and encouraged.

Humane euthanasia is a critical area for both fish welfare and public relations in this sector. There are several species of ornamental fish that cannot be easily killed (e.g. those having spines). At the 2007 aquatic animals workshops there was unanimous agreement that it would be highly beneficial to have an approved method for killing fish that could be provided to members of the public<sup>7</sup>. Scientific research and/or review may be required to identify or validate methods that meet the criteria of causing minimal suffering to the fish and minimal risk of injury to the operator (generally the owner). The correct feeding regime is also important for maintaining fish health and welfare.

Ornamental fish present a significant risk to Australia's aquatic systems and have the potential to trigger or contribute to a future major aquatic animal pest or disease outbreak, particularly in freshwater habitats. A number of populations of exotic or non-endemic ornamental fish species are established in Australia and these 'pests' seriously impact on biodiversity in our freshwater systems. Introduced aquatic organisms can cause considerable problems and environmental harm if released (accidentally or otherwise) into Australia's natural waterways.

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<sup>6</sup> Department of Agriculture, Fisheries and Forestry, 2007. *A Strategy Approach to the Management of Ornamental Fish in Australia*.

<sup>7</sup> Development of Welfare Codes and Standards in the Aquatic Animal Sector, Report on Workshops for the Finfish Sectors, Panaquatic® Health Solutions Pty Ltd, 28 October, 2007

They can:

- displace native species by competing for or destroying their habitat
- compete for food supply and disturb the balance of the food chain
- carry diseases that are harmful to our native organisms.

The Pet Industry Association of Australia (PIAA) has a National Code of Practice (2005) that includes fish with the focus on the care and husbandry of fish in retail outlets and on fish being kept in wholesale facilities.

## Informal Education Ornamental Fish – Industry

### Pet Industry Association of Australia

[www.piaa.net.au](http://www.piaa.net.au)

In the ornamental fish sector, the primary process for progressing fish welfare is through working with the existing Pet Industry Association of Australia (PIAA) National Code of Practice. PIAA has a National Code of Practice, first produced in 2005. PIAA members agree to abide by this Code. This Code is reviewed every 3 years, with the first review due in October 2008. The primary focus for the Ornamental fish sector is to ensure that a National Code of Practice comprehensively addresses issues of fish welfare.

PIAA is the peak body for the commercial pet industry in Australia. Hence its membership is not exclusive to ornamental retailers but represents a diverse array of commercial enterprises across the Australian pet industry. Approximately 25-30% of retail ornamental and pet shops are members of PIAA<sup>8</sup>. The two largest ornamental wholesalers in Australia are also PIAA members.

PIAA is actively involved in welfare information and education strategies under the AAWS Companion Animals Working Group.

The PIAA National Code discusses both general guidelines (e.g. the responsibilities of proprietors and staff in pet shops) and specific guidelines (e.g. Appendix III – Stocking Density Guidelines for Aquarium Fish in Shops).

The PIAA National Code is primarily focused on the care and husbandry of fish in retail outlets and not on fish being kept in wholesale facilities although many of the specific guidelines (e.g. the regular checking of water chemistry) are applicable to both sectors.

PIAA has a brochure titled “Don’t Dump That Fish” on its website. The aim is to stop the spread of introduced fish and plants into our waterways and it also covers a few basic fish care tips.

### Petalia

[www.petalia.com.au](http://www.petalia.com.au)

Petalia was set up by Provet Holdings Ltd, a veterinarian-owned and controlled veterinary distributor, established in 1982 in Brisbane. The company has developed into Australia’s largest veterinary distributor. The current ownership of Provet is by some 220 veterinarians. The Australian Veterinarian Association (AVA) endorses Petalia.

Petalia has developed a website for online purchasing of high quality pet care products. The website also includes information and advice for enriching and rewarding a pet’s life.

It includes a Beginner’s Guide to Keeping Fish:

[www.petalia.com.au/templates/StoryTemplate\\_Process.cfm?story\\_No=2022](http://www.petalia.com.au/templates/StoryTemplate_Process.cfm?story_No=2022)

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<sup>8</sup> Development of Welfare Codes and Standards in the Aquatic Animal Sector, Report on Workshops for the Finfish Sectors, Panaquatic® Health Solutions Pty Ltd, 28 October, 2007

### **Pets Paradise pet stores**

[www.petsparadise.com.au/mainSite.asp](http://www.petsparadise.com.au/mainSite.asp)

Pets Paradise is the largest pet store franchise business in Australia. There are more than 120 stores throughout Australia, except Tasmania. The website includes Pet Care Info Sheets including one for fish that covers information about caring for pet fish.

### **PETstock pet stores**

[www.petstock.com.au/](http://www.petstock.com.au/)

There are over 30 PETstock pet stores in Victoria, NSW, Qld and SA. There is information about fish care on the website: [www.petstock.com.au/index.php?id=fish](http://www.petstock.com.au/index.php?id=fish)

### **Marine Aquarium Council (MAC)**

[www.aquariumcouncil.org/education.html](http://www.aquariumcouncil.org/education.html)

The Marine Aquarium Council (MAC) is an international, not-for-profit organization that brings marine aquarium animal collectors, exporters, importers and retailers together with aquarium keepers, public aquariums, conservation organizations and government agencies.

MAC's mission is to conserve coral reefs and other marine ecosystems by creating standards and certification for those engaged in the collection and care of ornamental marine life from reef to aquarium.

The MAC Certification system provides the marine aquarium industry with internationally approved environmental and quality standards. A growing number of collectors, wholesalers and retailers have committed to meet these Standards and become MAC Certified.

MAC Certification covers both practices (industry operators, facilities and collection areas) and products (aquarium organisms).

#### **Certification of Practices**

Industry operators at any link in the chain of custody (collectors, exporters, importers, retailers, etc.) can seek to become MAC Certified by being evaluated for compliance with the appropriate MAC international Standard.

#### **Certification of Products**

MAC Certified marine ornamentals must be harvested from a MAC Certified collection area, or cultured in a MAC Certified facility, and pass from one MAC Certified operation to another, eg from collector to exporter to importer to retailer. MAC Certified marine organisms bear the 'MAC Certified' label on the tanks and boxes in which they are kept and shipped.

#### **Accredited Certifiers**

To ensure that MAC Certification is credible and internationally acceptable, MAC does not verify compliance with its own international Standards. It accredits independent third-party certification companies, which in turn assess compliance to the appropriate MAC international Standard.

A company, which is MAC Certified, has been assessed by a third independent party for its compliance with the MAC international Standard, corresponding to its activity. It has the right to sell "MAC Certified organisms", under the conditions described above in Certification of Products.

#### **Education**

There is an Education section on the MAC website that cites an Education Kit although it was not available at the time of this report.

## **Informal Education Ornamental Fish – Government**

### **South Australia**

#### **Primary Industries and Resources South Australia (PIRSA)**

[www.pir.sa.gov.au/fisheries/aquarium\\_and\\_ornamental\\_fish](http://www.pir.sa.gov.au/fisheries/aquarium_and_ornamental_fish)

PIRSA has developed a number of educational resources about keeping ornamental fish.

[Don't Dump Your Aquarium Fish \(.PDF\) 1.23MB](#)

This explains the impact aquarium fish can have on the environment and on native fish stocks and the rules and regulations to protect the environment from introduced diseases and harmful species.

### **NSW Government**

#### **Fish n Kids website**

<http://fishnkids.dpi.nsw.gov.au/pets/pets.html>

On the DPI Fisheries Kids website there is a section on keeping fish as pets with information about caring for them.

### **WA Government**

There is information about ornamental fish on the WA Department of Fisheries website:

[www.fish.wa.gov.au/sec/aqua/species/Ornamental.php?0308](http://www.fish.wa.gov.au/sec/aqua/species/Ornamental.php?0308)

In particular, health issues:

[www.fish.wa.gov.au/sec/fh/index.php?0408](http://www.fish.wa.gov.au/sec/fh/index.php?0408)

## **Informal Education – Aquaria**

### **Sydney Aquarium**

[www.sydneyaquarium.com.au](http://www.sydneyaquarium.com.au)

The Sydney Aquarium has a number of educational initiatives and resources for students and teachers and the general public available on its website.

### **Melbourne Aquarium**

[www.melbourneaquarium.com.au/education/index.asp](http://www.melbourneaquarium.com.au/education/index.asp)

The Melbourne Aquarium has educational resources and activities available for students and teachers on its website.

### **Aquarium of Western Australia**

[www.aqwa.com.au](http://www.aqwa.com.au)

The Aquarium of Western Australia (AQWA) covers the journey along Western Australia's 12 000 km coastline, internationally renowned for its unique ocean conditions and unrivalled diversity of marine life. AQWA has an extensive education program and resources that are linked to the WA Schools Curriculum.

### **Reef HQ**

[www.reefhq.com.au](http://www.reefhq.com.au)

Reef HQ is the world's largest living coral reef aquarium and is a must see attraction in the Townsville region. Reef HQ is the Reef Education Centre for the Great Barrier Reef Marine Park Authority.

### **Aquarium Clubs and Societies**

[www.e-aquarium.com.au](http://www.e-aquarium.com.au)

Aquarium clubs improve the hobby of fish keeping by educating, conserving, sharing and organising.

There are a number of benefits of being involved with aquarium clubs and societies. By becoming a member of such a network you can learn from fellow hobbyists, obtain quality fish and find social events to be involved with.

The popularity of fish keeping has led to a number of clubs developing around the world and in Australia. Many clubs specialise in a particular group of fish while others are broader.

Below is a selection of clubs and societies which may assist or provide information and education.

### **Australia New Guinea Fishes Association**

[www.angfa.org.au/](http://www.angfa.org.au/)

### **Native Fish Australia**

[www.nativefish.asn.au](http://www.nativefish.asn.au)

### **Queensland Federation of Aquarium Societies**

[www.qfas.org](http://www.qfas.org)

**Eastern Districts Aquarium Association**

[www.edas.com.au/](http://www.edas.com.au/)

**Newcastle Aquarium Society**

[www.users.bigpond.com/bmate/](http://www.users.bigpond.com/bmate/)

**Marine Aquarium Society of Sydney**

[www.masa.asn.au/mass/](http://www.masa.asn.au/mass/)

**Victorian Fish Society**

[www.home.iprimus.com.au/dogday/fish/index.html](http://www.home.iprimus.com.au/dogday/fish/index.html)

**Marine Aquarium Society of Victoria**

[www.ozreef.org/masov.html](http://www.ozreef.org/masov.html)

### 3. Recreational Fishing

Recreational fishing is one of the most popular leisure activities in Australia, with more than 4.5 million Australians going fishing every year. This includes angling with hook and line, beach seining, spear fishing, crab and lobster pots and cast-netting.

Management of recreational fishing is the responsibility of the individual state and territory authorities and, as such, licensing requirements and regulations vary considerably depending on location, fishing method and species targeted.

A licence is required for all recreational fishing activities in New South Wales and Victoria. Size and/or bag limits apply for most species, as do restrictions on the type/method of activities. There are a number of categories entitling an exemption to holding a licence.

In Western Australia, recreational fishing licences are required for net fishing and freshwater angling. Size and bag limits also apply for the majority of species caught. A recreational fishing licence is necessary in Tasmania for inland fishing.

Queensland, South Australia and the Northern Territory do not require recreational fishing licences, however a Stocked Impoundment Permit is required when fishing in Queensland water storage impoundments. Queensland, Northern Territory and South Australia use effort controls such as size limits, gear restrictions and area/seasonal closures to regulate recreational catch.

