



PROVISION REEF

Promoting Sustainable Reef Harvest



STEWARDSHIP ACTION PLAN 2013

*Mitigating Ecological Risk
in a Changing Climate*

www.provisionreef.org.au

Queensland Coral Fishery

Queensland Marine Aquarium Fish Fishery

Commonwealth Coral Sea Fishery

Project Partners:



CARING
FOR
OUR
COUNTRY



Australian Government
Great Barrier Reef
Marine Park Authority



ARC Centre of Excellence
Coral Reef Studies

Cover Photo: *Blastomussa wellsi*, Fenton Walsh

Copyright © Pro-vision Reef Inc. 2013

This work is copyright. Unless permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission from Pro-vision Reef Inc. Requests and inquiries concerning reproduction and rights should be addressed to:

President
Pro-vision Reef Inc.
Email: info@provisionreef.org.au

This publication is available online at www.provisionreef.org.au

First published 2009 by:

Pro-vision Reef Inc.
ABN: 57 442 161 812
PO Box 5N Cairns North QLD Australia 4870

Donnelly, RJ. 2013. *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate*. Pro-vision Reef Inc., Cairns, Australia.

ISBN: 978-0-646-90850-2

Author: Ryan Donnelly (<http://donnelly.com.au>)

Design: Cool Planet Design (www.coolplanetdesign.com.au)

Photos: Fenton Walsh, Russell Kelley, John Rumney, Great Barrier Reef Marine Park Authority, Kirsten Michalek-Wagner

The author acknowledges the support of the Pro-vision Reef Inc. management committee and members; and the contributions from project partners: Anthony Roelofs from Fisheries Queensland; Randall Owens from the Great Barrier Reef Marine Park Authority; Prof. Morgan Pratchett and Prof. David Bellwood from the Australian Research Council Centre of Excellence for Coral Reef Studies; and Chris Maple from Queensland Parks and Wildlife Service. The author also acknowledges the support provided to the project by Sian Breen from WWF Australia.

The Pro-vision Reef Inc. logo is a Registered Trademark ®

Use of the Pro-vision Reef Inc. logo is conditional and subject to authorisation by Pro-vision Reef Inc. This includes use of the *Stewardship in Action* boat sticker and use of the Pro-vision Reef Inc. logo in any promotional material.



Printed on recycled paper by Lotsa Printing, Cairns

Foreword



Lyle Squire Jnr
[President]

Keeping fish for display is a long held tradition. The earliest known aquarists were the Sumerians in southern Mesopotamia – modern Iraq – who kept fishes in artificial ponds at least 4,500 years ago. Records of fish keeping also date from ancient Egypt and Assyria. Indeed, pictures of fish are found in frescoes in Egyptian tombs.

Marine aquarium displays are relatively new but have formed an effective medium for learning about life in the sea. In his 1854 book, *The Aquarium: an Unveiling of the Wonders of the Deep Sea*, Philip Henry Gosse aroused public interest in aquatic life. With interest came increased knowledge and appreciation of our oceans.

Fast-forward to today and the ornamental fish industry is global in scale. The overwhelming majority of specimens are cultured freshwater fish species but marine displays have grown in popularity. These displays are typically mini-reef reproductions featuring live rock, corals, invertebrates and, of course, brightly coloured reef fish.

A plethora of publications and online forums assist hobbyists to understand the marine life in their care, including interaction with other species and their habitat. It is a hobby for enthusiasts and has launched the careers of many internationally recognised marine biologists and documentary filmmakers.

And literally hundreds of millions of visitors to public aquaria annually are amazed by the diversity of marine life on display accompanied by explanatory extension material that helps expand community understanding and appreciation of life in our seas.

Supplying the marine aquarium markets has created opportunity for income generation for coastal communities in various countries throughout the tropics where such opportunities are often limited. However, the manner in which some of these fisheries are conducted and overseen has raised questions about their sustainability.

The marine aquarium supply industry on Australia's iconic Great Barrier Reef is different. It is conducted within a comprehensive framework of assessment, management and monitoring that includes compulsory periodic third party environmental assessment that ensures continuous improvement in environmental performance. Importantly, it operates within a vast network of marine protected areas.

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate is specially designed to complement fishery and protected areas management arrangements. It has been developed by industry in partnership with the government agencies that oversee it, world-renowned coral and fish scientists and the world's foremost conservation organisation. The initiative enables industry to contribute in a purposeful and practical way to the ecological sustainability of the fisheries at the individual fishery practitioner level.

Pro-vision Reef Inc. is proud to present this initiative and we believe that we have established a sound blueprint for world-class aquarium fisheries.

Lyle Squire Jnr
President

Executive Summary

Pro-vision Reef Inc. is a not-for-profit organisation whose mission is to engender community and market confidence in the marine aquarium industry on the Great Barrier Reef and in the Coral Sea through commitment to the highest standards of environmental performance.

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate is the major output from a collaborative fishery management project funded by Caring For Our Country and Pro-vision Reef Inc.

The goal of the project is to build resilience in the marine aquarium industry on the Great Barrier Reef. The project forms part of a wider strategy of climate change adaptation in response to the industry *Climate Change Vulnerability Assessment* that was completed in 2010.

That study highlighted the longer-term biophysical implications of climate change on coral reef ecosystems. It also indicated that there is a range of shorter-term implications for businesses reliant on coral reef ecosystems that would require action across the industry to assist adaptation now.

Shorter-term implications include management of coral reef fisheries and the process that approves eligibility for export, which is critical to the commercial viability of the marine aquarium industry.

The Queensland Coral Fishery underpins the marine aquarium industry on the Great Barrier Reef. However, all stony corals are listed on Appendix II of CITES.

As a signatory to that international agreement, the Australian CITES Scientific Authority must assess whether international trade in those corals from Australia is detrimental to their survival.

As a result of the CITES Non-detriment Finding, the cycle of fishery assessment, management and monitoring has been made much stronger. Through *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate*, industry aims to contribute in a practical way to driving down ecological risk in the fisheries and to assist achievement of management objectives for the fisheries.

The majority of the marine aquarium industry, particularly those involved in the Queensland Coral Fishery, attended workshops to devise standards to mitigate risk to species identified in the Ecological Risk Assessments of the fisheries.

Fishery businesses also committed to supply coral specimens as part of a Research Plan that will fill knowledge gaps such that the initiative, and the Ecological Risk Assessments, can continuously improve. The industry will provide digital imagery to fishery and marine park managers to assist resource assessment. And they committed to the development of electronic logbooks to provide high-resolution spatial and taxonomic fishery data in real time for the management of the fisheries.

Lastly, this initiative expands the role of the existing Management Response Task Force. The purpose of the Management Response Task Force is to gather the available resources from industry, fishery and marine park management agencies and other applicable expertise to determine a management response to disturbance or sustainability concern that will assist recovery capacity of coral reefs in affected areas.

This initiative builds on the strong foundations of the first edition of the *Stewardship Action Plan* in 2009.

Stewardship Action Plan 2009 (left)
Climate Change Vulnerability Assessment 2010 (right)



Contents

Foreword	I
Executive Summary	II
Stewardship Action Plan 2013	2
Adapting to a Changing Climate	4
Implications for the Great Barrier Reef	4
Implications for Marine Aquarium Industry Businesses	6
Application	7
Goal and Objectives	8
www.provisionreef.org.au	8
Queensland Marine Aquarium Industry	10
Queensland Coral Fishery	10
Queensland Marine Aquarium Fish Fishery	11
Commonwealth Coral Sea Fishery	12
Cycle of Assessment, Management and Monitoring	14
Industry Integration	14
Step by Step	15
Identified Ecological Risk	18
CITES Non-detriment Finding	18
Ecological Risk Assessment	18
Industry Risk Mitigation Standards	22
Collecting Coral	22
Collecting Fish	25
Management Response Task Force	26
Participation	26
Trigger	26
Terms of Reference	26
Filling Knowledge Gaps	28
Research Plan	28
Resource Condition Monitoring	30
e-logs	30

Stewardship Action Plan 2013

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate is the major output from a collaborative fishery management project funded by Caring For Our Country and Pro-vision Reef Inc.

Pro-vision Reef Inc. carried out the project in conjunction with project partners from Fisheries Queensland, Great Barrier Reef Marine Park Authority, Queensland Parks and Wildlife Service, and the Australian Research Council Centre of Excellence for Coral Reef Studies. The project is proudly supported by WWF Australia.

Pro-vision Reef's mission is to engender community and market confidence in the marine aquarium industry through commitment to the highest standards of environmental performance in the fisheries on the Great Barrier Reef and in the Coral Sea.

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate is not a Code of Practice. However, the highly targeted and adaptive approach by the industry to mitigate risks identified through an independent scientific assessment process can be considered 'World's Best Practice'.

This industry initiative creates a framework for collaborative management and fishery improvement that is replicable across other Australian commercial fisheries. It creates a means for fishery risks to be managed through the involvement of industry practitioners that implement agreed risk mitigation standards at the individual operator level.

