Queensland marine science syllabus guide

Unit 4 Ocean issues and resource management

Topic 1: Oceans of the future

Wet Paper

Management and conservation

Topic 1: Oceans of the future

a. Management and conservation

T122 Habitat preservation arguments

T123 MPA design criteria II

T124 Marine ecosystem health

T125 MPA success stories

T126 Government and NGO management roles

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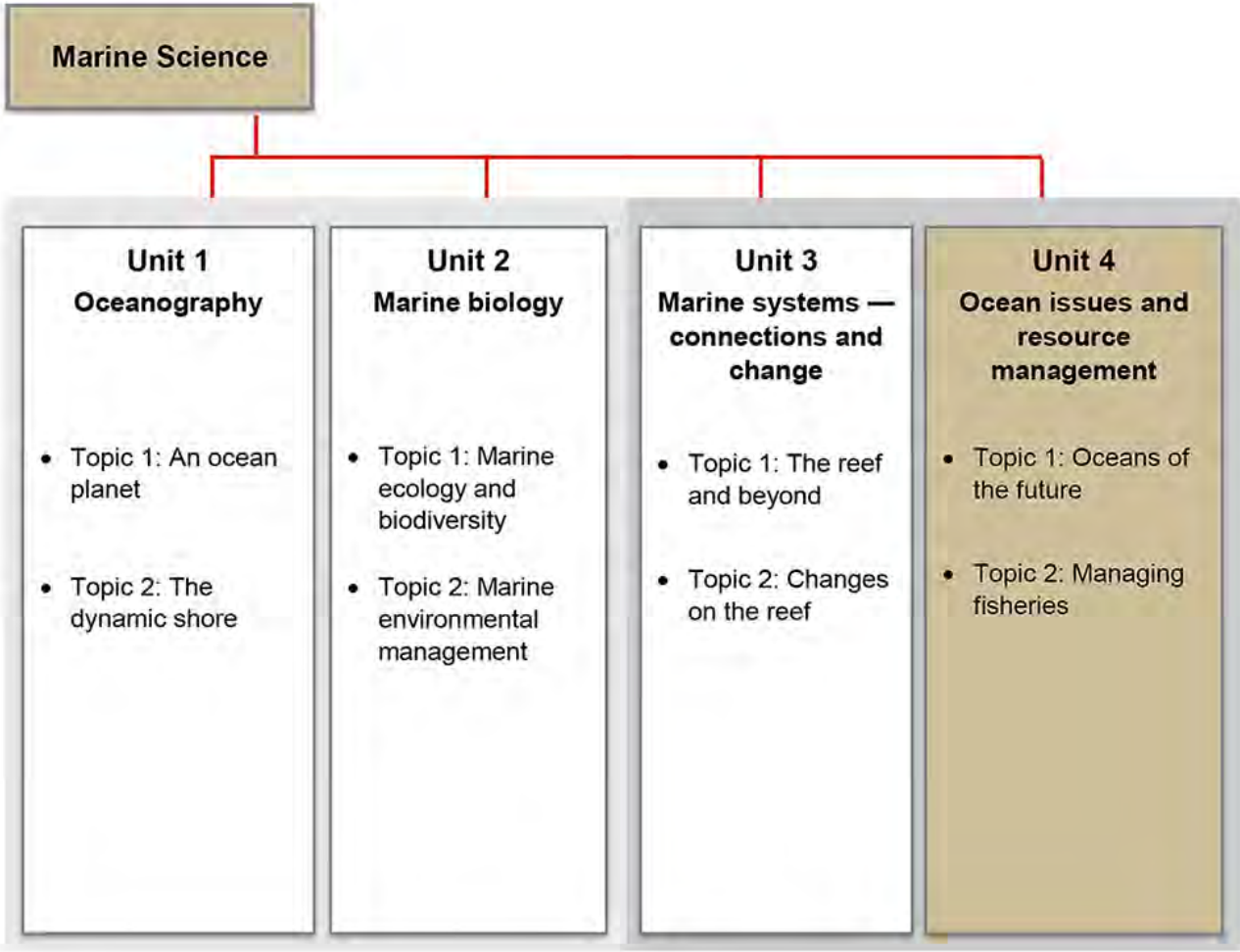
Schools should be aware that these power points make extensive use of journal articles, which, in the scientific community, often need to be replicated and in some cases are often refuted. In addition marine park regulations and policies can change with changing governments, so teachers are advised to check acceptable answers with the relevant QCAA officer if in doubt.

June 2019

Syllabus reference



Classification of verbs – degree of difficulty

★	★★	★★★
calculate (e.g. numerical answer; mathematical processes)	analyse	appraise
clarify	apply	appreciate
comprehend (meaning)	categorise	argue
construct (e.g. a diagram)	classify	assess
define	compare	comment (make a judgment)
demonstrate	consider	conduct (e.g. investigations)
describe	contrast	construct (e.g. an argument)
document	critique	create (e.g. a unique product/ artefact; language texts; meaning)
execute	deduce	decide/determine
explain	derive	discuss/explore
identify	determine	evaluate
implement (e.g. a plan, proposal)	discriminate	experiment/test (e.g. ideas, methods)
recall	distinguish	generate/test (e.g. hypotheses)
recognise (e.g. features)	identify	investigate/examine
select	infer/extrapolate	justify/prove (e.g. an argument, statement or conclusion)
understand	interpret (e.g. meaning)	modify
use		predict (e.g. a result)