#### **Welfare issues related to Recreational Fishing**

Recreational anglers often catch fish that they are required by law to return to the water, or they do not wish to retain as food or bait. It is therefore important for recreational anglers to know how to handle fish to maximise survival after release.

In Victoria, for example, the Fishing Regulations require the return of fish to water (except noxious aquatic species) with the "least possible injury or damage".

Improper handling can easily injure fish, with potentially fatal results after release. Damage normally is centred on interference with the slimy protective coating (mucous) on the fish that forms a barrier to bacterial infections. Damage may be caused by removal or damage to the scales which permits easier access for bacterial and other infections.<sup>9</sup>

Key education messages when practicing catch and release to reduce the risk of injury or damage to fish are:

- using a landing net that isn't made of knotted mesh (because it causes damage to the body of the fish)
- handling fish with wet hands, cotton gloves or a wet cloth
- place fish when caught into water, not on a dry surface

Appropriate hook removal techniques are also important to limit potential injury to the fish.

Australia has made significant gains in improving the sustainability of recreational fishing (bag limits, seasonal closures, release techniques, fish friendly gear, etc). There is further improvement available with more research and better extension of new techniques - some of which relate to improved animal welfare outcomes. Improving the knowledge of fishers regarding best practices is a challenge given the diverse nature of the participants and their wide geographic spread.

One of the key challenges is ensuring fishers kill fish that are to be retained in a fast and appropriate manner. This is a focal point in Recfish Australia's national code of practice.

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<sup>9</sup> Department of Primary Industries Victoria, 'Returning Fish to Water', Information Note. [www.dpi.vic.gov.au](http://www.dpi.vic.gov.au)

Recreational fishers can accidentally catch species they don't want – known as bycatch. The bycatch of recreational fishing includes catching non-targeted finfish, sharks or stingrays that fishers don't want or can't keep due to bag limits and legal sizes. Bycatch sometimes also includes birds or sea turtles that can get caught unintentionally when they try and take the bait from hooks or lobster pots or get tangled in the fishing line or nets. Appropriate action to minimise adverse welfare in these situations is also important.

### **Recreational Fishing Licences revenue contributing to education**

Jurisdictions that require a recreational fishing licence have/can use revenue from licence sales to specifically target fishers with educational material. The opportunity to provide information with licence issue/renewal is always available. For those jurisdictions without licences the responsible agency has to rely on broader educational tools e.g. printed media, TV, radio, brochures, etc., to get information to fishers.

### **Catch and Release**

Studies around Australia have shown that approximately 50% of all fish caught recreationally are released. More and more recreational anglers are practising 'catch and release'. Taking care to release a fish properly means that it has a better chance of surviving.

Infotish Services and Fisheries Research and Development Corporation have produced a number of publications with useful "catch and release" tips, which can be found on the Released Fish Survival website [www.info-fish.net/releasefish/](http://www.info-fish.net/releasefish/)

Some of the tips include:

- Use barbless hooks where possible
- Invest in a pair of long nose pliers to remove hooks
- Always use wet hands or a wet cloth when handling fish to avoid damaging the fish's sensitive mucous layer
- Use a knotless landing net
- Avoid lifting fish from the water to remove hooks
- Avoid placing fish on hot dry surfaces
- If you can't remove the hook without damaging the fish, it is best to cut the line

### **The National Strategy for the Survival of Released Line Caught Fish**

The *National Strategy for the Survival of Released Line Caught Fish* is an initiative of the Fisheries Research and Development Corporation (FRDC) in conjunction with the Australian National Sportfishing Association (ANSA) and Recfish Australia (See separate entries on these organisations).

The strategy aims to improve the understanding of, and increase the survival rates of, released line caught fish.

The National Strategy promotes best practices in releasing fish by recreational fishers and includes a number of research projects into aspects of fish survival. The National Strategy involves projects aimed at achieving the following outcomes.

Improving the survival of released line caught fish through:

- A better understanding of the effects of fishing; and
- Increased adoption of best practices in handling fish.

Improving fisheries management through:

- A reduction in the total mortality of released line caught fish; and
- Inclusion of recreational catch and fish survival data in fisheries stock assessment.

A lot of educational materials can be found at: [www.info-fish.net/releasefish/](http://www.info-fish.net/releasefish/).

### **Info-fish Services**

[www.info-fish.net](http://www.info-fish.net)

Infotish Services was established in October 1995 by Bill Sawynok, a keen recreational fisher. It is a small family business aimed at providing a high quality targeted information service to the recreational fishing industry.

Infotish has a strong partnership arrangement with the Australian National Sportfishing Association (ANSA) for whom it manages its national Austag program and the Suntag program in Queensland.

The Info-fish website aims to provide a single point of entry, fast and convenient access to factual information about some specific facets of the recreational fishing industry. The focus is on providing a gateway to information on tagging of interest to recreational fishers.

## **Informal Education Recreational – Fishing Industry**

### **Recfish Australia**

[www.recfish.com.au/](http://www.recfish.com.au/)

Recfish Australia is the peak national body for recreational and sport fishing in Australia and is made up of many other organisations:

- AFANT (Amateur Fishermen's Association of Northern Territory) [www.afant.com.au/](http://www.afant.com.au/)
- NSW ACoRF Advisory Council on Recreational Fishing  
[www.dpi.nsw.gov.au/fisheries/recreational/licence-fee/trusts/acorf/about-acorf](http://www.dpi.nsw.gov.au/fisheries/recreational/licence-fee/trusts/acorf/about-acorf)
- Recfishwest (Western Australian Recreational & Sportfishing Council) [www.recfishwest.org.au/](http://www.recfishwest.org.au/)
- TARFish (Tasmanian Association for Recreational Fishing) [www.tarfish.org](http://www.tarfish.org)
- VRFish (Victorian Recreational Fishing Peak Body) [www.vrfish.com.au](http://www.vrfish.com.au)
- ANSA (Australian National Sportfishing Association) [www.ansa.com.au/](http://www.ansa.com.au/)
- AUF (Australian Underwater Federation – Spearfishing Commission) [www.auf.com.au/](http://www.auf.com.au/)

Recfish Australia's mission is "One voice promoting sustainable fishing and representing recreational fishers at the national level."

Recfish Australia developed one of the world's first genuine "national" recreational fishing codes of practice following extensive consultation in 1995. The National Code of Practice (CoP) is recognised by the Australian Veterinary Association and the RSPCA and is available on the Recfish Australia website.

Recfish Australia is currently reviewing and updating the National CoP to reflect best practice and outcomes of the Federal Government sponsored Released Fish Survival Program ([www.info-fish.net/releasefish](http://www.info-fish.net/releasefish)) and the general increase in knowledge and science about recreational fishing. The review will also take into account the recently drafted international code of practice.

### **Recfishwest**

[www.recfishwest.org.au/](http://www.recfishwest.org.au/)

Recfishwest supports the national CoP and also has a Catch and Release Fishing Policy - [www.recfishwest.org.au/PolicyCatch&Release.htm](http://www.recfishwest.org.au/PolicyCatch&Release.htm)

### **VRFish**

[www.vrfish.com.au](http://www.vrfish.com.au)

VRFish promotes Victoria's Recreational Fishing Code of Conduct which is for recreational boat, shore, river, stream and jetty fishers in Victoria – "Recreational fishers have a responsibility to look after fisheries resources for the benefit of the environment and future generations of fishers".

The VRFish website has an area called 'Angler Info' with a lot of information including a link to the National Strategy for the Survival of Released Line Caught Fish.

### **Australian National Sport Fishing Association**

[www.ansa.com.au](http://www.ansa.com.au)

ANSA has adopted the national Code of Practice and also has its own code of ethics.

## **Formal Education Recreational Fishing – VET Sector**

### **National Fishing Industry Education Centre (Natfish)**

[www.natfish.tafensw.edu.au/](http://www.natfish.tafensw.edu.au/)

The Natfish Recreational Fishing Services courses take people who have an interest in fishing and give them skills they need to make a career in the industry.

Courses prepare students to work in areas such as tackle shops, fishing equipment wholesale, fishing tours and charter boat operations. They learn basic fishing techniques, about weather, safety and the regulatory and environmental responsibilities associated with fishing.

Offered in a flexible workshop format combined with home study the course is easily accessible. The course is unique in its location for practical sessions on the Lower Clarence, with access to some of the best fishing on the NSW coast.

Natfish delivers a Certificate II in Recreational Fishing which is aimed at people looking to gain work servicing the recreational fishing industry. The course is delivered flexibly, which involves a combination of external study and practical workshops. The course can be completed in one year part time.

Other VET educational opportunities may be covered under VET Education Wild Catch & Aquaculture.

## Formal Education Recreational Fishing – Schools Sector

### ‘Get Hooked’ Educational Kit – Schools Education

[www.pir.sa.gov.au/fisheries/products/educational\\_resources](http://www.pir.sa.gov.au/fisheries/products/educational_resources)

Endorsed by Recfish Australia and delivered by State Government Fisheries Departments and Fishcare Programs, *Get hooked... it's fun to fish* introduces middle (years 3 and 4) and upper (years 5 and 6) primary school students to freshwater and marine fish, other aquatic life, and the importance of sustaining a quality fish habitat. (Note: Fisheries Victoria originally developed it.)

The kit contains a series of interactive discovery-based lesson plans and 'hands on' activities to help children understand the need for safe and responsible fishing practices. Each activity session is based on one of the six National Junior Fishing Codes that have been developed by [Recfish Australia](#) to help manage, protect and conserve the environment.

- Code 1 Take only what you need
- Code 2 Fish with friends
- Code 3 You're the solution to water pollution
- Code 4 Throw the little ones back
- Code 5 Don't leave your tackle behind
- Code 6 Quality catchments equals quality fish

See the following section on Government Education for other schools education resources produced by the various State Government agencies responsible for fishing and seafood production.

## **Informal Education Recreational Fishing – Government**

### **NSW Government**

The NSW Department of Primary Industries (DPI) is responsible for managing fish resources in NSW.  
[www.dpi.nsw.gov.au/fisheries](http://www.dpi.nsw.gov.au/fisheries)

### **NSW Fish n kids**

<http://fishnkids.dpi.nsw.gov.au/>

DPI Fisheries has developed a website directed at children interested in fish and fishing. It covers tips for keeping fish as pets as well as good practices for recreational fishing.

Specific information about fishing on the website is at:

<http://fishnkids.dpi.nsw.gov.au/learn/learn.html>

### **NSW Fishcare**

[www.dpi.nsw.gov.au/fisheries/recreational/your-fees/fvp](http://www.dpi.nsw.gov.au/fisheries/recreational/your-fees/fvp)

The NSW Government (DPI Fisheries) has a Fishcare Volunteer program. Volunteers talk to anglers about fishing rules and responsible fishing and help in a range of activities, such as fishing clinics, catch surveys and community fishing events. Funded by the recreational fishing licence, the NSW Fishcare Volunteer Program continues to expand boasting volunteers in many inland and coastal areas around the State.

People 18 years or over who have a keen interest in fish, fishing and the conservation of our fish resources and habitat, can apply to become a Fishcare Volunteer. No formal qualifications are required but some knowledge of angling and the aquatic environment is useful.

Volunteers are expected to give approximately one day per month to assist the program. Volunteers are involved in a range of interesting activities, helping to inform anglers and the wider community about responsible fishing and protecting our aquatic habitat.

### **Fishing clinics/workshops**

Fishcare Volunteers assist NSW DPI staff, community groups and fishing club members run Fishcare fishing clinics across the State. At the clinics, participants learn hands-on fishing techniques, such as casting techniques and retrieval techniques, basic knot tying and rigging, and good fishing practices. They also learn about the importance of protecting fishing resources for future generations and about threatened species and aquatic habitats.