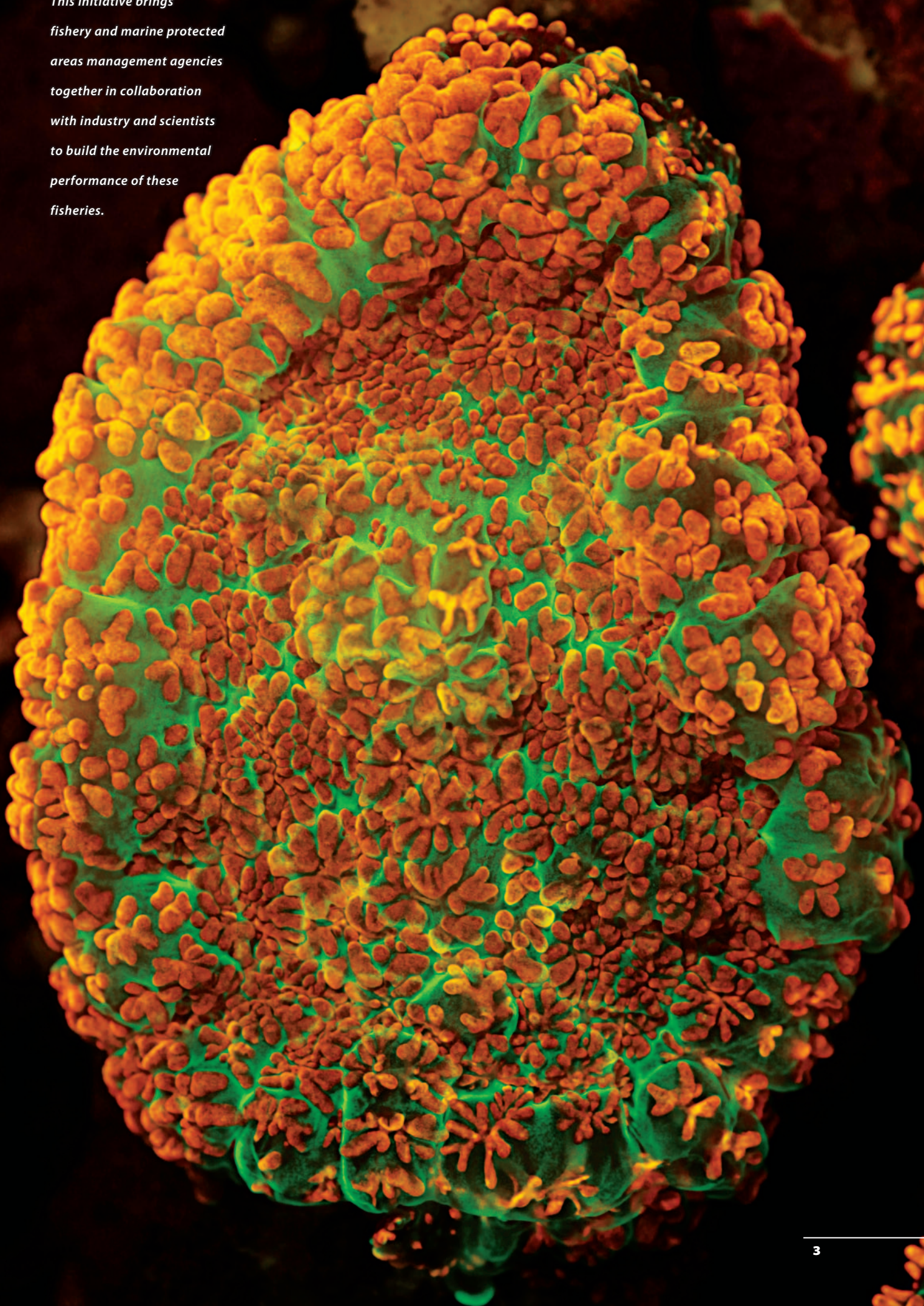
It is an initiative that is based on partnerships and integrates practical industry participation early in the existing cycle of assessment, management and monitoring.

The project aims are depicted in the table below.

Build resilience in the marine aquarium industry on the Great Barrier Reef

	Environmental		Social		Economic	
Aspirational Goal	Mitigate ecological risk in the fisheries		Adapt to new priorities driven by climate change		Increase adaptive capacity and reduce vulnerability	
Longer Term Outcomes	Articulated and documented industry contribution to retention of coral reef biodiversity and resilience in a changing climate.		Effective collaboration formalised between industry, fishery and marine protected areas managers, researchers and conservation to achieve low-risk private commercial use of a public asset.		Industry assisted to legitimately claim a high-end international market position and to pursue a low-volume, high-value market strategy on the basis of sound and defensible provenance.	
	Formal linkage of the industry prescribed 'Stewardship Action Plan' to the cycle of the fishery manager's Ecological Risk Assessment for the whole Queensland fishery		Consideration of community expectation of the industry and how it is managed in the context of a changing climate based on scientific advice, resource management practicalities, conservation aspirations and industry profitability		Increased industry cohesion, sharing of experiences and ideas and a breaking down of competitive barriers; and unification in the development of a sustainable future for an industry characterised by family businesses	
Intermediate Outcomes	Increased understanding of climate change risks to the Great Barrier Reef and to industries reliant upon it	Increased understanding of natural resource management priorities and the business decisions that must be made in consideration of these priorities	Increased understanding of the social paradigm associated with natural resource sustainability and stewardship by natural resource users	Increased understanding of the bridging effect of collaboration with key stakeholders to building community confidence about sustainability of fisheries	Increased 'ownership' of the future of the industry as a whole by individual businesses	Increased understanding of the market positioning opportunities generated by affirmative action to mitigate ecological risk from the fisheries

This initiative brings fishery and marine protected areas management agencies together in collaboration with industry and scientists to build the environmental performance of these fisheries.



// The spectre of climate change is prompting the authorities that determine export approval to apply added attention to the management of our fisheries. Through this initiative, we aim to contribute to make our fisheries the best they can be. //

Lyle Squire Jnr
[President, Pro-vision Reef Inc.]

// Scientists are becoming increasingly concerned about reported declines in coral cover on the Great Barrier Reef. However, corals harvested by the aquarium industry are very different or contribute little to live coral cover in shallow reef environments where monitoring is being undertaken. //

Professor Morgan Pratchett
[Australian Research Council
Centre of Excellence for
Coral Reef Studies]

ADAPTING TO A CHANGING CLIMATE

Scientists tell us that human development activity worldwide since the Industrial Revolution in the 18th century is causing changes to global climate that have not been seen for hundreds of thousands of years, at a pace that is likely to exceed anything experienced for many millions of years.

Naturally occurring gases in our atmosphere, including carbon dioxide, trap heat in the atmosphere that helps maintain Earth's average temperature at a habitable level. Without this 'Greenhouse Effect', Earth's average temperature would fall below freezing.

Human development activity, including modification of the landscape for settlement, agriculture and forestry; and generating energy through burning fossil fuels that had been stored in the environment for more than 300 million years since the Carboniferous Period¹, are now increasing the concentration of carbon dioxide and other gases in our atmosphere, amplifying the natural warming caused by the Greenhouse Effect. This 'Enhanced Greenhouse Effect' gives rise to measurements, observations and predictions around global warming and climate change.

Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation, states that, for the past 800,000 years, the range of atmospheric carbon dioxide concentration has been 172 to 300 parts per million. Consequently, this is the range experienced throughout the existence of humanity. The concentration of atmospheric carbon dioxide at the time of publication was about 400 parts per million and rising at a rate that is continually increasing.

Manifestations will be realised first and more acutely at higher latitudes, inland from the coast and at higher altitude. However, the changes also affect the Great Barrier Reef. There are concomitant implications for reef-based industries that must be considered as part of a wider adaptation strategy.

IMPLICATIONS FOR THE GREAT BARRIER REEF

Consequences of the Enhanced Greenhouse Effect for the Great Barrier Reef include rising sea surface temperatures. This increase is expected to affect natural disturbance, such as the intensity of tropical cyclones; the frequency and extent of coral bleaching; and rainfall patterns that include longer droughts and more intense rainfall events.

Increased carbon dioxide in the atmosphere also has consequences for ocean chemistry. Absorption of excess atmospheric carbon dioxide into the ocean serves to lower the pH of the seawater and inhibit the growth of calcifying organisms, including crustaceans and corals.

Whilst the cycle of natural disturbance and subsequent recovery on the Great Barrier Reef is a normal part of life, the capacity of the ecosystem to fully recover is likely to diminish over time as the frequency and intensity of disturbance increases.

It is expected that coral species that are least resistant to disturbance, including many branching forms that create structural complexity in the coral reef habitat, may gradually tend toward recovery failure. And that ocean acidification will reduce the structural integrity of the reef matrix, making it more susceptible to erosion and the physical assault of wild weather.

¹ The Carboniferous Period lasted more than 60 million years and had the highest atmospheric oxygen levels the Earth has experienced. Plants grew and died at a great rate and eventually became coal and oil.

The consequences of loss of structural complexity in the habitat include loss of highly specialised and endemic species, many of which carry out critical ecosystem functions. This reduction in biodiversity reduces the flow of energy through the food chain that will ultimately result in a reduction of higher trophic level predator species.

Management

On the Great Barrier Reef and in adjacent coastal catchments, climate change has prompted a strong management emphasis on making natural systems as healthy as possible to retain biodiversity and to maximise the natural capacity of ecosystems to recover after disturbance.

Following rezoning of the Great Barrier Reef Marine Park in 2004 that substantially increased the area that excludes fishing, the Great Barrier Reef Marine Park Authority emphasises stewardship by all reef users, schools, councils and agricultural industries in the Great Barrier Reef catchment. The *Reef Guardians* program establishes a framework for stewardship recognition based on a set of voluntary standards determined by each sector of the community engaged in the program.

On the reef, the Authority awards differential permits to Ecotourism certified tourism operators. The Authority also provides support for adaptation planning through their *Climate Change Adaptation Strategy and Action Plan*.

In the catchment, the Australian Government offers financial assistance to farmers to modify land management practices to reduce sediment and nutrients flowing to the sea. Regional Natural Resource Management groups focus on-ground works on 'system repair' and planting riparian zones of waterways. They aim to encourage terrestrial and aquatic biodiversity, and to improve the connectivity between terrestrial, riverine, estuarine and marine systems.

The scale of port developments on the Queensland coast, and the concomitant increase in shipping traffic through the Great Barrier Reef, has prompted a review of the management programs from the Queensland and Australian Governments that will guide the future management of the Queensland coastal zone, including coastal development associated with population and industrial growth.

The changes to resource management priorities, the legislative amendments, the government investment in restoration of natural systems, strategic assessment of coastal zone management, and the stewardship programs are all linked to maximising the resilience of the Great Barrier Reef in a changing climate.

Pro-vision Reef Inc. recognises the need to act to contribute to climate change mitigation on the Great Barrier Reef. The organisation has identified integration with the existing cycle of fishery assessment, management and monitoring as an appropriate mechanism. *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* gives carriage to actions that assist integration and formalises critical partnership arrangements by which integration might be achieved.