Workshops are run in both saltwater and freshwater locations. The location sites vary over time but generally are located in either DPI-owned facilities or safe coastal locations. Freshwater workshops are run at the Gaden (Jindabyne), Dutton (Ebor), Narrandera and Grafton fish hatcheries. Saltwater workshops are run at places such as, Coffs Harbour, Urunga, The Entrance, Lake Macquarie, Potonga, Narrabeen, Cronulla, Lake Illawarra, Narooma and Bateman's Bay.

Workshops are for children aged between 8 and 14 years. Workshops run for no more than 5 hours with a maximum of 30 participants.

### **Surveying**

Fishcare Volunteers visit prominent fishing grounds to advise anglers on catch and release methods and other aspects of responsible fishing, distribute educational material and collect research information. Volunteers also collect data on angler demographics, awareness of fishing rules and regulations and catch and release practices.

### **Fishing and trade shows**

At fishing and trade shows, volunteers assist NSW DPI staff provide information about sustainable fishing practices, rules and regulations and promote awareness of the Fishcare Volunteer Program.

### **Fishcare Volunteer training weekends**

Experienced Fishcare Volunteers assist NSW DPI train new volunteers. The experienced volunteers share their knowledge and experiences with newcomers, providing valuable insights into what it means to be a Fishcare Volunteer.

### **Mobile Education Units**

DPI Fisheries have constructed five mobile education units (1 freshwater and 4 saltwater) which are used by Fishcare Education Officers and Volunteers. These eye-catching, versatile communications tools are out and about along the coast, spreading the message of responsible fishing at fishing events, community days, schools presentations and fishing clinics.

Their purpose is to inform and educate the community about responsible fishing through the use of colourful, practical education units at events, shows and schools.

### **Bondi Marine Discovery Centre**

[www.marinediscovery.org.au](http://www.marinediscovery.org.au)

The Bondi Marine Discovery Centre program aims to educate Sydney's school children on sustainable recreational fishing. This Centre is a non-profit organisation that offers marine and coastal education excursion programs to schools and communities in the Sydney region. Located within the Bondi Pavilion, there is an interactive aquarium, museum and educational arcade. School excursions include visits to the local marine environment, slide shows, talks and presentations using individual aquarium for close up investigation.

Launched at the beginning of 2008, the new Bondi Marine Discovery Experience will become the first custom-built visitor attraction on Bondi Beach. It will be a combination of real and virtual elements that take people on a 30-minute 'virtual dive' around Bondi Bay from a fish's perspective. Tourism consultants have predicted it will attract 50-100,000 visitors in the first year - mainly Sydney families.

The Marine Discovery Centre Bondi Beach also enhances DPI Fisheries' [education programs](#), [Fishcare Volunteer program](#), [Fishing Clinics](#) and Community Events.

Action-orientated education and awareness programs will include topics related to habitat protection, bag limits, closures, litter prevention and pest species identification.

The Discovery Centre also provides educational facilities for communities of non-English speaking backgrounds.

### **Victorian Government**

In 1999, the Victorian State Government introduced the Recreational Fishing Licence - a significant source of funding for education in Victoria. Listed below are key educational initiatives.

#### **Fishcare Victoria**

[www.dpi.vic.gov.au/dpi/nrenfaq.nsf/childdocs/-AF299D9126EAD105CA256C6F0017D2C3-65A2C6132A703367CA256C6F001CB4C6?open](http://www.dpi.vic.gov.au/dpi/nrenfaq.nsf/childdocs/-AF299D9126EAD105CA256C6F0017D2C3-65A2C6132A703367CA256C6F001CB4C6?open)

The Victorian Government initiated the Fishcare Program in 1995 as a vehicle to encourage appropriate fishing behaviours primarily amongst recreational anglers through the provision of information, guidance and education at or near the point of angling.

It is a volunteer program that promotes responsible attitudes and practices amongst recreational anglers and the broader community, towards fish and fish habitats.

The Fishcare Program in Victoria has evolved substantially over the past 12 years and a recent survey (2006) indicated the following:

- 36% of anglers were familiar with Fishcare
- 22% of anglers had personal contact with Fishcare
- 28% of those who receive information from Fishcare said they subsequently made a change to the way they fished.

In terms of fish welfare, the survey also highlighted the need for further regulations, safe fish handling and products to assist anglers to care for their catch.

Fishcare has developed an extensive array of education programs, products and messages that promote responsible recreational fishing practices, including:

- a Schools Programs (3 different programs)
- School holiday fishing clinics
- Attendance at special events such as angling competitions and trade shows
- The Fishcare Volunteer program
- Arrangements with angling clubs to deliver the Fishcare program
- Extensive educational materials and resources for different audiences, ranging from Weigh Your Catch sticker ruler, Know Your Catch brochures series (3 species), Set Me Free education kit (native fish species – Toadfish and Pufferfish).

The Victorian Fishcare website annually gets more than 200,000 hits and a planned redevelopment will include a lot more scientific-based information. The website contains copies of all information and educational products.

### **Marine Discovery Centre, Queenscliff**

[www.marinediscoverycentre.com.au](http://www.marinediscoverycentre.com.au)

The Victorian Government supports, and is the primary source of funding, for the Marine Discovery Centre (MDC) at Queenscliff on the south western point of Port Phillip Bay. The MDC is an education facility which assists people of all ages to discover the wonders of southern Australia's marine environment. Facilities include a visitors' aquarium, student laboratory, classroom, and a resource room.

The MDC provides curriculum-based education for early childhood, school and tertiary groups as well as programs for the general community. In addition, there are a number of specialised programs such as work experience, volunteer training, friends group and sand dune revegetation program.

MDC is ideally located for field activities as it is surrounded by a diverse range of habitats including rocky shores, mudflats, salt marshes, seagrass meadows, mangroves, sand dunes and temperate reefs. The majority of activities are conducted in Marine National Parks and Sanctuaries.

The education program includes creating an awareness of the issues concerning Victorian fisheries, recreational fishing and the marine and freshwater environment.

## **South Australian Government**

Primary Industries and Resources South Australia (PIRSA) is the State Government Department responsible for fisheries in SA.

### **FISHFACTS electronic newsletter**

[www.pir.sa.gov.au/fisheries/products/fishfacts\\_e-newsletter](http://www.pir.sa.gov.au/fisheries/products/fishfacts_e-newsletter)

*FishFacts* is PIRSA Fisheries' free, monthly, electronic newsletter designed to keep subscribers up to date with the latest South Australian fishing news and issues.

### **SA FISHCARE**

[www.pir.sa.gov.au/fisheries/recreational\\_fishing/fishcare\\_volunteers2](http://www.pir.sa.gov.au/fisheries/recreational_fishing/fishcare_volunteers2)

The FISHCARE volunteer program is part of PIRSA Fisheries Division's community awareness program. It was established in 1994 to raise awareness among fishing communities of the need to protect and preserve our resources for future generations.

FISHCARE volunteers are dedicated, highly motivated fishers who give their time, energy and effort to help others understand the rules and regulations that apply to recreational fishing in South Australia.

FISHCARE volunteers assist with various fisheries education programs. This includes:

- offering advice and assistance
- educating and informing recreational fishers about the rules and regulations associated with sustainable fishing in South Australia
- handing out fisheries information brochures, the Recreational Fishing Guide and stickers, distributing crab, abalone and rock lobster measures
- attending field days, shows and other community events throughout South Australia.

Anyone over the age of 18, male or female, can become a FISHCARE volunteer in SA. All that is needed is an interest in conserving SA's fisheries resources and be willing to help provide information to the fishing public.

FISHCARE volunteers attend a comprehensive two-day training course to increase their knowledge and awareness of issues affecting recreational fishing. FISHCARE volunteers are encouraged to work as often as they like, but a minimum of at least one-day per month is requested.

FISHCARE volunteers are given a uniform. According to the PIRSA website, the response from the SA community has been outstanding to FISHCARE volunteers, who are usually inundated with enquiries from fishers wanting to know the regulations.

## **Western Australian Government**

[www.fish.wa.gov.au/](http://www.fish.wa.gov.au/)

The Department of Fisheries, Western Australia is responsible for the sustainable development of WA's fisheries.

### **Fish Tales website**

[www.fish.wa.gov.au/fishtales/index.php](http://www.fish.wa.gov.au/fishtales/index.php)

Department of Fisheries WA has developed a website specifically aimed at children and it includes lots of educational resources and activities.

[www.fish.wa.gov.au/fishtales/education/index.php](http://www.fish.wa.gov.au/fishtales/education/index.php)

In particular, it includes ***Getting Hooked on Fishing***  
[www.fish.wa.gov.au/fishtales/gethooked/index.php](http://www.fish.wa.gov.au/fishtales/gethooked/index.php)

***Get Hooked on Fishing*** is a kid's guide on how to fish in WA. It is a 20-page full-colour booklet covering how to care for your catch, what kind of tackle you need, how to tie hooks onto lines, how to fish safely and responsibly, what fish species are protected, what species are dangerous and what species are most likely to be caught. Contents cover:

- Caring for your catch
- Groovy Tackle Box Tips
- Get Tied up in Knots
- Responsible Fishing - Find out how
- Watch Out! - Dangerous Creatures Inside
- Hands Off! - Totally Protected Species
- Popular Species to check out.

### **Naturaliste Marine Discovery Centre and MarineDiscoveryWest**

[www.nmdc.com.au/](http://www.nmdc.com.au/)

MarineDiscoveryWest is the WA Department of Fisheries' community and schools education program.

MarineDiscoveryWest operates at the Naturaliste Marine Discovery Centre, and at many other locations around the State including Busselton, Bunbury and Albany.

The Naturaliste Marine Discovery Centre is located on the Sunset Coast, 20 minutes north of Perth.

The education team and WA Fisheries volunteers develop and deliver learning programs about WA's unique and fragile aquatic environments, our precious fisheries, the science that underpins management, and how to fish and live sustainably.

Learning programs are based on current science and data generated by scientific research, and are supported by the WA Department of Fisheries Research Division and the WA Museum.

The Discovery Centre was created as a knowledge resource for the community and WA's 360,000 school students. A range of hands-on and fun learning activities are under development that will take students deep into the ocean, beneath the surface of our estuaries, through freshwater rivers and lakes and behind the scenes of aquatic science as it unfolds.

Schools groups may choose to visit the Discovery Centre for:

- a self-guided tour to explore the exhibition hall, aquaria and science viewing corridor
- a guided tour
- one or more of our curriculum-linked, structured education activities.

### **WA Volunteer Fisheries Liaison Officers**

[www.fish.wa.gov.au/sec/cominv/vflo/index.php?0001](http://www.fish.wa.gov.au/sec/cominv/vflo/index.php?0001)

The Department of Fisheries, WA Volunteer Fisheries Liaison Officer program was the first of its kind in Australia, established in the summer of 1993/94. It consists of a team of dedicated recreational fishers and community members who are concerned with conserving Western Australian fish stocks and protecting their aquatic habitats, now and for the future.

The Volunteer Fisheries Liaison Officer (VFLO) program aims to increase community support for - and awareness of - the need for the conservation of fish stocks and their habitats through interaction, community involvement, communication and education.

The volunteers play a vital role in educating the recreational fishing community through beach-front patrols and developing a strong conservation ethic in children and adults through educational displays and clinics across WA.

The program has become the single most significant channel through which educational programs on recreational fishing are delivered and information delivered directly to its target audience in WA.