// A dynamic example, by an industry, of applied stewardship for a resource they rely on and care about ... and a demonstrated willingness to work with management and science to get there. //

Randall Owens

[Manager, Sustainable Fishing
Great Barrier Reef Marine Park
Authority]

// Everyone who keeps a marine aquarium has a vested interest in the future of coral reefs. The Stewardship Action Plan is an invaluable step in the securing a sustainable future. //

Professor David Bellwood

[Australian Research Council
Centre of Excellence for
Coral Reef Studies]

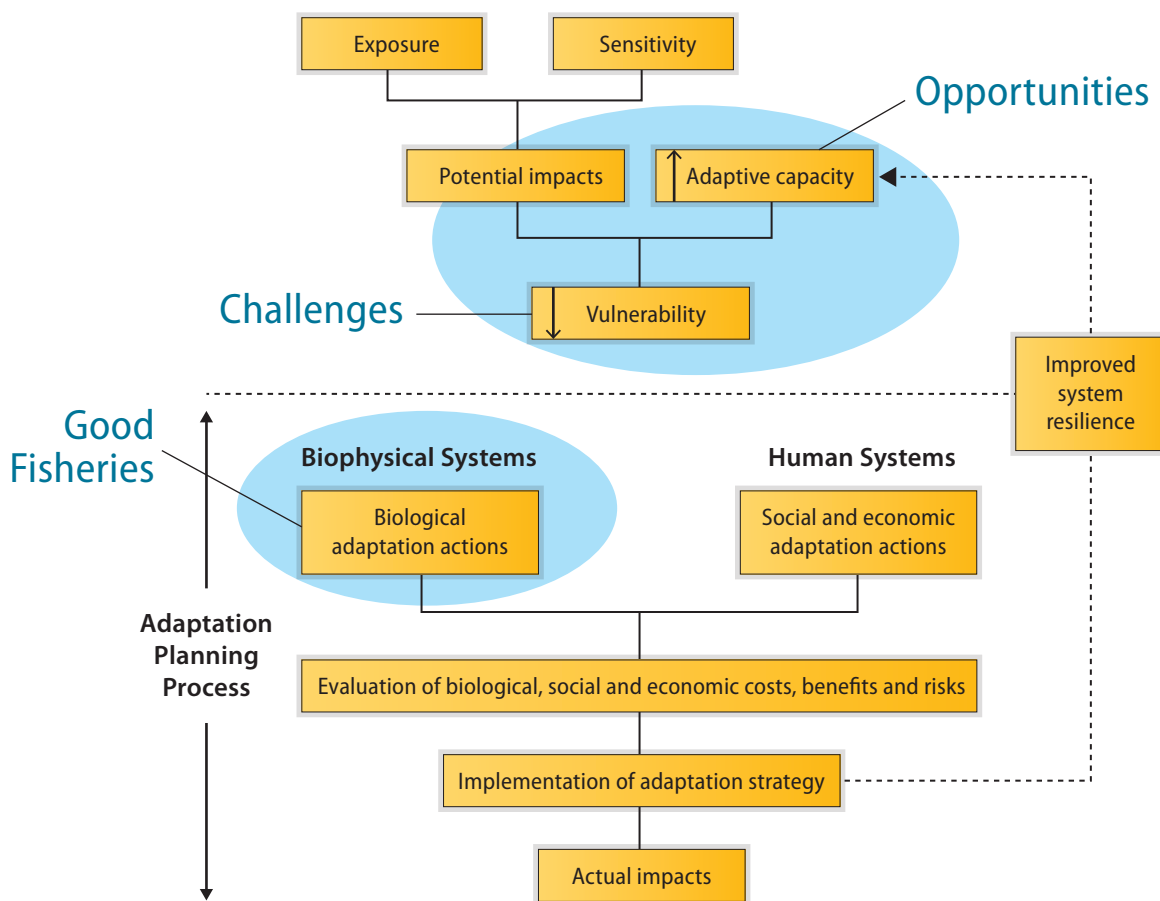
IMPLICATIONS FOR MARINE AQUARIUM INDUSTRY BUSINESSES

Pro-vision Reef Inc. examined a range of implications arising from a changing climate in order to chart a course to industry adaptation. It was concluded that business-as-usual would not be a viable option for the industry.

Climate Change Vulnerability Assessment: Queensland Marine Aquarium Supply Industry was published in 2010 and summarized the biophysical implications of a changing climate on the Great Barrier Reef plus the social and economic implications that manifest in the shorter term from realignment of natural resource management priorities and development of policies to mitigate carbon pollution.

It was concluded that incremental climate change adaptation could be achieved on an ongoing and continuously improving basis by focusing on improved system resilience through practical contribution to fisheries performance and an internal industry focus on profitable businesses.

As part of the overall strategy to improve system resilience, *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* is focused on 'Good Fisheries' to assist businesses to achieve increased adaptive capacity and decreased vulnerability.



In the context of climate change, fisheries that are mostly reliant on coral reefs are vulnerable if there is uncertainty about the ecological risk posed by the activity. Confidence in the management and operation of the fisheries is critical for security of tenure, market position and ongoing international market access.

To achieve more robust fisheries, Pro-vision Reef Inc. concluded that industry needed to collaborate with the fishery and marine park managers and contribute in a practical way to the achievement of management objectives for the fisheries early in the cycle of assessment, management and monitoring.

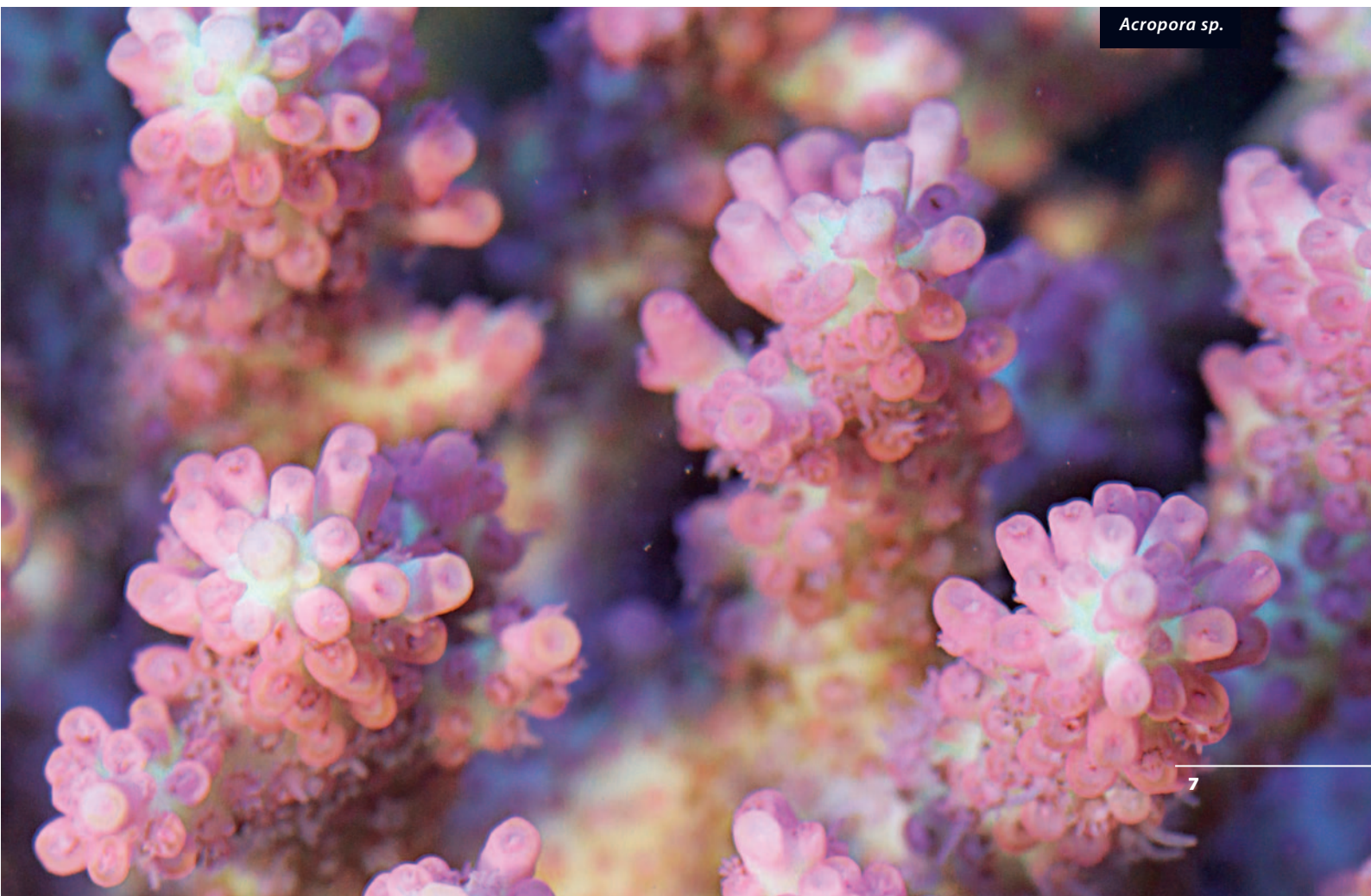
Such contribution could be achieved in a highly targeted manner through establishing industry standards for the collection of species that are identified in the Ecological Risk Assessment, which incorporates conditions stipulated in the CITES Non-detriment Finding for the Queensland Coral Fishery.

The industry standards are voluntary but were agreed upon by consensus at industry workshops in Cairns and Brisbane that were attended by an overwhelming majority of businesses active in the industry and were subject to critical review by all of industry.

Industry will additionally commit to partnerships with research institutions to provide specimens to researchers in order to fill identified knowledge gaps; and individual fishery practitioners will provide digital imagery to fishery and marine park managers to assist assessment of resource condition.

APPLICATION

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate applies to the Queensland Coral Fishery, the Queensland Marine Aquarium Fish Fishery and the Commonwealth Coral Sea Fishery. In combination, this area represents more than 1.5 million km² encompassed broadly by Cape York in the north, the Tweed River in the south and the extent of Australia's Exclusive Economic Zone in the east.



Acropora sp.

GOAL AND OBJECTIVES

The goal of the project is to build resilience in the marine aquarium industry on the Great Barrier Reef by contributing to more robust fisheries through partnerships and stewardship.

The objectives of the initiative commit participating businesses to actions designed to mitigate ecological risk from the fisheries, including:

- Collection standards for species identified in the fishery Ecological Risk Assessment, including spatially explicit standards where identified risks are restricted to identified areas
- Participation in a collaborative management response framework in the wake of disturbance or localised sustainability concern

In parallel, Pro-vision Reef Inc. commits to:

- Partnership with research institutions to fill knowledge gaps where such gaps exist for species identified in the fishery Ecological Risk Assessment
- Provision of digital imagery to fishery and marine park managers for the purpose of assessing resource condition
- Partnership with fishery managers and others to develop electronic logbooks that deliver species level fishery data reports in real time

www.provisionreef.org.au

The Pro-vision Reef Inc. website is the second major output from the project funded by Caring For Our Country and Pro-vision Reef Inc.

The printed copy of *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* is a snapshot in time. However, this initiative will evolve as new information is received and as circumstances change. It requires a platform to enable flexibility to alter the critical components of the plan as the need arises. Consequently, the Pro-vision Reef Inc. website will feature all the component parts of the initiative and will highlight any updates to the plan as it continuously improves.

The website will link visitors to information sources, including dissemination of climate change research on the Great Barrier Reef, fishery and marine park management, fishery assessment reports and contact details of the businesses that implement the initiative in the water.

This initiative articulates the manner in which the marine aquarium industry contributes to reef resilience, which is vital for the capacity of coral reefs to recover after natural disturbance.

Most of Australia's marine aquarium industry is based in Queensland with activity occurring on the Great Barrier Reef and in the Coral Sea.

The industry in Queensland operates across the Queensland Coral Fishery, the Queensland Marine Aquarium Fish Fishery and the Commonwealth Coral Sea Fishery. The Queensland fisheries are minor suppliers of marine fish and invertebrates on the world stage. However, the Queensland Coral Fishery supplies around 20% of the coral.

There are 24 active businesses of disparate scale usually working in reasonable proximity to the major air routes out of Cairns and Brisbane with a node of activity in the Mackay region. Other businesses carry long-held licenses but are not in operation.

The industry focuses on high quality specimens supplied to the market in low volume. The fisheries feature a highly selective hand collection technique, which is imperative to ensure that the highest quality specimens meet the market. Similar fisheries operate on a smaller scale in Western Australia and the Northern Territory.

“ WWF Australia supports this industry's journey and commends their ongoing role in the stewardship of Queensland's iconic reef habitats in an uncertain future climate setting. ”

Sian Breen
[Manager – GBR Fisheries Conservation, WWF – Australia]

The Queensland fisheries operate within an extensive network of marine protected areas. The Great Barrier Reef Marine Park features more than 125,000km² that is off-limits to all collection, including more than 7,500km² of coral reef. There are State marine parks south of the Great Barrier Reef and the Coral Sea Commonwealth Marine Reserve, which is the world's largest marine park and features the world's largest no-take zone at more than 500,000km².

The international trade in marine specimens has been stigmatised by the unregulated nature of the fisheries in some countries. Some of these fisheries are characterised by destructive fishing practices, including use of a sodium cyanide solution to stun fish prior to capture, which has consequences for the captured fish and the coral reef matrix from which it was removed. This practice does not occur in Australia.

Like all other commercial fisheries in Australia, there is a process for the identification of ecological risk from the activity of the fishery. *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* enables the industry to take highly targeted steps to mitigate those risks and to progress a collaborative management approach to the fisheries.

QUEENSLAND CORAL FISHERY

Coral has been collected on a commercial basis on the Great Barrier Reef since the 1950s. For the majority of that period, the fishery mostly targeted abundant, fast growing species, such as those from the Acroporidae and Pocilloporidae families, for ornamental display and the curio trade.

In 2006, the Policy for the Management of the Coral Fishery was implemented and the fishery was approved for export eligibility for the first time.

The arrangements reflected the shift in market demand to live corals for mini-reef display. The policy featured a move away from 'coral leases' to a roving policy that enabled businesses to distribute and rotate fishing effort across the fishery area to access a diverse range of species and to minimise the risk of localised concentration of effort.

Entry to the fishery has been limited since 1997 and the fishery is operated by fewer than 20 businesses of disparate scale. Many of those businesses also hold licenses in the Marine Aquarium Fish Fishery.

In practical terms, the fishery operates within the Great Barrier Reef Marine Park with two spatially defined high-use Coral Collection Areas at Cairns and around the Keppel group of islands. There is also a hub of collection activity around Mackay.

“ By committing to practical and precautionary collection standards, the Stewardship Action Plan demonstrates that Queensland’s aquarium industries share the international communities’ vision for coral reef sustainability. ”

Anthony Roelofs
[Senior Fisheries Biologist
Fisheries Queensland]

The emphasis of coral collection is on quality, with specimens chosen for their vibrant colour, appropriate size and suitability for aquaria. There is no market for live corals that are broken, bleached or affected by sediment from flooding.

Much of the coral is sourced from depths greater than 10m and often in areas between reefs. Light levels in these habitats can be more easily replicated in domestic aquaria.

An annual Total Allowable Catch of 200t applies whereby 30% (60t) may be collected as ‘specialty coral’, which comprises living coral specimens. The balance may be collected as ‘other coral’, which mostly comprises live rock with some collection of the fast-growing and abundant species of *Acropora* spp. and *Pocillopora* spp. for ornamental purposes.

A system of Individual Transferable Quota applies and is monitored through a system that obliges collectors to report the catch electronically or by phone prior to landing. In 2011–12, 76t of coral was collected in the fishery, including 28t of live coral and 48t of other coral, which comprised 42t of live rock and 6t of ornamental coral.

There are limits imposed on the size of boats and the number of divers. Collectors typically use underwater breathing apparatus, such as SCUBA or Hookah, and collect coral by hand with non-mechanical, hand-held instruments. There is no bycatch in the fishery.

As most corals collected in the Queensland Coral Fishery are listed on Appendix II of CITES, the obligatory Non-detriment Finding plays an important role in the cycle of assessment, management and monitoring of the fishery.

“ This industry sector has demonstrated leadership through their stewardship program and their willingness to collaborative with marine park managers in the field. ”

Chris Maple
[Senior Ranger, Marine Parks
Queensland Parks & Wildlife
Service]

QUEENSLAND MARINE AQUARIUM FISH FISHERY

Aquarium fish have been collected on a commercial basis on the Great Barrier Reef since the 1970s. Entry to the fishery has been limited since 1997.

This fishery formed the backbone of the marine aquarium industry on the Great Barrier Reef for many years. However, market demand has shifted in recent years to mini-reef replications and this has resulted in hobbyist displays that feature a diverse range of marine life, including invertebrates and corals. Colourful tropical fish are still popular but there is less emphasis within the industry on collecting fish.

The fishery operates along the Queensland east coast from the tip of Cape York south to the New South Wales border within the bounds of the Offshore Constitutional Settlement, which extends beyond the outer boundary of the Great Barrier Reef Marine Park.

Around 600 species of fish are collected plus a range of invertebrates, including starfish, molluscs and crustaceans. The market demands species diversity and perfect specimens with low susceptibility to disease or infection, often in specific size ranges.

The species collected in the fishery are typically lower trophic level prey species. Grazing herbivores that carry out important functions in reef resilience and recovery after disturbance are not collected in any substantial number.

There are limits imposed on the size of boats and the number of divers. Collectors typically use underwater breathing apparatus, such as SCUBA or Hookah, and collect by hand using a fine mesh barrier net and a herding device. Collectors can also use fishing lines with barbless hooks, cast nets and scoop nets.

Management arrangements include several Special Management Areas adjacent to population centres. These areas further restrict the number of operators that can access them in order to prevent localised concentration of effort.

COMMONWEALTH CORAL SEA FISHERY

The Coral Sea Fishery operates from Sandy Cape on Fraser Island in the south to Cape York in the north; and east of the Offshore Constitutional Settlement to the edge of Australia’s Exclusive Economic Zone, which is an area of 780,000km².

The fishery is limited entry and there are just two permit holders in the aquarium fish collection sector. The fishery is managed in accordance with the Australian Fisheries Management Authority’s harvest strategies, which include gear restrictions as well as size and catch limits and conservative management intervention triggers. It is the world’s only aquarium fishery with a compulsory 24/7 satellite Vessel Monitoring System for all vessels. Collection of coral is not permitted in the Coral Sea Fishery.

The Coral Sea Fishery is situated wholly within the 1,000,000km² Coral Sea Commonwealth Marine Reserve. This is the worlds largest marine protected area and extends from the outer edge of the Great Barrier Reef Marine Park to the extent of Australia’s Exclusive Economic Zone.

More than 65% of the Coral Sea Fishery area is designated IUCN II (National Park). No fishing of any kind is permitted in this vast area. The remainder of the Coral Sea Fishery remains open to some forms of fishing but is subject to marine park management in addition to fishery management arrangements.



Fish collection is labour intensive and entails careful handling to ensure the well being of the animals.

The Australian public expects high standards of environmental performance from all users of the Great Barrier Reef. This initiative outlines how the marine aquarium industry can deliver on that expectation.



Management of commercial fisheries in Australia was augmented substantially with the assent of the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). This legislation requires the Australian Government to assess the environmental performance of commercial fisheries on the basis of the management arrangements applied to them. Such assessments have important implications for international market access and, as a consequence, the commercial viability of many fisheries and the businesses that operate them.

Components of the assessments include those relating to protected species under Part 13; and those for the purpose of export approval under Part 13A. Importantly, the EPBC Act gives carriage to Australia's obligations under various international agreements, including CITES, which has particular implications for the Queensland Coral Fishery.

The Australian Government undertakes a Fishery Assessment of each Australian commercial fishery. The assessment evaluates the ecological sustainability of management arrangements against the *Guidelines for the Sustainable Management of Fisheries* under the EPBC Act.

Fishery Assessments typically recur on a three-year cycle of assessment, management and monitoring. Pro-vision Reef Inc. recognises the importance of industry collaboration with the fishery management agency and scientists early in this cycle to add value to this continuous improvement model through targeted operational standards that complement the objectives of the fishery management agency.

Fishery Assessment approval includes negotiated conditions and recommendations that the fishery management agency must seek to achieve within a stipulated timeframe. Failure to achieve these conditions and recommendations may render products from the fishery ineligible for export.

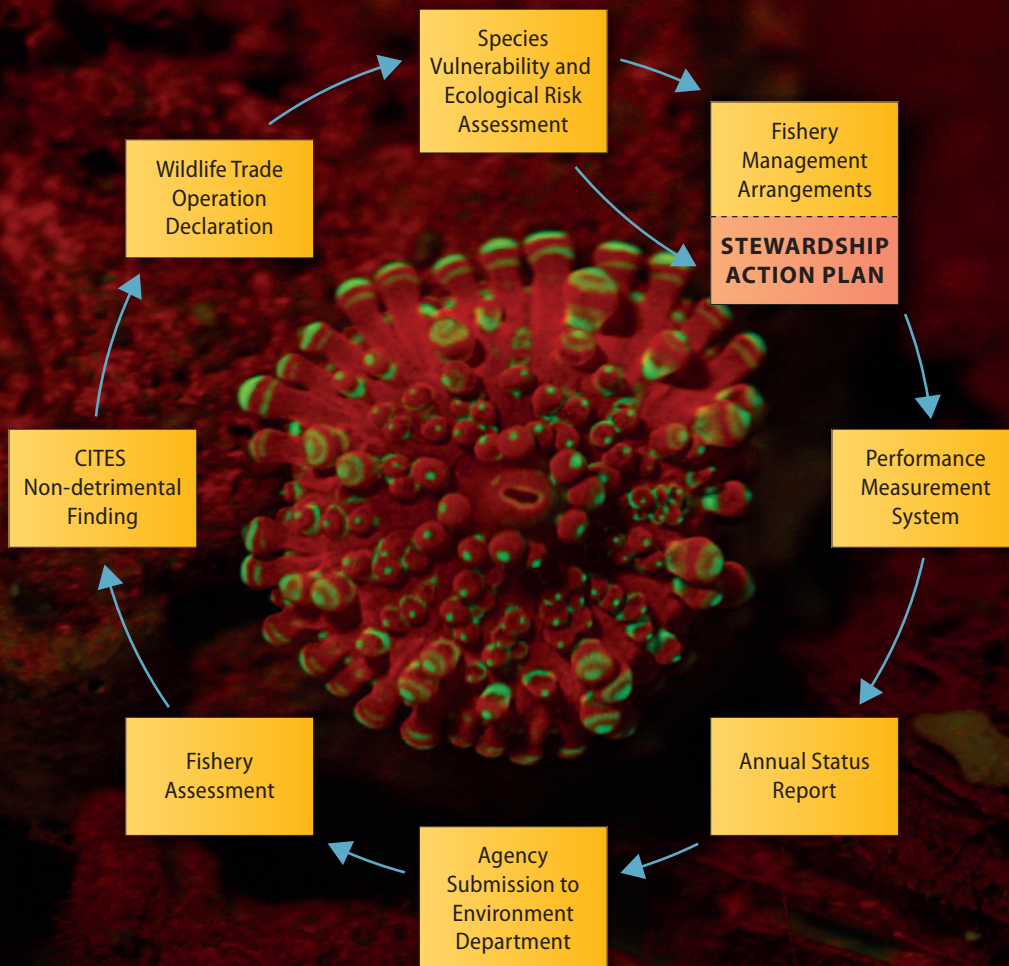
Such an outcome can have far-reaching consequences for the commercial viability of all businesses within an industry sector, including businesses upstream and downstream in the supply chain.