A core philosophy behind the VFLO program is to encourage recreational fishers to view themselves as guardians or stewards of Western Australia's fish resource and their own chosen pastime or sport.

## **Tasmania**

### **Department of Primary Industries and Water**

[www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH86L?open](http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH86L?open)

In Tasmania, the Department of Primary Industries and Water is the agency responsible for the management of our sea fisheries and has a strong focus on education and promoting public awareness. Marine farming, which is also regulated by the Department, has expanded rapidly in Tasmania in the past decade to become one of Tasmania's major industries. The Department does not manage freshwater fishing and aquaculture in Tasmania.

### **Inland Fisheries Service**

[www.ifs.tas.gov.au/ifs/home](http://www.ifs.tas.gov.au/ifs/home)

The Inland Fisheries Service is responsible for managing Tasmania's freshwater fish resources and aquaculture. The Service has an obligation to manage Tasmania's freshwater resources in a sustainable manner, so that the best use is made of them while ensuring that Tasmania's freshwater fauna and its habitat are protected for the benefit of future generations.

### **Fishcare Volunteers**

[www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/ALIR-4YL2LX?open](http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/ALIR-4YL2LX?open)

Fishcare Volunteers are enthusiastic individuals who give up their time in order to help members of the recreational fishing community with good fishing practices and the rules. There are currently 90 *Fishcare* Volunteers working around Tasmania to improve the State's recreational fishing experience and to help make sure that there are fish for the future.

Fishcare Volunteers patrol at local fishing spots, educate school groups or staff Fishcare Trailers at events as boat shows. They also conduct "Take a Kid Fishing" days at venues around the State.

Fishcare Volunteers are well versed in the rules and regulations relating to recreational fishing. There are Fishcare Volunteer groups in the South, North and Northwest.

## **Queensland**

### **Department of Primary Industries**

[www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/28\\_ENA\\_HTML.htm](http://www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/28_ENA_HTML.htm)

In Queensland, the Department of Primary Industries is responsible for the protection and conservation of fisheries resources while maintaining profitable commercial and enjoyable recreational fishing sectors. The Department is also the lead agency in developing the policy framework for the management of Queensland's fisheries resources and the development of a profitable fisheries industry.

### **Fishcare volunteer program**

[www2.dpi.qld.gov.au/fishweb/2972.html](http://www2.dpi.qld.gov.au/fishweb/2972.html)

The Fishcare volunteer program is a community-based project in which recreational fishers educate the angling community about the rules and ethics of fishing in Queensland. Its aims:

- To encourage community support for conservation in recreational fishing
- To reduce the take of juvenile fish and the number of individual anglers taking too many fish
- To educate the general public about fisheries regulations
- To help monitor fisheries habitats and alert fisheries managers and the public to any changes

Fishcare volunteers work to raise community awareness about preserving fisheries resources and the need for an ethical approach to recreational fishing. They do this by:

- Promoting the benefits of catch-and-release and giving information on handling fish so that they survive
- Giving advice about fishing methods and how to improve the quality, rather than the quantity, of the catch
- Providing information about rules and regulations

The volunteers' role is educational only. They have no enforcement powers. Volunteers are asked to commit one field activity per month to the program and occasionally attend events, such as boat shows and fishing competitions, kids fishing clinics and seniors fishing days.

## 4. Wild Catch (Commercial) Fishing

The wild catch sector is a vast and diverse industry with fishers using a number of different capture methods. For the 2005/06 year, the total value of Australian wild catch fisheries was around \$1.2 billion<sup>10</sup> (includes vertebrates and invertebrates).

Combined, fishing and aquaculture, is Australia's fifth most valuable rural industry after wool, beef, wheat and dairy, and offer great potential for continuing growth and development.<sup>11</sup>

Most of Australia's fisheries and aquaculture production is exported overseas to countries such as Japan (Australia's main export market for edible products) Hong Kong, and the United States.

Australian seafood is an integral part of our international image as a clean and environmentally responsible country with an enjoyable climate, innovative cuisine and cosmopolitan culture.

The Australian wild capture fishing industry is diverse and covers many methods of fishing and many species of wild fish. The Australian Fishing Zone (ADFZ) extends 200 nautical miles from the baseline of the continent and Australia's island territories. The zone is the largest in the world, covering about 10.3 million square kilometres: one and a third times the area of Australia's land mass.<sup>12</sup>

The quality of the fish product is directly linked to how fish are caught, handled, stored and slaughtered. It is in the interests of the commercial fishing industry to carry out operations in the least stressful way for fish in order to maximise quality and thus maintain the highest commercial value. Many practices have already been adopted in this sector to improve overall product quality and satisfy the general principles necessary to minimise suffering to a fish.<sup>13</sup>

The wild catch industry has a considerable number of Codes of Conduct, Best Practice Manuals and Environmental Management Plans and Systems that include both direct and indirect reference to fish welfare or with minimal amendment would capture the general principles necessary to minimise suffering to a fish.<sup>14</sup>

### Welfare issues related to Wild Catch Fishing

The key welfare issues in the wild catch sector relate to the capture, killing, transportation and holding of live fish. Commercial wild catch fisheries in Australia aim to minimise stress through time from the point of capture to slaughter in order to maximise the quality of the seafood product and therefore support the principles for fish welfare.

Currently guidelines and codes of practice/conduct are being developed that address the welfare aspects of wild catch fishing.

In particular, there are two issues that commercial wild capture fisheries are addressing which provide the opportunity to improve animal welfare:

1. the reduction of bycatch
2. improvement in the quality of fish.

Bycatch is the part of a fisher's catch that is returned to the sea either because it has no commercial value or because regulations preclude it being retained.

By addressing these issues, the commercial fishers, are addressing fish welfare.

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<sup>10</sup> *Australian Fisheries Statistics 2006*, ABARE.

<sup>11</sup> Department of Agriculture, Fisheries & Forestry website - <http://www.daff.gov.au/fisheries>

<sup>12</sup> A Review of Current Welfare Arrangements for Finfish in Australia, Panaquatic® Health Solutions Pty Ltd, September 19, 2006.

<sup>13</sup> Panaquatic® Health Solutions Pty Ltd Report on the AAWS Wild Capture Sector Workshop, September 2007

<sup>14</sup> *op.cit*

## Informal Education Wild Catch – Industry

### Australian Seafood Industry Council (ASIC)

The Australian Seafood Industry Council (ASIC) was the seafood industry's peak body until it went into voluntary administration in 2006. ASIC, through its subsidiary, Seafood Training Australia, was responsible for delivering training to the industry. Seafood Services Australia (SSA) has taken over some training responsibilities from ASIC/STA.

### Seafood Services Australia

[www.seafoodservices.com.au](http://www.seafoodservices.com.au)

Seafood Services Australia (SSA) was established in 2002 to link people with the experience, skills and knowledge required to help the Australian seafood industry identify and realise its sustainable development opportunities. These include people from all sectors of the Australia seafood industry, government, and non-government organisations.

SSA was established by:

- The Fisheries Research and Development Corporation (FRDC) — the leading Australian Government agency responsible for planning, investing in and managing fisheries R&D throughout Australia. SSA delivers, or advises on, a substantial proportion of the FRDC's Industry Development Program and manages the FRDC-funded Seafood Industry Development Fund.
- The Australian Seafood Industry Council (ASIC).

Seafood Services Australia (SSA) is the one-stop-service-provider for the Australian seafood industry. SSA has a range of information on the seafood food quality program SeaQual and its website that incorporates some fish welfare issues.

### Other Peak Bodies

Other peak bodies involved with the commercial wild catch fisheries are:

- **Tasmanian Fishing Industry Council** – [www.tfic.com.au/](http://www.tfic.com.au/)  
Peak representative body for Tasmanian licensed commercial fishermen, marine farmers and seafood processors.
- **Northern Territory Seafood Council** – [www.ntsc.com.au](http://www.ntsc.com.au)  
The Northern Territory Seafood Council is the peak representative body of the seafood industry in the Northern Territory, representing approximately 300 businesses.
- **Queensland Seafood Industry Association** – [www.ntsc.com.au/](http://www.ntsc.com.au/)  
QSIA is active in representing members' interests in a range of different areas affecting the industry including fisheries & marine park policy and management planning, research and development, protection of the aquatic environment.
- **Seafood Industry Victoria** – [www.siv.com.au](http://www.siv.com.au)  
Victorian seafood industry peak body.
- **Western Australian Fishing Industry Council** - [www.wafic.com.au/](http://www.wafic.com.au/)  
Peak body representing the professional fishing industry in Western Australia. Members comprise professional fishing associations, exporting and processing companies and fishing industry small businesses.
- **South Australia Fishing Industry Council** – [www.safic.com.au](http://www.safic.com.au)  
The South Australian Fishing Industry Council (SAFIC) is the representative organisation for the commercial seafood sector in South Australia.

## Ocean Watch/SeaNet

[www.oceanwatch.org.au/snindex.htm](http://www.oceanwatch.org.au/snindex.htm)

Ocean Watch was established in 1989 by renowned seafood industry personality Peter Doyle OA in response to adverse public reaction about poor water quality and high levels of contamination in fish from Sydney's inshore ocean outfalls.

Since then, activities have expanded across Australia and now focus on finding practical solutions to environmental problems (both land and marine sourced) affecting coastal and aquatic environments.

Ocean Watch facilitates improved environmental practices across Australian fisheries.

It runs 3 core programs:

1. **Aquatic habitat protection and enhancement** that informs and provides advice to governments, Natural Resource Management (NRM) managers, the community and other coastal and marine stakeholders in relation to NRM issues impacting on the seafood industry.
2. **Aquatic habitat rehabilitation** that undertakes on-ground works to rehabilitate and enhance priority fish habitat areas across Australia. The flagship project within this program is known as *Tide to Table* and is funded under the National Landcare Programme.
3. **Advancing sustainable fisheries** that improves the sustainability of Australian fisheries by working with professional and recreational fishers and others to develop cost-effective and practical solutions to reducing the environmental impacts of professional and recreational fishing.

This program is delivered predominantly to the professional sector through a national environmental extension service called **SeaNet**. SeaNet provides information and advice on reducing environmental impacts, and works directly with industry; managers and researchers to develop and implement improved fishing gear, technology and methods. It aims to minimise the catch of non-target species (bycatch) and encourage environmental best practice for industry.

There is an opportunity with the Advancing Sustainable Fisheries extension program to improve the welfare of fish – both target catch and bycatch.

## **Formal Education – General Aquatic Animals**

The following education and training opportunities are applicable across aquatic animals and are not industry-specific.

## **Formal Education – Higher Education Sector**

Undergraduate and postgraduate courses along with teaching and research programs in Aquaculture, Freshwater and Marine studies are offered by the following higher education institutions, many of which are involved in cooperative research ventures. The exact animal welfare content of these award courses and programs is not readily identifiable, however whatever the adequacy of the content is these organisations provide a structured opportunity for improved animal welfare education in the future.

### **Seafood CRC**

[www.seafoodcrc.com](http://www.seafoodcrc.com)

The Seafood CRC was incorporated on 20 June 2007. It is involved in research and development that includes wild harvest and aquaculture production.

Through research along the entire seafood value chain - from wild-harvest and aquaculture production, to the consumer - the Seafood CRC will assist the seafood industry to profitably deliver safe, high-quality, nutritious Australian seafood products to premium markets, domestically and overseas. The Seafood CRC has 26 research projects under way with another 11 currently awaiting approval (as at November 2007).

The CRC's research program outcomes span the entire value chain from production (wild-harvest and aquaculture) to consumer.