INDUSTRY INTEGRATION

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate establishes standards to be implemented by industry that will mitigate fishery risks that are identified through the Ecological Risk Assessment.

The standards include modified collection practices in the water, committing to partnerships with research bodies to fill knowledge gaps, trial and adoption of new technology for species level fishery data delivered in real time, and providing the fishery and protected areas managers with digital imagery in a format that is beneficial for resource assessment.

The industry has taken these steps to strengthen the environmental performance of the fishery and its management prior to the subsequent Fishery Assessment and the provision of sufficient information to enable a CITES Non-detriment Finding.



Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate

responds to the Ecological Risk Assessment with industry standards that manifest in the water. These standards aim to mitigate identified risks and complement, in a highly targeted manner, the Fishery Management Arrangements devised by Fisheries Queensland. It is at this early stage of the cycle of assessment, management and monitoring that the industry standards are introduced to drive down ecological risk within the fishery so that there is a practical industry contribution to an ongoing finding of 'non-detriment' in the CITES assessments and ongoing approval for export eligibility.

STEP BY STEP

Species Vulnerability and Ecological Risk Assessments

Species Vulnerability Assessment identifies and quantifies the factors that influence a species' vulnerability to collection and has been designed as a pre-assessment tool for a subsequent Ecological Risk Assessment. In turn, the Ecological Risk Assessment considers aspects of the fishery and assigns a level of consequence for the impact of each aspect; and the likelihood of this consequence occurring for each species. The assessment focuses on a mix of biological and fishery factors that exert influence on a species' vulnerability, including life history, growth rates, ecological niche, and physical accessibility. The Ecological Risk Assessment is a critical step in the continuous improvement cycle for the management of the fisheries.

Fishery Management Arrangements

Management arrangements for the fisheries include input controls that manage effort through limited entry, special management areas, number of boats and divers and temporal closures during spawning. Output controls that manage catch include quotas for the Coral Fishery and catch triggers across all fisheries.

Performance Measurement System

Performance Measurement System formalises the objectives, performance indicators, performance measures and management responses developed by Fisheries Queensland with input from key stakeholders. It measures the performance of Queensland fisheries with respect to sustainable use of fish stocks and fishery related impacts on the broader ecosystem.

A Performance Measurement System provides detail about how fishery performance can be achieved according to the fishery objectives. It also provides a monitoring system that can trigger a review of current management arrangements.

The Performance Measurement System is reviewed and updated regularly, and provides a guide to sustainability criteria reported on in Annual Fishery Reports. Development of Performance Measurement System is also required under recommendations attached to the Wildlife Trade Operation approvals granted by the Australian Government under the EPBC Act.

Annual Fishery Report

Annual Fishery Reports include analysis of performance against fishery objectives as outlined in the Performance Measurement System. The reports include information regarding: a description of the fishery; management arrangements in place; research and monitoring outcomes; recent catch data for all sectors of the fishery; status of target stock; interactions with protected species; impacts of the fishery on the ecosystem in which it operates; and information outlining progress in implementing recommendations resulting from the previous accreditation of the fishery.

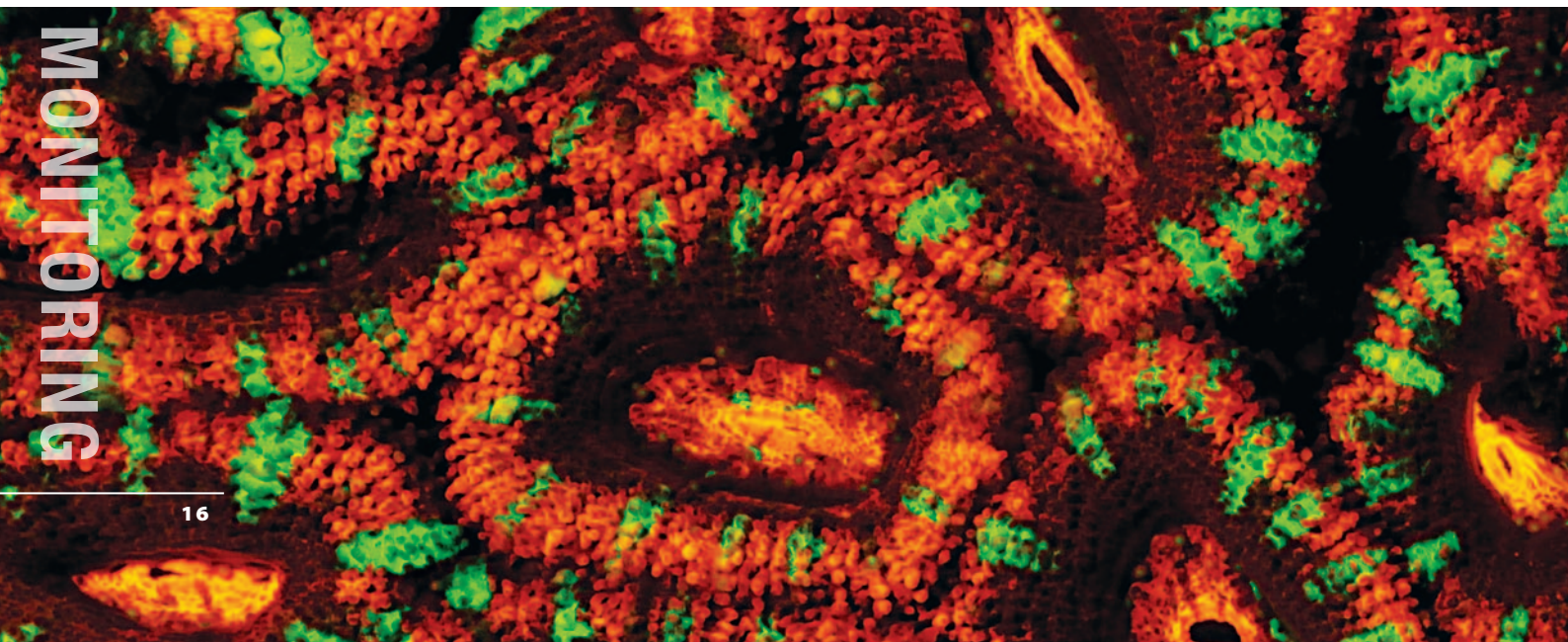
Agency Submission to the Australian Government

The fishery management agency submits an application to the Australian Government for assessment for ongoing export eligibility, including progress against the conditions and recommendations that accompanied the previous 'Fishery Assessment'.

Fishery Assessment

Fishery Assessments are conducted against the *Guidelines for the Sustainable Management of Fisheries*, which outline specific principles and objectives designed to ensure a strategic and transparent way of evaluating the ecological sustainability of fishery management arrangements. The management regime must take into account arrangements established under Australian laws and international agreements, including CITES.

These assessments are based on the merits of the combination of management measures in place and fishery specific issues. The conditions and recommendations that accompany approval from a Fishery Assessment can include implications for Ecological Risk Assessment, which in turn flows through to fishery management and the subsequent Fishery Assessment.



CITES Non-detriment Finding

The Australian Government CITES Scientific Authority must determine whether international trade in Appendix II species will be detrimental to the survival of those species in the wild. A positive Non-detriment Finding is a critical link in the cycle of assessment, management and monitoring. Export eligibility will not be approved without it. This is particularly important for the Coral Fishery as all stony corals are listed on Appendix II.

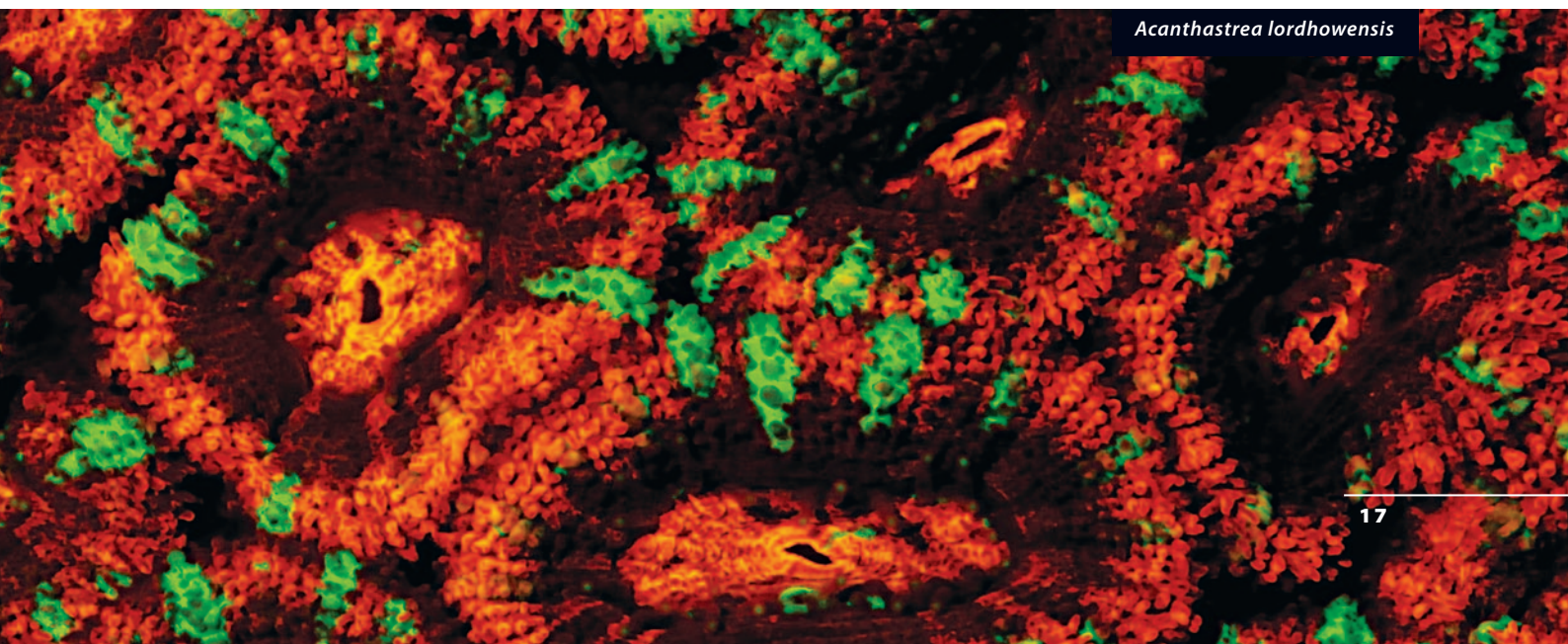
This assessment has been developed to inform the Minister's consideration and support a decision on whether to declare a Wildlife Trade Operation for the fishery to allow export from the fishery, and also to inform individual decisions about whether to grant export permits for CITES listed species taken in the fishery.

Wildlife Trade Operation Declaration

Export of an Australian native wildlife specimen and/or CITES-listed specimen for commercial purposes must come from an approved program, such as a Wildlife Trade Operation. A Wildlife Trade Operation is an operation that meets legal requirements under the EPBC Act, such as a commercial fishery.

The Australian Government Minister for the Environment declares the fishery to be a Wildlife Trade Operation and stipulates the conditions and recommendations required of the fishery management agency. These can, and do, incorporate the conditions for ongoing Non-detriment Findings for CITES listed species. Approval is for a maximum of three years.

NB: All fishery assessment reports can be accessed at www.provisionreef.org.au



Acanthastrea lordhowensis

Identified Ecological Risk

The Queensland Coral Fishery underpins the marine aquarium industry on the Great Barrier Reef. The fishery underwent EPBC Act Fishery Assessment for approval as a Wildlife Trade Operation for export eligibility in 2012.

Conditions applied to Fisheries Queensland for ongoing export approval for the Queensland Coral Fishery included stipulations outlined in the Non-detriment Finding assessment undertaken by the Australian Government's CITES Scientific Authority earlier in 2012. This was the first time since the fishery was first approved for export in 2006 that the Non-detriment Finding had been a separate assessment. It heralded a higher level of scrutiny of the fishery commensurate with its development as a supplier to the international market.

CITES NON-DETRIMENT FINDING

The Non-detriment Finding assessment for the Queensland Coral Fishery considered the existing framework of assessment of species vulnerability and ecological risk. It appraised the framework as being capable of providing leading edge management practices, on condition of articulated improvements.



Coral reefs are some of the most biologically rich ecosystems on earth. Keeping an aquarium helps people to better understand them.

The assessment considered data from a range of sources, including export records, Annual Fishery Reports and fishery logbooks. It considered 424 stony coral species and identified 18 species of potential concern on the basis of trends identified in the combined data plus various other characteristics.

The assessment concluded that, subject to conditions, the existing assessment and performance measurement framework and industry Stewardship Action Plan provides confidence that the collection of coral species will not be detrimental to the survival of CITES-listed species.

The conditions include a need to review the Species Vulnerability Assessment and Ecological Risk Assessment and revise the Performance Measurement System in 2013 to ensure that ongoing collection is non-detrimental. The report also emphasised the need for finer scale reporting. Meeting the Non-detriment Finding assessment conditions is a condition for ongoing export eligibility approval for the fishery as a Wildlife Trade Operation.

ECOLOGICAL RISK ASSESSMENT

Species identified in the CITES Non-detriment Finding for the Queensland Coral Fishery were assessed in the Species Vulnerability Assessment and those that justified further consideration were assessed in the Ecological Risk Assessment.

The Ecological Risk Assessment entailed a two-day workshop in May 2013. In attendance were fishery practitioners from the north, central and southern parts of the fishery; fishery managers from Queensland, Western Australia and the Northern Territory; the Great Barrier Reef Marine Park Authority; representatives from the Australian Government Environment department, including the CITES division, and the Australian Government Fisheries department; coral reef scientists; and representatives from environmental advocacy groups adjacent the Cairns and Keppel Coral Collection Areas plus a representative from WWF Australia.

The analysis assigned a level of consequence (from negligible to catastrophic) and the likelihood of this consequence occurring (from remote to likely) for each species assessed.

When considering the level of consequence or likelihood, participants made an assessment in context of what existing control measures and management arrangements are already in place. A ten year forecast was considered when determining consequence and likelihood levels. This time frame equates to at least one generation of growth for most coral species. The allocated risk ranking dictates the amount of justification required and also the extent of management likely to be needed to address the risk.

The process follows the following structure:

Consequence	
Negligible (0)	Insignificant impacts to populations, (dynamics/structure/size). Unlikely to be measurable against background variability for this population.
Minor (1)	Possibly detectable, but minimal localised impact on population size and none on dynamics.
Moderate (2)	Noticeable local impact, likely minimal impact on regional populations. Short-term recruitment/dynamics not adversely impacted.
Severe (3)	Significant impacts on populations. Affecting recruitment levels of stocks/or their capacity to increase.
Major (4)	Long-term local depletion if continued. Likely to cause local extinctions, if continued in longer term (i.e. probably requiring listing of species in an appropriate category of the endangered species list e.g. CITES Appendix I).
Catastrophic (5)	Local extinctions are imminent/immediate

Likelihood	
Remote (1)	Never heard of, but not impossible
Rare (2)	Happens only very rarely
Unlikely (3)	Unlikely, but has been known to occur elsewhere
Possible (4)	Is expected to occur only infrequently
Occasional (5)	Is expected to occur moderately
Likely (6)	Is expected to occur often

The overall level of risk assigned to each species is based on the group's assessment of the perceived consequence multiplied by the perceived likelihood.

		Consequence					
		Negligible	Minor	Moderate	Severe	Major	Catastrophic
		0	1	2	3	4	5
Likelihood	Remote 1	0	1	2	3	4	5
	Rare 2	0	2	4	6	8	10
	Unlikely 3	0	3	6	9	12	15
	Possible 4	0	4	8	12	16	20
	Occasional 5	0	5	10	15	20	25
	Likely 6	0	6	12	18	24	30

Adapted from Fletcher, W, Chesson, J, Fisher, M, Sainsbury, K, Hundloe, T, Smith, A & Whitworth, B. 2002, National ESD Reporting Framework for Australian Fisheries: The 'How To' Guide for Wild Capture Fisheries. FRDC Project 2000/145, Canberra, Australia.

Risk profiles are used to develop appropriate mitigation measures to be implemented through the Performance Measurement System and *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate*.

Risk		Reporting	Management Response
Negligible	0	Short justification only	Nil
Low	1-6	Full justification needed	None specific
Moderate	7-12	Full performance report	Continue current management arrangements
High	13-18	Full performance report	Changes to management required
Extreme	19-30	Full performance report	Substantial additional management needed urgently

Results

The Ecological Risk Assessment of the Queensland Coral Fishery in 2013 identified 17 species at the moderate level of risk. A further 63 species were judged to be at low risk in the fishery.

<i>Acanthastrea bowerbanki</i>	<i>Acropora acuminata</i>	<i>Caulastrea echinulata</i>	<i>Leptoseris incrustans</i>
<i>Acanthastrea lordhowensis</i>	<i>Acropora aspera</i>	<i>Caulastrea furcata</i>	<i>Leptoseris papyracea</i>
<i>Acanthophyllia deshayesiana</i>	<i>Acropora bushyensis</i>	<i>Cladiella spp.</i>	<i>Leptoseris yabei</i>
<i>Acropora multiacuta</i>	<i>Acropora chesterfieldensis</i>	<i>Clavularia spp.</i>	<i>Montipora caliculata</i>
<i>Acropora nana</i>	<i>Acropora digitifera</i>	<i>Cryptodendrum adhaesivum</i>	<i>Moseleya latistellata</i>
<i>Cycloseris cyclolites</i>	<i>Acropora horrida</i>	<i>Dendrophyllia spp.</i>	<i>Pachyclavularia spp.</i>
<i>Cynarina lacrymalis</i>	<i>Acropora hyacinthus</i>	<i>Diaseris fragilis</i>	<i>Pachyseris rugosa</i>
<i>Duncanopsammia axifuga</i>	<i>Acropora listeri</i>	<i>Euphyllia paraancora</i>	<i>Pavona cactus</i>
<i>Entacmaea quadricolor</i>	<i>Acropora millepora</i>	<i>Euphyllia paradivisa</i>	<i>Plerogyra sinuosa</i>
<i>Euphyllia ancora</i>	<i>Acropora palmerae</i>	<i>Favites abdita</i>	<i>Scolymia vitiensis</i>
<i>Euphyllia cristata</i>	<i>Acropora paniculata</i>	<i>Favites flexuosa</i>	<i>Sinularia spp.</i>
<i>Euphyllia divisa</i>	<i>Acropora plana</i>	<i>Favites pentagona</i>	<i>Stichodactyla gigantea</i>
<i>Euphyllia fimbriata</i>	<i>Acropora prostrata</i>	<i>Fungia repanda</i>	<i>Stichodactyla haddoni</i>
<i>Euphyllia glabrascens</i>	<i>Acropora subglabra</i>	<i>Goniastrea australensis</i>	<i>Stichodactyla mertensii</i>
<i>Micromussa amakusensis</i>	<i>Acropora verweyi</i>	<i>Gorgoniidae various</i>	<i>Turbinaria bifrons</i>
<i>Scolymia australis</i>	<i>Actinia tenebrosa</i>	<i>Heliofungia actiniformis</i>	<i>Turbinaria conspicua</i>
<i>Trachyphyllia geoffroyi</i>	<i>Balanophyllia europaea</i>	<i>Heliopora coerulea</i>	<i>Turbinaria frondens</i>
	<i>Blastomussa merleti</i>	<i>Heteractis aurora</i>	<i>Turbinaria heronensis</i>
	<i>Blastomussa wellsi</i>	<i>Heteractis crispa</i>	<i>Turbinaria mesenterina</i>
	<i>Catalaphyllia jardinei</i>	<i>Heteractis magnifica</i>	<i>Turbinaria patula</i>
	<i>Caulastrea curvata</i>	<i>Heteropsammia cochlea</i>	<i>Turbinaria reniformis</i>

The Ecological Risk Assessment of the Queensland Marine Aquarium Fish Fishery in 2008 identified two species at the moderate level of risk. A further seven species were judged to be at low risk in the fishery.

The next Ecological Risk Assessment for the Queensland Marine Aquarium Fish Fishery is due in 2014. It is expected that that assessment will mirror the rigour applied to the Queensland Coral Fishery and will also demand finer scale reporting of fishery data.

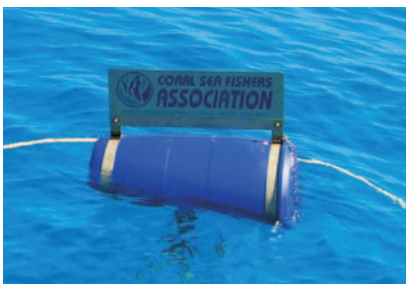
When the 2014 Ecological Risk Assessment is carried out, identified risks will be updated on the Pro-vision Reef Inc. website at www.provisionreef.org.au to keep the initiative current.