The planned outcome for the CRC is "*Increased profitability and value of the Australian seafood industry, increased access to premium markets, and increased demand for Australian seafood.*"

### **Aquafin CRC**

[www.aquafincrc.com.au/](http://www.aquafincrc.com.au/)

The Aquafin CRC is a research and education provider for the sustainable aquaculture of finfish in Australia. The main research emphasis is on Atlantic salmon and southern bluefin tuna. The Aquafin CRC is a joint venture of a large group of research institutions, universities, industry associations, companies and the Fisheries Research and Development Corporation. The Centre's effectiveness depends entirely on the collaborative efforts of these partners. The CRC also runs an Education and Training Program for postgraduate research students.

### **Industry Training**

One of the objectives of Aquafin CRC is to develop a program in partnership with the national network of training and technology transfer providers, including agribusiness, extension services, TAFE and other vocational training organisations, to transfer our research outcomes to the industry.

### **National Marine Science Centre**

[www.nmsc.edu.au](http://www.nmsc.edu.au)

The National Marine Science Centre (NMSC) at Coffs Harbour is Australia's newest development in the study and research of marine and coastal science and management. With an innovative approach to teaching, students gain first-hand experience in their chosen field, with an emphasis on utilising the amazing marine environment on our own doorstep.

The Centre was opened in 2002 and is a joint venture of the University of New England and Southern Cross University. Both Universities have a history of innovation in natural resource management and marine science that they bring to the NMSC. Undergraduate and postgraduate courses at the NMSC have been tailored to meet student needs, focusing on constantly changing and expanding career opportunities for marine scientists in Australia and overseas.

### **Sydney Institute of Marine Science**

[www.sims.org.au/](http://www.sims.org.au/)

The Sydney Institute of Marine Science (SIMS) is a joint venture, research facility based on Sydney Harbour's North Shore at Chowder Bay. SIMS partners are Macquarie University, University of New South Wales (UNSW), the University of Sydney and the University of Technology, Sydney (UTS). SIMS brings together teams of leading scientists to work on issues that are critical for the management of coastal and oceanic environments.

### **Macquarie University, Sydney, Division of Environmental and Life Sciences**

[www.mq.edu.au](http://www.mq.edu.au)

The Division of Environmental and Life Sciences offers a range of undergraduate and postgraduate courses in the biological sciences. Macquarie University is also a research partner in the Sydney Institute of Marine Science.

### **Deakin University, School of Life and Environmental Sciences**

[www.deakin.edu.au/scitech/les/](http://www.deakin.edu.au/scitech/les/)

The School of Life and Environmental Sciences offers a range of undergraduate and postgraduate courses including a Bachelor of Environmental Science (Freshwater Biology and Management) and a Bachelor of Environmental Science (Marine Biology).

### **National Centre for Marine & Coastal Conservation**

[www.amc.edu.au/ncmcc/](http://www.amc.edu.au/ncmcc/)

Established in 2005 by the Australian Maritime College (AMC), the National Centre for Marine and Coastal Conservation (NCMCC) specialises in conservation education. While the Centre will have a focal point in Point Nepean, it will also deliver programs more widely, including through the Victorian Marine Science Consortium and the Chisholm Institute (Rosebud).

### **School of Marine Biology and Aquaculture, James Cook University**

[www.jcu.edu.au/school/mbiolaq/mbiol/](http://www.jcu.edu.au/school/mbiolaq/mbiol/)

James Cook University is the only tertiary institution with a discipline dedicated to specialised training in marine biology. This reflects its location in North Australia, which provides access to a variety of tropical marine environments and a planning process that identifies marine science as a strategic growth area.

Marine Biology is a discipline within the School of Marine Biology and Aquaculture and enjoys a close working relationship with other disciplines within the Biological Sciences Group.

The Marine Biology discipline has teaching and research programs that emphasise a whole-organism approach to the study of tropical systems. This provides a unique opportunity for direct hands-on research in an area of relatively undisturbed tropical habitats with their associated biodiversity.

### **University of the Sunshine Coast**

[www.usc.edu.au](http://www.usc.edu.au)

The University of the Sunshine Coast currently offers a Bachelor of Animal, Plant and Marine Biotechnology, but there are no new enrolments from 2008. This program was focused on marine, animal, and plant biotechnology.

From 2008, there is a Bachelor of Biotechnology offering students the opportunity to gain a strong foundation in scientific areas that underpin most biotechnology. Students have the opportunity to pursue interests dealing with animals, particularly marine animals in aquaculture and fisheries, plants, environmental biotechnology and microbiology.

### **Southern Cross University, Fisheries Research Centre**

[www.scu.edu.au](http://www.scu.edu.au)

The Fisheries Research Centre (FRC) at Southern Cross University conducts research into the biology of exploited species, the impacts of fishing on aquatic communities and examines strategies for effective management of fisheries, both freshwater and marine.

The FRC conducts research in conservation biology of fishes; ecology and genetics of rare and endangered fish and invertebrates; biology and management of marine and estuarine fish and invertebrates species in commercial and recreational fisheries; and rehabilitation of fish habitat.

Significant projects include: effects of closures to fishing on fish populations and benthic habitats in protected and open areas of marine parks; effects of opening flood gates to inundate former tidal brackish water areas degraded by cattle pasture and the biology of beach worms.

Other projects examine the biology, ecology and evolution of very rare and highly restricted montane freshwater crayfish. This research has resulted in several new species being described and the ecology and reproductive biology of freshwater crayfish from subtropical Australia being completely revised.

Postgraduates employed by NSW Fisheries are studying:

- the vulnerability of fish to different net configurations
- the survivorship of released fish after being hooked, and
- the biology of mullet.

### **Central Queensland University, Faculty of Sciences, Engineering & Health**

[www.cqu.edu.au](http://www.cqu.edu.au)

CQU has undergraduate courses in aquaculture within the Faculty of Sciences, Engineering & Health.

### **Centre for Marine Studies (CMS)**

[www.marine.uq.edu.au/index.html](http://www.marine.uq.edu.au/index.html)

The Centre for Marine Studies coordinates research and teaching on the ocean, coast, estuaries and reefs of Queensland for the University of Queensland.

Accessible through the Centre are the diverse marine systems of Queensland, which include pristine coral reefs, rugged rocky shores and clean beaches, salt-marshes, mangroves and seagrasses. Their teaching and research programs cover the full range of organisms and environments.

The Centre coordinates Heron Island Research Station, the largest research station on the Great Barrier Reef; Moreton Bay Research Station, a new modern facility on Stradbroke Island in Moreton

Bay; Low Isles Research Station, a small station on the inner, northern Great Barrier Reef; a suite of vessels of various capacities; and an Aquaculture facility a few kilometres from the main University campus.

### **CRC Reef**

(Coral Reef Cooperative Research Centre for Ecologically Sustainable Development of the Great Barrier Reef) [www.reef.crc.org.au](http://www.reef.crc.org.au)

CRC Reef Research Centre is a collaborative venture with the following organisations:

- Association of Marine Park Tourism Operators (AMPTO)
- Australian Institute of Marine Science (AIMS)
- Great Barrier Reef Marine Park Authority (GBRMPA)
- Great Barrier Reef Research Foundation (GBRRF)
- James Cook University (JCU)
- Queensland Seafood Industry Association (QSIA)
- Queensland Department of Primary Industries and Fisheries (DPI&F)
- SUNFISH Queensland Inc.
- The University of Queensland is an associate member.

The CRC Reef is a potential education resource. For example, one PhD student is undertaking a scholarship research project titled "Perceived and actual differences in recreational line catch trends between estuaries open and closed to commercial gillnet fishing in north Queensland."

### **Central Queensland University**

[www.cqu.edu.au](http://www.cqu.edu.au)

Central Queensland University's Faculty of Sciences, Engineering & Health offers a 144-hour course in aquaculture during term 2 through its Rockhampton campus.

### **Flinders University of SA, School of Biological Sciences**

[www.flinders.edu.au](http://www.flinders.edu.au)

Flinders University in South Australia offers degrees in Marine Biology and Aquaculture through its School of Biological Sciences. Qualifications include:

- Bachelor of Technology (Aquaculture) - 3 years full time
- Bachelor of Science (Marine Biology) - 3 years full time
- Bachelor of Technology (Aquaculture) (Honours) - 1 year full time
- Master of Science (Research) - 2 years full time
- Doctor of Philosophy (Research) - 3-4 years full time

### **Lincoln Marine Science Centre**

[www.bio.flinders.edu.au/marine/lmsc/lmsc.htm](http://www.bio.flinders.edu.au/marine/lmsc/lmsc.htm)

The LMSC was established to support research and tertiary level education in marine science. Located on the shore of Boston Bay in Port Lincoln, South Australia, it is situated in the heart of a region with a temperate climate, clean waters, abundant marine life and many developing aquaculture industries.

Opened in 1995, the facilities and location make it ideally suited to marine research and education. In addition to activities by Flinders University staff and associates, it is a research centre for the South Australian Research and Development Institute (SARDI), and a venue for joint teaching activities with the Spencer Institute of Technical And Further Education (TAFE).

The LMSC also offers excellent facilities for visiting students and researchers including a large lecture theatre, teaching laboratory and extensive aquarium areas.

### **University of Tasmania, School of Aquaculture**

<http://fcms.its.utas.edu.au/scieng/aqua/>

School of Aquaculture courses include:

- Associate Degree in Aquaculture
- Bachelor of Aquaculture
- Bachelor of Science
- Graduate Diploma in Aquaculture
- Masters of Applied Science (Aquaculture)

### **The Tasmanian Aquaculture and Fisheries Institute (TAFI)**

[www.utas.edu.au/tafi](http://www.utas.edu.au/tafi)

The Institute is a joint venture between the Tasmanian Government and the University of Tasmania, combining aquatic research expertise in sustainable fisheries, sustainable aquaculture and natural resource management. The Marine Research Laboratories (MRL) are situated in Taroona on the Hobart waterfront and form the heart of TAFDI. MRL is responsible for the annual assessments upon which the management of all Tasmanian fisheries is based.

### **Australian Maritime College**

[www.amc.edu.au](http://www.amc.edu.au)

The Australian Maritime College (AMC) is a higher education institution that has a range of courses including fisheries and marine resource management. From 2008, the AMC and the University of will be integrated, with AMC becoming a specialist institute of the University. AMC will continue as a centre of expertise in maritime-related studies, including marine science and technology, fisheries and sustainable management of ocean resources.

### **Fish Health Unit (DPI&W, Tasmania)**

The Tasmanian Department of Primary Industries and Water has a Fish Health Unit, as part of the Animal Health Laboratory at Mt Pleasant. This Unit provides veterinary pathology and fish microbiology diagnostic services for aquaculture and wild fish, including shellfish and crustacea; and participates in research projects dealing with fish health issues with the Tasmanian Aquaculture and Fisheries Institute.

### **Curtin University of Technology, Centre for Marine Science and Technology**

[www.curtin.edu.au](http://www.curtin.edu.au)

[www.cmst.curtin.edu.au](http://www.cmst.curtin.edu.au)

Curtin University offers a Bachelor of Science (Aquatic Resources and Fisheries Management) and a Master of Science (Aquatic Resource Management).

The Aquatic Science group within the Department of Applied Biosciences at Curtin University has been conducting research and offering courses in aquaculture, aquatic resources, fisheries management, and more recently, coastal zone management, since 1990. The Curtin Aquatic Research Laboratories (CARL) has recently been constructed to recognise the need to conduct quality research and to produce high calibre graduates to be future managers of Australia's precious aquatic resources.