<i>Chaetodontoplus duboulayi</i>	<i>Amphiprion latezonatus</i>
<i>Chaetodontoplus meredithi</i>	<i>Amphiprion melanopus</i>
	<i>Amphiprion ocellaris</i>
	<i>Amphiprion percula</i>
	<i>Choerodon fasciatus</i>
	<i>Cleidopus gloriamaris</i>
	<i>Paracanthurus hepatus</i>

Commonwealth Coral Sea Fishery

The 'Reducing Uncertain Stock Status' project undertaken by the Australian Bureau of Agricultural and Resource Economics and Sciences in 2011 clarified the status of stocks accessed by the aquarium sector of the Commonwealth Coral Sea Fishery.

The project found the potential maximum footprint achievable by the fishery, with the two existing fishery practitioners, to be around 7.4% of the estimated suitable habitat area in a given fishing season. The estimated extraction rate for the 2008–09 fishing season (the largest catch season) for all key commercial families was less than 0.02% of potential population size.



***Coral Sea collectors
install their own moorings
to minimise the risk of
anchor damage.***

The risk assessment considered 623 species. All were found to be at low risk or very low risk. Consequently, no action will be taken in *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* in regard to the Commonwealth Coral Sea Fishery assessment. This could change over time and participating businesses stand ready to respond should risks be identified in the future.

Industry Risk Mitigation Standards

Industry workshops were conducted in Cairns in late May and Brisbane in early June 2013. The workshops followed a road trip by the Project Manager to engage with each business in the marine aquarium industry in Queensland. Not every business could be contacted. However, every business that operates in the Queensland Coral Fishery was contacted and encouraged to attend one of the workshops.

Just one business refused to participate in the initiative, which means more than 90% of Queensland Coral Fishery businesses support the initiative, most of whom attended the workshops and were active participants in the application of agreed industry standards to mitigate identified risks.

Fisheries Queensland, Great Barrier Reef Marine Park Authority and the Centre of Excellence for Coral Reef Studies additionally attended the workshops. A representative from WWF Australia was unable to attend.

A tally of individual experience at the workshops revealed that the allocation of industry standards would be guided by a combined 550 years of experience, including industry participation, fishery and protected areas management and coral reef research.

COLLECTING CORAL


The standards outlined below were determined by consensus among attendee businesses to mitigate risk to species identified in the fishery Ecological Risk Assessment.

Participants chose to apply industry standards to all 17 species with a risk profile of 'moderate'. In addition, 14 of the species with a risk profile of 'low' were chosen, mostly on the basis of international concern, taxonomic misidentification or lack of adequate scientific knowledge regarding genetics, distribution and abundance.

Participants reviewed the rationale for the allocation of 'low' and 'moderate' risk profiles at the Ecological Risk Assessment and found that the species fell into six broad categories:

- Susceptibility to natural disturbance
- Taxonomic issues
- Lack of scientific knowledge or verification
- Sustainable harvest concern
- Low biological resilience
- Rarity

It was agreed that the industry standards would be broken into two categories. Collection standards will apply to some species, particularly those for which there is sustainable harvest concern, susceptibility to natural disturbance and low biological resilience. The risk associated with some of these species related to specific geographical areas and this reflected in the standards allocated to them.



The conservation education and awareness dividend from aquarium display is well documented. This initiative helps home hobbyists and public aquarium curators to choose the specimens in their care.

For all coral species chosen, businesses would commit to supply samples to a research partner in order to fill knowledge gaps and to guide risk assessment and mitigation. The species and the specific knowledge gap to be filled will form part of a Research Plan, which will occur in parallel to the collection standards. As knowledge gaps are filled, *Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate* will be updated via the Pro-vision Reef Inc. website.

For each species identified through Ecological Risk Assessment to which a minimum size limit is applied as an industry collection standard, the Research Plan will seek to understand the reproductive size and growth rate. Minimum size limits will be adjusted if research finds that the reproductive size is greater than the minimum size applied to the industry collection standard.

Concern was raised by a fishery practitioner at the Ecological Risk Assessment about localised concentration of effort in the Arlington/Vlassof Complex in the Cairns Coral Collection Area. Consequently, industry collection standards have been allocated that apply specifically to that area.

Workshop participants allocated collection standards to 10 of the 17 species with a 'moderate' risk profile. The remaining seven species with a 'moderate' risk profile have been added to the Research Plan to understand more about their reproductive biology and correct taxonomic identification and classification.

Catalaphyllia jardinei was chosen from the 'low' risk profile results and was allocated a collection standard due to international concern for the species. The species had also been singled out for mention in the CITES Non-detriment Finding in the Arlington/Vlassof Complex in the Cairns Coral Collection Area.

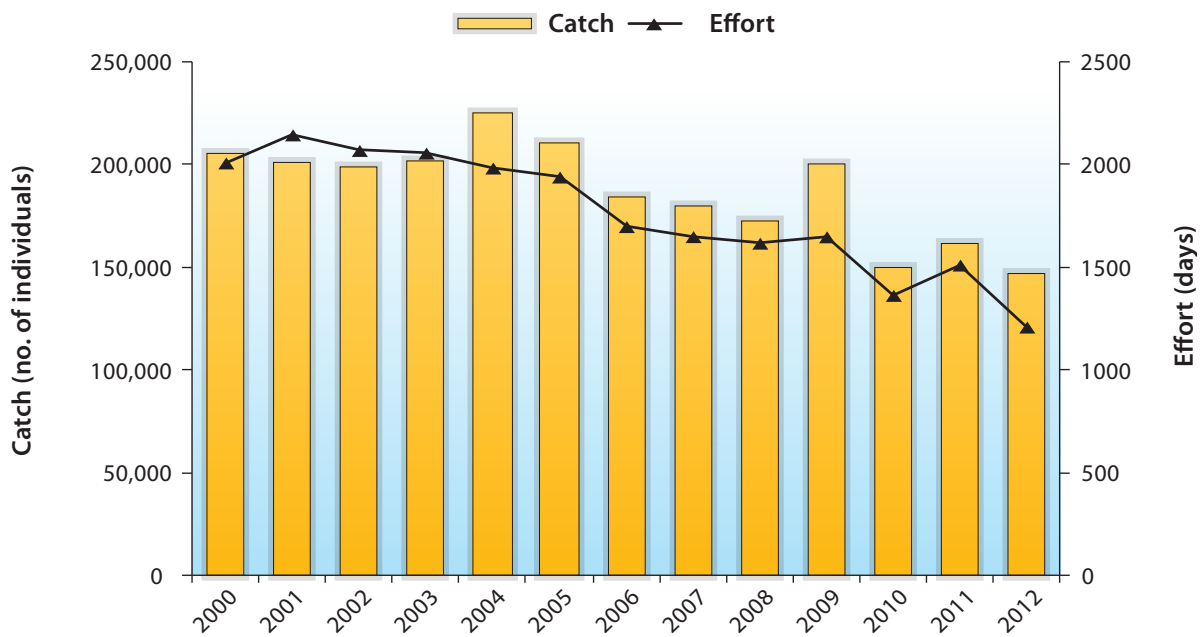
Risk	Species	Industry Risk Mitigation Standard
Moderate	<i>Acanthastrea lordhowensis</i>	Do not collect colonies <5cm
		Do not collect colonies with low profile morphology
Moderate	<i>Scolymia australis</i>	Do not collect colonies <4cm skeleton
Moderate	<i>Entacmaea quadricolor</i>	Do not collect more than 1/3 of any colony in the Keppel Coral Collection Area
		Do not collect more than 2/3 of any colony elsewhere in the fishery
		Do not collect visibly harvested colonies
Moderate	<i>Duncanopsammia axifuga</i>	Do not collect from colonies that are <10cm in the Keppel Coral Collection Area
Moderate	<i>Euphyllia ancora</i>	Do not collect from colonies that are <15cm in the Keppel Coral Collection Area
Moderate	<i>Euphyllia divisa</i>	Do not collect from colonies that are <15cm in the Keppel Coral Collection Area
Moderate	<i>Acanthophyllia deshayesiana</i>	Do not collect colonies <5cm in the Arlington/Vlassof Complex in the Cairns Coral Collection Area
Moderate	<i>Cycloseris cyclolites</i>	Do not collect colonies <2.5cm in the Arlington/Vlassof Complex in the Cairns Coral Collection Area
Moderate	<i>Cynarina lacrymalis</i>	Do not collect colonies <4cm in the Arlington/Vlassof Complex in the Cairns Coral Collection Area
Moderate	<i>Trachyphyllia geoffroyi</i>	Do not collect colonies <5cm in the Arlington/Vlassof Complex in the Cairns Coral Collection Area
Low	<i>Catalaphyllia jardinei</i>	Do not collect colonies <5cm in the Arlington/Vlassof Complex in the Cairns Coral Collection Area

COLLECTING FISH

Fishing effort in the Queensland Marine Aquarium Fish Fishery has decreased and no sustainability issues have arisen through careful monitoring in the Performance Measurement System.

This is unsurprising given the shift in market demand in recent years to mini-reef displays that comprise diversity of habitat and marine life. The demand for marine fish, particularly the more expensive Australian fish, has diminished accordingly.

The next Ecological Risk Assessment for the Queensland Marine Aquarium Fish Fishery is due in 2014. Complementary industry collection standards will be added to the Provision Reef Inc. website at www.provisionreef.org.au to keep the initiative current after the Ecological Risk Assessment has been undertaken.



Management Response Task Force

The Management Response Task Force is an existing mechanism under Fisheries Queensland's Coral Stress Response Plan to which Pro-vision Reef Inc. is a participant.



**Coral Stress Response Plan
for the Coral & Marine
Aquarium Fish Fisheries (left)
Coral Bleaching Response Plan
2010-2011 (right)**

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate expands the application of the Management Response Task Force to include localised sustainability concern after a fishery practitioner identified this as a risk at the 2013 Coral Fishery Ecological Risk Assessment.

The Management Response Task Force combines industry knowledge and experience with the expertise and spatial and temporal fishery records provided by Fisheries Queensland; the day-to-day operational assessment and monitoring activities undertaken by Queensland Parks and Wildlife Service; and the extensive early warning, monitoring and evaluation resources available to the Great Barrier Reef Marine Park Authority. Additional expertise will be sourced as required.

PARTICIPATION

- Pro-vision Reef Inc. and participating businesses in the affected area
- Fisheries Queensland
- Great Barrier Reef Marine Park Authority
- Queensland Parks and Wildlife Service
- Expert input as required

TRIGGER

- Natural disturbance event, including cyclone, flooding and coral bleaching
- Other disturbance event, including ship grounding or other unforeseen event
- Localised sustainability concern

TERMS OF REFERENCE

The Management Response Task Force will undertake its duties in the spirit of partnership to achieve its defined purpose.

The purpose of the Management Response Task Force is to gather the available resources from industry, fishery and marine park management agencies and other applicable expertise to determine a management response to disturbance or sustainability concern that will assist recovery capacity.