## **Murdoch University School of Veterinary and Biomedical Sciences**

[www.vetbiomed.murdoch.edu.au/research/res\\_groups.html#FHU](http://www.vetbiomed.murdoch.edu.au/research/res_groups.html#FHU)

Within the School of Veterinary and Biomedical Sciences at Murdoch University there are two fisheries-related research groups:

- the Fish Health Unit and
- the Inland Aquaculture Research Group.

Murdoch University also offers a Bachelor of Science (Marine Science).

## **CSIRO - Marine and Atmospheric Research**

[www.cmar.csiro.au](http://www.cmar.csiro.au)

CSIRO Research programs include:

- Aquaculture
- Aquaculture and Biotechnology
- Aquaculture and fisheries
- Fisheries
- Researching healthier marine ecosystems
- Tagging research [white sharks, whale sharks, grey nurse]
- Ecosystem-based fishery management
- Fishery assessment in south-east Australia
- Scientific support for Australian fisheries
- Fish for the future: fisheries and aquatic ecosystems
- Australian National Fish Collection
- CSIRO Fish Diseases Laboratory
- CSIRO Wealth from Oceans Flagship

The CSIRO website also has links to useful marine science education websites.

## **Australian Marine Science Association (AMSA)**

[www.amsa.asn.au](http://www.amsa.asn.au)

AMSA is Australia's major professional association for marine scientists from all disciplines. The primary goal of AMSA is to advance marine science and its understanding in Australia. AMSA works to promote liaison and foster cooperation between the diverse organisations/institutions and workers across Australia in the many disciplines of marine science, through:

- regular publication of a Bulletin
- holding an annual conference and other specialist meetings
- its website and associated discussion list.

As well as operating nationally, AMSA has active Branches in most States and Territories.

## **Careers in Marine Science (AMSA)**

[www.amsa.asn.au/cims.html](http://www.amsa.asn.au/cims.html)

The Australian Marine Science Association website has an on-line version of their booklet *Careers in Marine Science*. This also includes a table of universities and their subject departments, with hyperlinks to their own web pages.

## **Formal Education – VET Sector**

### **Agrifood Industry Skills Council (AFISC)**

[www.agrifoodskills.net.au](http://www.agrifoodskills.net.au)

[www.agrifoodskills.net.au/training-seafood.php](http://www.agrifoodskills.net.au/training-seafood.php)

The Agrifood Industry Skills Council (AFISC) aims to provide accurate industry intelligence to the vocational education and training sector about current and future skill needs and training requirements of its industries. Council supports the development, implementation and continuous improvement of quality nationally recognised training products and services, including Training Packages.

There are four approved AFISC training packages from which the Aquatic animals sector selects units of competency when delivering together training courses:

1. Seafood Industry Training Package (SITP) - the principal training package for this sector
2. Animal Care and Management Training Package (RUV04) - contains units of competency related to the care of ornamental fish
3. Rural Industry Training Package (RTE03) - contains units of competency related to industry animal welfare requirements.
4. Australian Meat Industry Training Package (MTM07) - contains units of competency that can be adapted for the humane slaughter of fish.

### **Training Package Reviews**

In 2006 the Agri-Food Industry Skills Council managed a review of Seafood Industry Training Package to determine its future skills development needs. Changes to Australian Government policy and procedures require the incorporation of employability skills, identification and removal of unnecessary duplication and template adherence. This review is ongoing.

### **Training Package Reform**

During 2007 the Agri-Food Industry Skills Council has responded to the challenge of simplifying national training packages by retaining the integrity of qualifications and units while at the same time reducing complexity.

The AFISC solution incorporates a range of initiatives that are designed to improve the understanding of training packages. The fundamental focus is on establishing clear industry and job needs, and clarity of purpose relating to units of competency and qualifications that are structured according to industry expectations.

Associated with this focus is a shift to incorporate implementation issues into consultation and development and promotion of industry guides. This initiative has the capacity to support training package improvement by providing contextualisation detail not possible in a unit of competency.

In late 2007, AFISC completed a round of consultation with national bodies associated with the training package improvement (including rationalisation) and training package review projects.

A key strategy going forward is to consolidate the AFISC unit of competence framework. This will involve improving the content within units of competence to more precisely define the "specification of work" required by the relevant industry.

This will lead to a greater transparency and understanding resulting in more valid and consistent assessment outcomes. The major impact will be a reduction to the list of knowledge and skill and the range of variables. The evidence guides will also be reworked to remove ambiguity. This is designed to provide clarity in relation to developing valid assessment and support materials.

A key outcome of the Training Package Reform will be Industry ownership. The reform will increase the capacity of industry (employers and employees) to own, understand, use and comment on their relevant section of the competency framework, as a result of the removal of content that does not add value.

This is an important opportunity for the AAWS. More information on Training Package reform will be available from AFISC in 2008.

### **Seafood Industry Training Package (SF104)**

The SF104 Seafood Industry Training Package (SITP) was endorsed in January 2004. During 2005, the Package was extended to include new qualifications in Environmental Management Systems at AQF levels 3 and 4. The National Quality Council (NQC) endorsed these qualifications in March 2006. Four new units of competency covering recirculation aquaculture systems were also endorsed during 2006.

The Seafood (SF104) training package has 27 qualifications at Certificate I to IV and diploma levels, covering aquaculture, compliance, charter operations, fishing, processing and sales and distribution.

#### **Industry sectors**

- Fishing
- Aquaculture
- Seafood processing and seafood sales and distribution
- Fisheries compliance

The Seafood Industry Training Package incorporates all commercial activities conducted in or from Australia concerned with harvesting, farming, culturing, processing, storing, transporting, marketing or selling fish and seafood and/or fish and seafood products.

The skills and knowledge required to work in the industry have been captured in competency standards for the four sectors of the seafood industry:

- Fishing sector: includes work undertaken by deckhands, fishers, skippers of fishing vessels, managers of fishing operations, business managers, divers and fishing charter operators.
- Aquaculture sector: includes work undertaken by field hands, leading hands, technicians, supervisors, quality assurance officers, operations managers and aquaculture business managers. The sector covers temperate and tropical operations and includes pearling and crocodile farms and land-based, water-based and hatchery operations.
- Seafood processing and seafood sales and distribution sector: includes work undertaken by basic and skilled process workers, leading hands, distributors, seafood retailers and wholesalers, supervisors, managers and seafood importers and exporters.
- Fisheries compliance sector: includes work undertaken by fisheries compliance officers, supervisors, managers and compliance support officers in indigenous Australian communities.

The National Centre for Vocational Education Research (NCVER) holds data on the take up of SITP qualifications through new apprenticeships and traineeships. The data reflects enrolments where training contracts have been used. It does not include fee-paying students or enrolments in anything less than a qualification (i.e. short courses).

The SF104 package is being used for short courses, VET in Schools programs, Traineeships/New Apprenticeships and Certificates of competency (e.g. coxswains). Anecdotal evidence from a AFISC 2006 survey suggests that all sectors access training to address specific needs but mostly this is through short courses in selected units. There is an increasing trend towards the take up of individual competencies and groups of competencies (skill sets) as distinct from the study of all units in a particular qualification.

## **Award Courses**

Studies within the Seafood Industry Training Packaging (SITP), developed by the Agri-Food Industry Skills Council can lead to the attainment of qualifications that include:

Certificate I in the Seafood Industry (Aquaculture)  
Certificate I in the Seafood Industry (Fishing Operations)  
Certificate II in the Seafood Industry (Aquaculture)  
Certificate II in the Seafood Industry (Fishing Operations)  
Certificate II in the Seafood Industry (Seafood Processing)  
Certificate III in the Seafood Industry (Aquaculture)  
Certificate III in the Seafood Industry (Fishing Operations)  
Certificate III in the Seafood Industry (Fisheries Compliance)  
Certificate III in the Seafood Industry (Environmental Management Support)  
Certificate IV in the Seafood Industry (Aquaculture)  
Certificate IV in the Seafood Industries (Fishing Operations)  
Certificate IV in the Seafood Industry (Fisheries Compliance)  
Certificate IV in Seafood Industry (Environmental Management)  
Diploma of the Seafood Industry (Aquaculture)  
Diploma of the Seafood Industry (Fishing Operations)  
Diploma of the Seafood Industry (Fisheries Compliance)

## **Registered Training Organisations**

Details of all RTOs, courses and competencies can be found on the National Training Information Service website ([www.ntis.gov.au](http://www.ntis.gov.au)).

Registered Training Organisations (RTOs) deliver industry-related training based around the competencies in the Training Packages developed by AFISC. Training in the aquatic animals sector draws primarily on units of competency from the Seafood Industry Training Package. In addition, RTOs who deliver training in this sector are increasingly also using animal welfare related units of competency from the Animal Care and Management Training Package (RUV04) and the Australian Meat industry training package (MTM07).

As part of the review of the Australian Seafood Industry Training Package<sup>15</sup>, the aquaculture industry is now developing a training package which encompass a full range of workplace tasks. The key benefit of this package will be the provision of consistent training across all Australia.

A training provider with the National Aquaculture Training Institute (NATI), SA, has provided comment to AFISC regarding recommended changes to the Seafood Training Packaging to include more animal welfare or associated units. The appropriate units come from the Rural Training Package (eg. RTE3136A Comply with industry animal welfare requirements, or RTE4120A Implement and monitor animal welfare programs) as well as for 'embedding' of animal welfare into the Occupational Health and Safety and Ecological Sustainable Development practices references already in the existing SITP competency units.

NATI undertakes training in the ornamental industry using the RUV04 Animal Care and Management Training Package (eg. RUV4501A Manage compliance in the companion animal industry).

NATI undertakes training for a number of RTOs around Australia and includes a training session specifically on aquatic animal welfare. This session is integrated into Health (eg. SFIAQUA505B Plan stock health management, RUV3504A Monitor & maintain health of companion animals), Production (eg. SFIAQUA509B Develop a stock production plan) and QA/Food safety (eg. MTMPS5603A Develop, manage & maintain quality systems, RTE5903A Plan, implement & review a quality assurance program) training materials.

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<sup>15</sup> AFISC 2005, 2006, 2007

In all cases there is a strong emphasis on the production of a high quality product. To achieve this training includes consideration of animal welfare issues, but these are also inherent in taking care of the stock and their culture conditions.

**Some of the Registered Training Organisations offering VET courses in SITP include:**

- Australian Institute of Marine Science, Townsville, QLD ([www.aims.gov.au](http://www.aims.gov.au))
- Australian Seafood Industry Council, ACT ([www.asic.org.au](http://www.asic.org.au))
- Australian Maritime College, Launceston TAS ([www.amc.edu.au](http://www.amc.edu.au))
- Central Queensland University, School of Biological and Environmental Science, Rockhampton ([www.cqu.edu.au](http://www.cqu.edu.au))
- Central West TAFE WA (Batavia TAFE) ([www.centralwest.wa.edu.au](http://www.centralwest.wa.edu.au))
- Charles Darwin University, Darwin ([www.cdu.edu.au](http://www.cdu.edu.au))
- Deakin University - Warrnambool Campus, School of Ecology & Environment ([www.deakin.edu.au](http://www.deakin.edu.au))
- East Gippsland Institute of TAFE, Bairnsdale Campus ([www.egtafe.vic.edu.au](http://www.egtafe.vic.edu.au))
- James Cook University, Department of Aquaculture, School of Biological Science, Townsville [www.jcu.edu.au/school/mbiolag/](http://www.jcu.edu.au/school/mbiolag/)
- MESA - Marine Education Society of Australasia ([www.mesa.edu.au](http://www.mesa.edu.au))
- Nagle College, Bairnsdale ([www.nagle.sale.catholic.edu.au](http://www.nagle.sale.catholic.edu.au))
- National Fishing Industry Education Centre (NFIEC)
- National Training Advisory Body for the Australian Seafood Industry, ACT
- North Coast Institute National Fishing Industry Education Centre, Grafton NSW ([www.natfish.tafensw.edu.au](http://www.natfish.tafensw.edu.au))
- Northern Melbourne Institute of TAFE, Epping ([www.nmit.vic.edu.au](http://www.nmit.vic.edu.au))
- Northern Territory University, School of Biological and Environmental Science, Darwin NT
- RMIT University, Melbourne ([www.rmit.edu.au](http://www.rmit.edu.au))
- South Metropolitan College of TAFE, Fremantle Maritime Centre Fremantle WA ([www.southmetrotafe.wa.edu.au](http://www.southmetrotafe.wa.edu.au))
- Southern Cross University, Lismore ([www.scu.edu.au](http://www.scu.edu.au))
- Spencer Institute of TAFE, Primary Industries Program, Port Lincoln, SA ([www.tafe.sa.edu.au](http://www.tafe.sa.edu.au))
- Sunraysia Institute of TAFE, Mildura ([www.sunitafe.edu.au](http://www.sunitafe.edu.au))
- University of Tasmania ([www.utas.edu.au/tafi](http://www.utas.edu.au/tafi))
- Wodonga Institute of TAFE, Wodonga ([www.wodonga.tafe.edu.au](http://www.wodonga.tafe.edu.au))

**Australian Fisheries Academy, SA**

Certificate II in Seafood Industry (Aquaculture)  
Certificate II & III in Seafood Industry (Fishing Operations)  
Certificate II & III in Seafood Industry (Fisheries Compliance)

**Cowell District High School, SA**

Certificate I in Seafood Industry (Aquaculture – 4 core units)

**Murray Institute of TAFE, SA**

Certificate II & III in Aquaculture (Freshwater)

**National Aquaculture Training Institute, SA**

Certificate II, III, IV and Diploma in Aquaculture (offered in conjunction with other RTO's)

**Nurioopta High School, SA**

Certificate I – Into to Aquaculture / Water quality (in conjunction with Spencer TAFE)  
Barramundi growout (experimental/pilot level)

**Parndana Area School, SA**

Certificate I – SFI Core Units & Into to Aquaculture

**TAFE SA, Port Lincoln Campus (also at Gilles Plains Campus - Adelaide)**

Certificate III in Seafood Industry (Aquaculture)  
Diploma in Seafood Industry (Aquaculture) - Port Lincoln Campus only

## **Challenger TAFE WA**

[www.challengertafe.wa.edu.au](http://www.challengertafe.wa.edu.au)

The WA Maritime Training Centre - Fremantle has been conducting training in aquaculture since 1989. The industry is diverse and will require skills in hatchery and on-growing operations as well as marketing and support services. The Aquaculture section works closely with local, national and international industry to ensure the highest quality and relevance of its training.

Courses provide graduates with qualifications as Aquaculture Farmhands, Technical Assistants, Aquaculture Technicians and in hatchery management.

The Diploma of Aquaculture is also recognised as an entry pathway into many university aquaculture degrees. The Centre also offers a Graduate Diploma of Marine Finfish Hatchery Management.

Aquaculture modules are also offered part-time or on-line.

- Certificate II&III in Seafood Industry (Aquaculture)
- Diploma in Seafood Industry (Aquaculture)
- Certificate II in Seafood Industry (Aquaculture) - Online
- Graduate Diploma in Marine Hatchery Management

## **Marine Innovation South Australia (MISA)**

[www.misa.net.au](http://www.misa.net.au)

Flinders University and the University of Adelaide are working with Marine Innovation South Australia (MISA) and its partners to provide enhanced secondary and higher education pathways and vocational and industry training courses.

Their researchers are major players in a variety of MISA initiatives to strengthen research capacity within South Australia. Flinders University, the South Australian Research and Development Institute (SARDI) and TAFE SA are further collaborating in infrastructure developments that include a multi-million expansion of the Lincoln Marine Science Centre (LMSC) in Port Lincoln, providing world-class facilities to attract significant new marine education and research activities.

## **Seafood Training Centre of Excellence**

Established in September 2006, the new Seafood Training Centre of Excellence aims to improve the quality and standard of vocational education and training to develop a dynamic and suitably trained workforce for the seafood industry. MISA partners will tap into the resources of the new Seafood Training Centre of Excellence.

## **The National Fishing Industry Education Centre**

[www.natfish.tafensw.edu.au](http://www.natfish.tafensw.edu.au)

The National Fishing Industry Education Centre (Natfish) offers a variety of accredited certificate and short courses for marine and freshwater industries covering aquaculture, seafood, marine studies and recreational fishing services. The centre has been recognised for excellence in flexible delivery through various awards including a National Best Practice Award. Natfish is part of the TAFE NSW - North Coast Institute. Natfish won the NSW Large Training Provider of the Year Award in 2004 & 2005, and the 2004 Australian Large Training Provider of the Year Award.

## **Aquaculture**

Natfish plays a major role in preparing aquaculture newcomers to operate efficiently, avoid the pitfalls and problems that troubled many industry pioneers. It offers short courses, traineeships and Certificate II through to Diploma level courses, designed for farm workers through to managers and owner operators. The mix of distance education and practical workshop blocks at Natfish makes the courses accessible to students across Australia.

### **Seafood**

Natfish offers seafood courses that are delivered by a mixture of flexible work-based training and distance education with some classroom sessions where appropriate.

These courses are registered for trainees and are aimed at people working already in the seafood industry. Much of the study is work based and the courses focus on recognising and formalising skills already learnt in the workplace and providing targeted training in the areas where it is needed.

### **Recreational fishing**

The Recreational Fishing Services courses take people who have an interest in fishing and give them skills they need to make a career in the industry. The courses prepare learners for employment in a support role for this sport through retail, wholesale, guiding or charter work.

## Formal Education – Schools Sector

### Marine Education Society of Australasia

[www.mesa.edu.au/](http://www.mesa.edu.au/)

The Marine Education Society of Australasia (MESA) is a national organisation that aims to bring together people interested in the study and enjoyment of coastal and marine environments.

MESA provides a forum for the sharing of ideas to facilitate the development of leading environmental education and interpretation programs with a coastal and marine focus.

MESA also promotes the sustainable use of marine and coastal environments through education.

Members are a wide variety of educators who share a common belief in education to achieve ecologically sustainable development for the marine environment.

MESA:

- Supports educators in delivering best practice marine education.
- Hosts the national event "Seaweek"
- Facilitates training, workshops and conferences for members.
- Produces educational kits.
- Promotes networking of environmental educators through the MESA website, forums and the quarterly MESA e-newsletter *Undercurrents*.

### MESA Coasts and Marine Schools Project

The MESA Coasts and Marine Schools Project is a comprehensive **professional development program for teachers** to develop skills and strategies for including marine education programs in school curricula.

The 15 modules and the supporting materials, including Black Line Masters and a Field Activities Guide, are designed to promote inclusion of coastal and marine content in school programs from Kindergarten to Year 12 and incorporates currently available teaching materials and resources.

It is in modular form for flexibility of use and to cater for differences in the needs of educators. This web version of the workshop modules has been developed to provide ease of access to these materials.

### Seaweek 2007 - Marine bycatch matters

MESA online teaching units and information sheets accompany Seaweek, held in March each year. Online teaching units developed for 'bycatch' can be downloaded free of charge. The 2007 theme had a definite aquatic welfare emphasis – the welfare of bycatch.

#### Discover bycatch – for Prep to Year 3

This unit introduces young students to the fisheries issue of bycatch – “when fishers target particular species that they want to catch, they also catch other species accidentally, these species are called bycatch”. Students obtain an understanding of the types of bycatch, such as marine mammals, seabirds, reptiles and sharks. They also become familiar with where their seafood comes from and fishing methods.

#### Explore bycatch and technologies to reduce it – for Years 4 to 7

This unit introduces students to the issue of bycatch in fisheries – “when fishers target particular species that they want to catch, they also catch “bycatch”. Students learn about the groups involved with the use, management and development of bycatch reduction devices. In examining bycatch, students are given a preliminary introduction to fisheries, including the contributions fisheries make

(food, economic, cultural, recreational), the issues they are trying to manage (such as overfishing, habitat impacts) and advancements in fisheries technologies.

### **Bycatch rescue – for Years 8 to 10**

In this unit students investigate the bycatch of marine mammals, seabirds, reptiles and some sharks and study ways in which individuals, communities, industry and Governments can protect, manage and conserve these bycatch species.

In Australia, fishers, makers of fishing gear, researchers, government and non-government organisations have worked together to introduce fishing technologies and innovations, including changes to fishing gear and practices that have reduced bycatch. Students gain an understanding of fishing practices and how the behaviour of the bycatch species can be combined to develop solutions in trying to reduce bycatch of species.

### **Managing bycatch in fisheries – for Years 11 to 12**

During this unit students gain an appreciation for, and understanding of fishing and specifically, the processes that affect bycatch in fisheries, how solutions to reduce bycatch can be developed and the resulting changes that can occur through sustainable fisheries management. Students learn to understand the need for sustainable management practices and the complexity of developing solutions to issues such as bycatch, and also to take actions to promote best environmental practices.

### **Marine Teachers Association of NSW**

[www.wetpaper.com.au/mtansw/main.html](http://www.wetpaper.com.au/mtansw/main.html)

The professional networking organisation of marine teachers working in NSW secondary schools. All schools in NSW will from 2008 be required to adhere to the National code of practice for recreational and sport fishing (as per Recfish Australia).

### **Deep Blue Sea Marine Education**

[www.deepblueseas.com.au](http://www.deepblueseas.com.au)

Deep Blue Sea Marine Education is a mobile hands-on learning experience which encourages children to learn about the marine life that inhabits the cool temperate waters of Victoria's Port Phillip and Western Port bays.

### **Gould League of Victoria**

[www.gould.edu.au/](http://www.gould.edu.au/)

The Gould League of Victoria produces materials, both as publications and on-line resources, to help develop and deliver a marine education program in schools.

### **Seaweed Sally Marine Education**

[www.seaweedsally.com.au](http://www.seaweedsally.com.au)

A mobile marine education program in Victoria run by a qualified aquatic scientist.

### **Ocean View College**

[www.oceanviewths.sa.edu.au](http://www.oceanviewths.sa.edu.au)

Ocean View College, an R-12 school, is situated on the beachfront of the St Vincent's Gulf, with a number of facilities conveniently located within easy access. In 2001, Ocean View College identified a number of elements of Marine Studies, such as Community, Recreation, Employment and the Environment, that could be integrated within the schooling framework. Their website includes examples of student-designed marine websites.

### **Marine Links: Aquatic Sciences Aquaculture – A Resource for Science Teachers**

The Marine Links project is generating a marine science resource for secondary science teachers, with an emphasis on aquatic sciences and aquaculture. The project is funded by Tasmania's Cradle Coast Natural Resource Management and developed by personnel from The University of Tasmania (School of Aquaculture), the State Education Department (Woodbridge District School) and the Tasmanian Department of Primary Industries and Water. Information in the resource has been sourced from current aquatic science school curricula, Tasmanian online campus education department materials in aquatic sciences, aquaculture academic staff, industry personnel, government staff, text books, journals and the internet, and compiled into easy to follow sections. The finished resource will be presented as an electronic text book in a DVD-ROM format containing facts and figures, descriptive material, photographs, video clips, PowerPoint displays, PDFs, web links and classroom activities from which teachers will be able to draw to personalise their lessons. The DVD will be laid out in a number of sections under headings relevant to aquaculture in Australia focusing mainly on Tasmania. Each section will be composed of background notes (with a built in glossary function) along with the resources for teachers to use in their classes. [Contact: [Marine.Links@aqua.utas.edu.au](mailto:Marine.Links@aqua.utas.edu.au)]

### **Sydney Aquarium**

[www.sydneyaquarium.com.au/AquaSchool/CLA030.asp](http://www.sydneyaquarium.com.au/AquaSchool/CLA030.asp)

The Sydney Aquarium produces on-line resources for primary and secondary students.