1. Assemble a clear understanding of the event or issue, including the nature and extent of the problem and the spatial dimensions
2. Assemble a clear understanding of the implications of the event or issue, including environmental, social and economic implications
3. Determine and apply agreed, spatially explicit management actions that will assist recovery capacity for an agreed period

Management of the Great Barrier Reef in a changing climate is strengthened through mitigation of risks that diminish resilience. This initiative is the contribution of the marine aquarium industry to that goal.

Filling Knowledge Gaps

Many of the species identified in the Ecological Risk Assessment of the Queensland Coral Fishery were identified on a precautionary basis due to a lack of scientific knowledge in relation to distribution and abundance, correct taxonomic identification and reproductive biology and growth rates.

Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate commits Pro-vision Reef Inc. to a parallel process that will operate in the period between Ecological Risk Assessments aimed at filling the knowledge gaps such that the full ecological risks posed by the fishery are better understood and subsequently mitigated at the individual fishery practitioner level.

RESEARCH PLAN

Pro-vision Reef Inc. will enter into a partnership arrangement with research institutions to learn more about the species in the table below whose identification in the Coral Fishery Ecological Risk Assessment was based on a lack of proper understanding of the species' biology, distribution and abundance or correct taxonomic identification.

Pro-vision Reef Inc., through the attendee businesses, gave a commitment at the two industry workshops to provide samples to the relevant people or institutions for analysis, including determining correct taxonomic identification.

Risk	Species	Knowledge Gap
Moderate	<i>Acanthastrea bowerbanki</i>	Need to determine reproductive size and growth rate
		Need to validate high abundance inshore, which contradicts scientific opinion
		Taxonomic identification issues. Confused with <i>Acanthastrea hillae</i>
Moderate	<i>Acanthastrea lordhowensis</i>	Need to determine reproductive size and growth rate
		Does colour have a genetic basis?
		Confirm proportion of ultra colours in the population
		Validate claims that it is a resilient coral
Moderate	<i>Acanthophyllia deshayesiana</i>	Need to determine reproductive size and growth rate
		Taxonomic identification issues. Not recognised as Australian species
		Need monitoring data for abundance
Moderate	<i>Acropora multiacuta</i>	Need to validate high abundance inshore, which contradicts scientific opinion
Moderate	<i>Acropora nana</i>	Taxonomic identification issues
Moderate	<i>Cycloseris cyclolites</i>	Need to determine reproductive size and growth rate
		Need to validate high abundance inshore, which contradicts scientific opinion. Scientists consider the species to be rare
Moderate	<i>Cynarina lacrymalis</i>	Need to determine reproductive size and growth rate
		Does colour have a genetic basis?
		Need monitoring data for abundance
Moderate	<i>Duncanopsammia axifuga</i>	Need to determine reproductive size and growth rate
		Need validation of widespread distribution
		Is it all one species?
		Need evidence to corroborate or refute growth and reproduction post disturbance

Moderate	<i>Euphyllia ancora</i>	Need to determine reproductive size and growth rate
		Suggestion that there has been no recruitment in Keppels
		Need evidence to corroborate or refute growth and reproduction post disturbance
		Taxonomic identification issues. Confused with <i>Euphyllia fimbriata</i>
Moderate	<i>Euphyllia cristata</i>	Need monitoring data for distribution
Moderate	<i>Euphyllia divisa</i>	Need to determine reproductive size and growth rate
		Need evidence to corroborate or refute growth and reproduction post disturbance
		Taxonomic identification issues
Moderate	<i>Euphyllia fimbriata</i>	Need to determine reproductive size and growth rate
		Need evidence to corroborate or refute growth and reproduction post disturbance
		Taxonomic identification issues. Confused with <i>Euphyllia ancora</i>
Moderate	<i>Euphyllia glabascens</i>	Need to determine reproductive size and growth rate
		Need evidence to corroborate or refute growth and reproduction post disturbance
Moderate	<i>Micromussa amakusensis</i>	Taxonomic identification issues. Confused with <i>Acanthastrea lordhowensis</i>
Moderate	<i>Scolymia australis</i>	Need to determine reproductive size and growth rate
		Does colour have a genetic basis?
		Is it locally abundant?
Moderate	<i>Trachyphyllia geoffroyi</i>	Need to determine reproductive size and growth rate
		Does colour have a genetic basis?
Low	<i>Acropora bushyensis</i>	Taxonomic identification issues. Confused with <i>Acropora digitifera</i>
Low	<i>Acropora chesterfieldensis</i>	Taxonomic identification issues
Low	<i>Acropora plana</i>	Taxonomic identification issues
Low	<i>Acropora prostrata</i>	Taxonomic identification issues. Synonymised with <i>Acropora millepora</i>
Low	<i>Acropora subglabra</i>	Taxonomic identification issues
Low	<i>Acropora verweyi</i>	Taxonomic identification issues
Low	<i>Balanophyllia sp.</i>	Taxonomic identification issues
Low	<i>Blastomussa wellsi</i>	Need to validate high abundance inshore, which contradicts scientific opinion
Low	<i>Catalaphyllia jardinei</i>	Need to determine reproductive size and growth rate
		Does colour and growth form have a genetic basis?
		Need to understand how they reproduce
		Need monitoring data for abundance
Low	<i>Euphyllia paraancora</i>	Taxonomic identification issues. Not supposed to occur in Queensland, but reported from Coral Sea and northern Great Barrier Reef
Low	<i>Euphyllia paradivisa</i>	Taxonomic identification issues
Low	<i>Montipora caliculata</i>	Need to validate high abundance inshore, which contradicts scientific opinion
Low	<i>Moseleya latistellata</i>	Need to validate high abundance inshore, which contradicts scientific opinion
Low	<i>Turbinaria heronensis</i>	Need to confirm distribution. Thought to be restricted

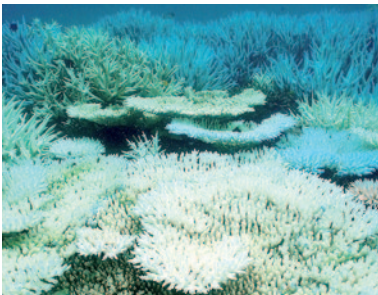
RESOURCE CONDITION MONITORING

Pro-vision Reef Inc. will partner with Fisheries Queensland and the Great Barrier Reef Marine Park Authority to develop a plan for the collection, delivery and synthesis of digital imagery to assist monitoring of resource condition.

Pro-vision Reef Inc. will provide selected Queensland Coral Fishery businesses at a range of latitudes along the Queensland coast with camera equipment to capture imagery of resource condition as it pertains to species identified in Ecological Risk Assessment, including those nominated in the CITES Non-detriment Finding.

As part of the partnership arrangement, Pro-vision Reef Inc. will provide Fisheries Queensland with the computer hardware and software with which to synthesise and store digital imagery provided by participating businesses. All imagery will be available for use by the Great Barrier Reef Marine Park Authority.

This initiative forms part of the culture of collaboration nurtured by Pro-vision Reef Inc. on behalf of the marine aquarium industry on the Great Barrier Reef. It exemplifies the transparency and the commitment to continuous improvement of the fisheries within which the participating businesses operate.



Scientists predict that global climate change will result in greater frequency of coral bleaching.

E-LOGS

Pro-vision Reef Inc. and participating businesses commit to participate in the development and adoption of electronic logbooks that gather high resolution spatial and taxonomic fishery records that can be delivered in real time.

Out on the water? Look for the Pro-vision Reef Inc. logo



Author: Ryan Donnelly [ryan@donnelly.com.au]

Ryan Donnelly provides services to the commercial fishing industry; and fishery and marine protected areas managers.

He specialises in fostering collaboration and advocacy between commercial fishers, scientists and resource management agencies to add value to the implementation and effectiveness of ecosystem-based fishery management, which is critical for maintaining export eligibility approval.

The collaborative approach enables complementary management of fisheries to mitigate ecological risk, enhance the conservation of biological diversity and promote reef resilience in the face of global climate change.

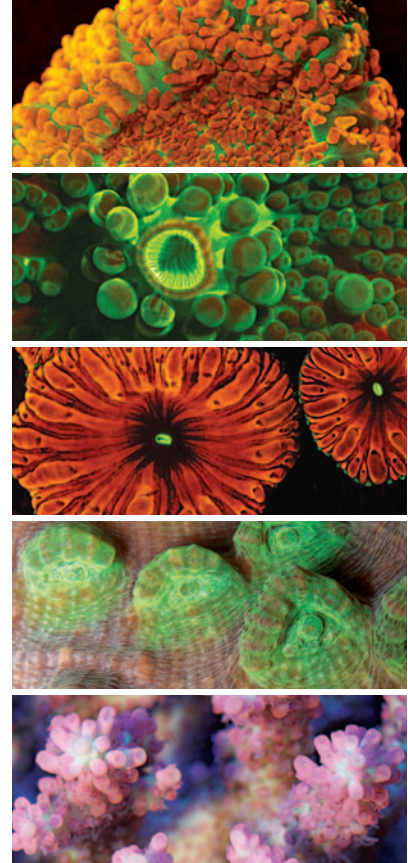
Design: Andreas Wagner [andreas@coolplanetdesign.com.au]

Andreas Wagner of Cool Planet Design is an award-winning designer specialising in science communication products in web and print formats. He has developed material for Australian research organisations and government agencies, including the Great Barrier Reef Marine Park Authority, the Commonwealth Scientific and Industrial Research Organisation, Australian Institute of Marine Science, the Bureau of Meteorology, various Cooperative Research Centres, regional Natural Resource Management groups and City Councils.



PROVISION REEF

Promoting Sustainable Reef Harvest



Aquarium displays are traditionally based on cultured freshwater fish species. This is still the case but, in recent years, the availability of inexpensive, self-contained saltwater filtration systems has seen growth in the popularity of keeping marine specimens in a colorful mini-reef replication.

These displays generally feature dead coral that has been colonised by colorful bryozoa and coralline algae. This matrix is adorned with colorful corals, corallimorphs and sea anemones. Australia is an insignificant supplier of tropical marine fish to the international market but provides about 20% of the living coral.

The aquarium supply industry on the Great Barrier Reef and Coral Sea is small and the fishery assessment, management and monitoring framework is robust. However, in a changing climate, Pro-vision Reef Inc. is aware that the industry must make a practical contribution to the management of the fisheries.

***Stewardship Action Plan 2013: Mitigating Ecological Risk in a Changing Climate** provides a means by which industry integrates into the existing cycle of assessment, management and monitoring to collaboratively achieve management objectives for the fisheries.*

www.provisionreef.org.au

Project Partners:



CARING
FOR
OUR
COUNTRY



Australian Government
Great Barrier Reef
Marine Park Authority



ARC Centre of Excellence
Coral Reef Studies