### **Melbourne Aquarium**

[www.melbourneaquarium.com.au/education](http://www.melbourneaquarium.com.au/education)

The Melbourne Aquarium produces on-line resources for primary and secondary students.

### **Kondinin Group**

[www.kondinin.com.au](http://www.kondinin.com.au)

The Kondinin Group produces an agricultural series of educational materials for children called THE WORKBOOT SERIES. This is a collection of books and teacher resource kits about Australia's primary industries, and is designed to educate children about the role and diversity of agriculture in Australia and the key issues and challenges confronting farm enterprises. The books show all aspects of the industry to allow children to gain a balanced view of the production process and where they fit into that chain as consumers.

The Workboot Series includes *The Story of Seafood in Australia* book. The book has won an award at The Australian Awards for Excellence in Educational Publishing. There is also a Seafood teacher's resource kit to help teachers use the book to develop a seafood theme in their classrooms. The teacher's kit contains the relevant book, lesson notes, photocopiable activity pages across the key learning areas and product samples where possible.

### **Into the Blue Education Kit (A resource for teachers)**

[www.nt.gov.au/dpifm/Fisheries/index.cfm?Header=Into%20the%20Blue](http://www.nt.gov.au/dpifm/Fisheries/index.cfm?Header=Into%20the%20Blue)

Fisheries of DPiFM (Department of Primary Industry, Fisheries and Mines, NT) has produced an educational package focusing on the marine environment. The aim of this kit is to increase students understanding of marine habitats and the responsibility that everyone shares in ensuring that it remains in good health.

The website also includes **Webquest** which allows students to explore the oceans using an on-line resource for middle primary students studying life in the marine environment.

## **Informal Education – Other**

### **Federal Department of Agriculture, Fisheries and Forestry**

[www.daff.gov.au](http://www.daff.gov.au)

The Australian fishing and aquaculture industries are Australia's fifth most valuable rural industry after wool, beef, wheat and dairy. Growth will continue to occur through aquaculture and increasing returns from current commercial catches through value adding. The Department of Agriculture, Fisheries and Forestry hold a large amount of information on marine and freshwater fisheries.

### **Australian Fisheries Management Authority**

[www.afma.gov.au](http://www.afma.gov.au)

The Australian Fisheries Management Authority (AFMA) is a Commonwealth Statutory Authority responsible for the management of fisheries under Commonwealth jurisdiction.

### **Fisheries Research and Development Corporation**

[www.frdc.com.au](http://www.frdc.com.au)

The FRDC is a national organisation responsible for planning, funding and managing research and development programs, and facilitating the dissemination of the results of research and development. The FRDC Home page includes links to on-line publications, the FRDC R&D Plan, R&D News, and information on their Directors and Staff.

### **oneFish Community Directory**

[www.onefish.org](http://www.onefish.org)

A fishery projects portal and participatory resource gateway for the fisheries and aquatic research and development sector.

### **Fishing Industry Networks**

Fishing industry networks are an important communication opportunity for the AAWS.

### **GROWfish and Gippsland Aquaculture Industry Network Inc (GAIN)**

GAIN has a significant paid up membership base and a regular mailing list to over 2000 people and organisations. GAIN receives administrative support from Gippsland Development Limited, one of whose regional role is to promote and facilitate the development of aquaculture in Gippsland.

#### **Salmonids**

- Australian Trout & Salmon Farmers Association
- Tasmanian Salmonid Growers Association Ltd ([www.tsga.com.au](http://www.tsga.com.au))
- Victorian Trout Association

#### **Barramundi**

- Barramundi Farmers Association of Australia ([www.abfa.info](http://www.abfa.info))

#### **Mariculture - General**

- Jervis Bay Mariculture Association Inc.
- Marine Farmers Association of Tasmania

### **Silver Perch**

- NSW Silver Perch Growers Association
- Silver Perch Association of WA

### **Tuna**

- Tuna Boat Owners Association of Australia

### **Anglers Alliance, Tasmania**

- Southern Tasmanian Licensed Anglers association
- Northern Tasmanian Fisheries Association
- North Western Fisheries Association.
- Tasmanian Fly Fishing Association.
- Australian Fishing Tackle Association.
- Trout Guides and Lodges Tasmania.
- Three unattached and unaligned independent anglers.

### **Enviro Action**

[www.enviroaction.com.au](http://www.enviroaction.com.au)

Enviro Action assists businesses and industry groups to develop sustainable management systems through training. Enviro Action has worked with a number of seafood industry sectors to improve their environmental practices and management:

- Spencer Gulf Kingfish Farmers and the Seahorse Farm (Port Lincoln)
- Australian Prawn Farmers
- Tuna Farmers

### **TASSAL**

[www.tassal.com.au](http://www.tassal.com.au)

Australia's largest producer and exporter of Atlantic Salmon, marketed under the Royal Tasmanian Salmon brand. There is information about aquaculture available on the website.

## **Informal Education – Animal Interest Groups**

Some of the animal interest groups that focus on fish welfare are included here.

### **Animals Australia**

[www.animalsaustralia.org](http://www.animalsaustralia.org)

Animals Australia believes that fish suffer. Animals Australia has identified fishing as one of its key animal welfare issues and quotes research from Dr Culum Brown from Macquarie University (NSW). The Animals Australia website has extensive information on the following topics:

- Recreational
- Commercial fishing
- Aquaculture
- Live fish in Restaurants
- Pet fish—aquaria
- Do Fish Have Feelings Too?
- Fact Sheet: Fish & Crustaceans

### **PAWS**

[www.paws.org.au](http://www.paws.org.au)

People & Animal Welfare Society Inc (PAWS) is a non-government, not for profit organisation established in 2000.

The PAWS vision is a society wherein humans and animals can coexist peacefully without the threat of cruelty, exploitation or untimely death. Its mission introduce and maintain projects that encourage environmental sustainability, sensible agriculture, community welfare and education, and that display harmonious and productive relationships between humans and animals thereby creating greater peace within society.

PAWS have a section on its website about fishing.

### **Animal Liberation Victoria**

[www.avl.org.au](http://www.avl.org.au)

Animal Liberation Victoria Inc. (ALV) is a non-profit organisation dedicated to helping all animals with a strong focus on those that are factory farmed. The underlying goal of ALV is to abolish the property status of animals.

“Animal Liberation Victoria commits itself to public education concerning the rights of animals.”  
It has information on its website about fishing.

### **Vegetarian Action**

[www.vegetarianaction.org.au/Articles/05BigFish.htm](http://www.vegetarianaction.org.au/Articles/05BigFish.htm)

A South Australian based organisation with a position on tuna farming.

## **5. Live fish held for human consumption**

There are facilities around Australia that hold live fish either for sale to retail outlets (wholesalers) or direct to consumers (markets).

In addition, there are a number of restaurants which house live fish ready to be cooked when ordered by customers.

In both circumstances, there should be a major consideration for the welfare of the fish – both in caring for it during its life and killing it humanely.

### **Victorian Department of Primary Industries**

<http://www.dpi.vic.gov.au/dpi/nrenfa.nsf/linkview/93eb9925e88a7cf7ca256d780013f01951f52e6260bc77b8ca2572b10008eed4>

The Victorian Department of Primary Industries has developed an information sheet (available on its website) – Guidelines on Fish and Crustacea welfare for marketing and preparation for human welfare – to address the welfare of live fish held for consumption.

## 6. Harvesting of tropical fish

Worldwide it is estimated that more than 20 million tropical fish are caught each year for the aquarium trade<sup>16</sup>. Leading marine biologists have also called for a crackdown on the trade in tropical fish, which is threatening to destroy the world's already endangered coral reefs, including Australia's Great Barrier Reef.

Scientists have said that the plunder of reef fish is having a devastating impact on coral reserves.<sup>17</sup> Apart from endangering these tropical species, which are slow to breed and therefore slow to recover from overfishing, the effect on coral reefs is highly damaging, the scientists say.

Little information was found about education related to the need to limit or stop the harvest of tropical fish.

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<sup>16</sup> "Minding Nemo: Tropical Fish Trade Threatens Coral Reef Ecosystems", The Association of Marine Laboratories of the Caribbean website, <http://www.amlc-carib.org/en/index.html?&L=0>

<sup>17</sup> 'Tropical fish trade threatens to devastate reefs' by Robin McKie, *The Observer*, 6 August 2006.

## Appendix 1: Seafood Industry Training Package

### Competencies in the functional area that have specific animal welfare implications related to aquatic animals

Unit Code	Unit
SFIAQUA201A	Collect broodstock and seedstock
SFIAQUA201B	Collect broodstock and seedstock
SFIAQUA205B	Feed stock
SFIAQUA206A	Handle stock
SFIAQUA206B	Handle stock
SFIAQUA207A	Harvest stock
SFIAQUA209B	Manipulate stock culture environment
SFIAQUA213A	Monitor stock and environmental conditions
SFIAQUA213B	Monitor stock and environmental conditions
SFIAQUA216A	Harvest aquaculture stock
SFIAQUA217A	Maintain stock culture and other farm structures
SFIAQUA218A	Control predators, pests and diseases
SFIAQUA303A	Coordinate stock handling activities
SFIAQUA309A	Oversee harvest and post-harvest activities
SFIAQUA310A	Oversee emergency procedures in an aquacultural enterprise
SFIAQUA401A	Supervise a stock health program
SFIAQUA402A	Coordinate construction/installation of stock culture and farm structures
SFIAQUA403A	Supervise stock production
SFIAQUA404A	Operate hatchery
SFIAQUA408A	Supervise harvest and post-harvest activities
SFIAQUA502A	Develop and implement an aquaculture breeding strategy
SFIAQUA505A	Plan stock health management
SFIAQUA505B	Plan stock health management
SFIAQUA509B	Develop a stock production plan
SFIDIST202B	Retail fresh, frozen and live seafood
SFIFISH203A	Maintain, prepare, deploy and retrieve trawls to land catch
SFIFISH204A	Maintain, prepare, deploy and retrieve pots and traps to land catch
SFIFISH205A	Maintain, prepare, deploy and retrieve drop lines and long lines to land catch
SFIFISH206A	Maintain, prepare, deploy and retrieve hand operated lines to land catch
SFIFISH207A	Maintain, prepare, deploy and retrieve beach seines, mesh nets or gill nets to land catch
SFIFISH208A	Maintain, prepare, deploy and retrieve purse seines to land catch
SFIFISH209A	Maintain the temperature of seafood
SFIFISH209B	Maintain the temperature of seafood
SFISTOR201A	Prepare and pack stock for live transport
SFISTOR201B	Prepare and pack stock for live transport
TDTA2097B	Replenish stock

### Competencies from other Training Packages

RTE3136A	Comply with industry animal welfare requirements
RTE4120A	Implement and monitor animal welfare programs
RTE5903A	Plan, implement & review a quality assurance program
RUV4501A	Manage compliance in the companion animal industry
RUV3504A	Monitor & maintain health of companion animals
MTMPS5603A	Develop, manage & maintain quality systems