Approximate exam paper match

Unit 4: Ocean issues and resource management

Topic 1 Oceans of the future

A. Management and conservation				Exam example	
Power point titles		**Matching syllabus statements**		**School**	**Public**
T122	Use conservation arguments	T 122	Recall and use the arguments for preserving species and habitats (i.e. ecological, economic, aesthetic, ethical) through identifying their associated direct and indirect values in a given case study		P 1 M/c Q20
T123	Explain MPA design criteria	T 123	Recall and explain the criteria (i.e. site selection, networking and connectivity, replication, spacing, size and coverage) used to design protected marine areas		P1. M/c Q10
T124	Marine ecosystem health	T 124	Identify management strategies used to support marine ecosystem health (e.g. managing threats, zoning, permits, plans, longitudinal monitoring)		P 1 M/c Q9
T125	Evaluate MPA success	T 125	Evaluate the success of a named protected marine area		P 1 M/c Q18
T126	Compare management roles	T 126	Compare the roles of government and non-government organisations in the management and restoration of ecosystems and their relative abilities to respond (e.g. speed, diplomatic constraints, political influence, enforceability).	P2. S/a Q5	

T122 Habitat preservation arguments

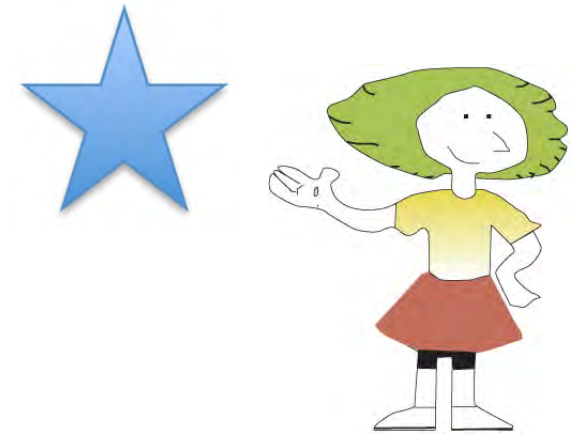
Adam Richmond

Syllabus statement

At the end of this topic you should be able to ...

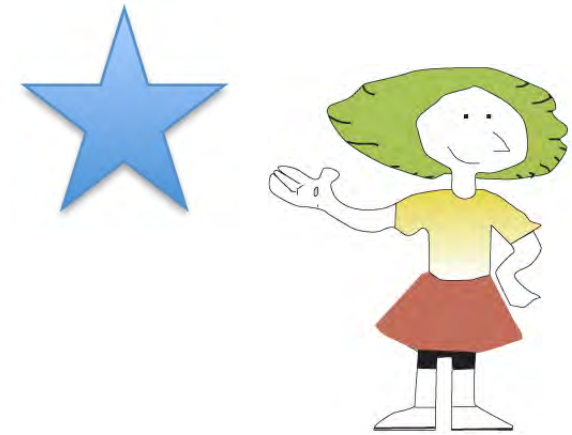
Recall

and **use** the arguments for preserving species and habitats (i.e. ecological, economic, aesthetic, ethical) through identifying their associated direct and indirect values in a given case study



Recall

- remember; present remembered ideas, facts or experiences;
- bring something back into thought, attention or into one's mind



Objectives

Explain the different arguments for protecting biodiversity

Identify the direct and indirect values of a marine species or habitat

Argue why your chosen species or habitat should be protected

Revisit T060 Species habitat preservation.

Recall the ecological, economic, social, aesthetic, ethical arguments for preserving species and habitats.

Summarise ecological, economic, social, aesthetic, ethical arguments for preserving species and habitats in a table.

Category	Argument
Genetic	Wild animals and plants are sources of genes for new adaptations to assist the survival in a changing environment. Ecosystems become more resilient to the loss of a species/reduction of population. Some species are keystone species, which if removed from the ecosystem can lead to many other species becoming extinct
Ecological	More species increases food web complexity. If prey or predator is lost other species can fill in gap. Life-support service value e.g. stable climate
Economic	People take vacations on areas surrounded by natural beauty and ntional parks (examples: snorkelling, fishing, boating, sailing, hiking) Unknown value in the potential of the species for agriculture, medicine, genetic diversity and biotechnology The sea is also a vast source of commercial resources such as oil and gas, which help run the electricity in your school.
Social	Provide a place for people to socialize - Let's all go for a surf, paddle, swim – source of networking, buildings environmental groups. OR Different societies need to defend environmental protection. Biodiversity should be preserved for its own sake as humans have a responsibility to act as stewards of the Earth.
Aesthetic	Source of beauty. People rely on wild places for spiritual fulfillment Nature can provide inspiration for the arts eg: music, poetry, painting, stories Surfers have a special relation with the sea which leads to the phrase - "only a surfer knows the feeling". I am sure you have your OWN special feelings and it is for these that habitats and species are worth preserving.
Ethical	Each species has a right to exist (a bioright) which is unrelated to human needs/ Habitats should be preserved for their own sake. Humans have a responsibility to act as stewards of our oceans and land

Revisit T063 Stakeholder value systems

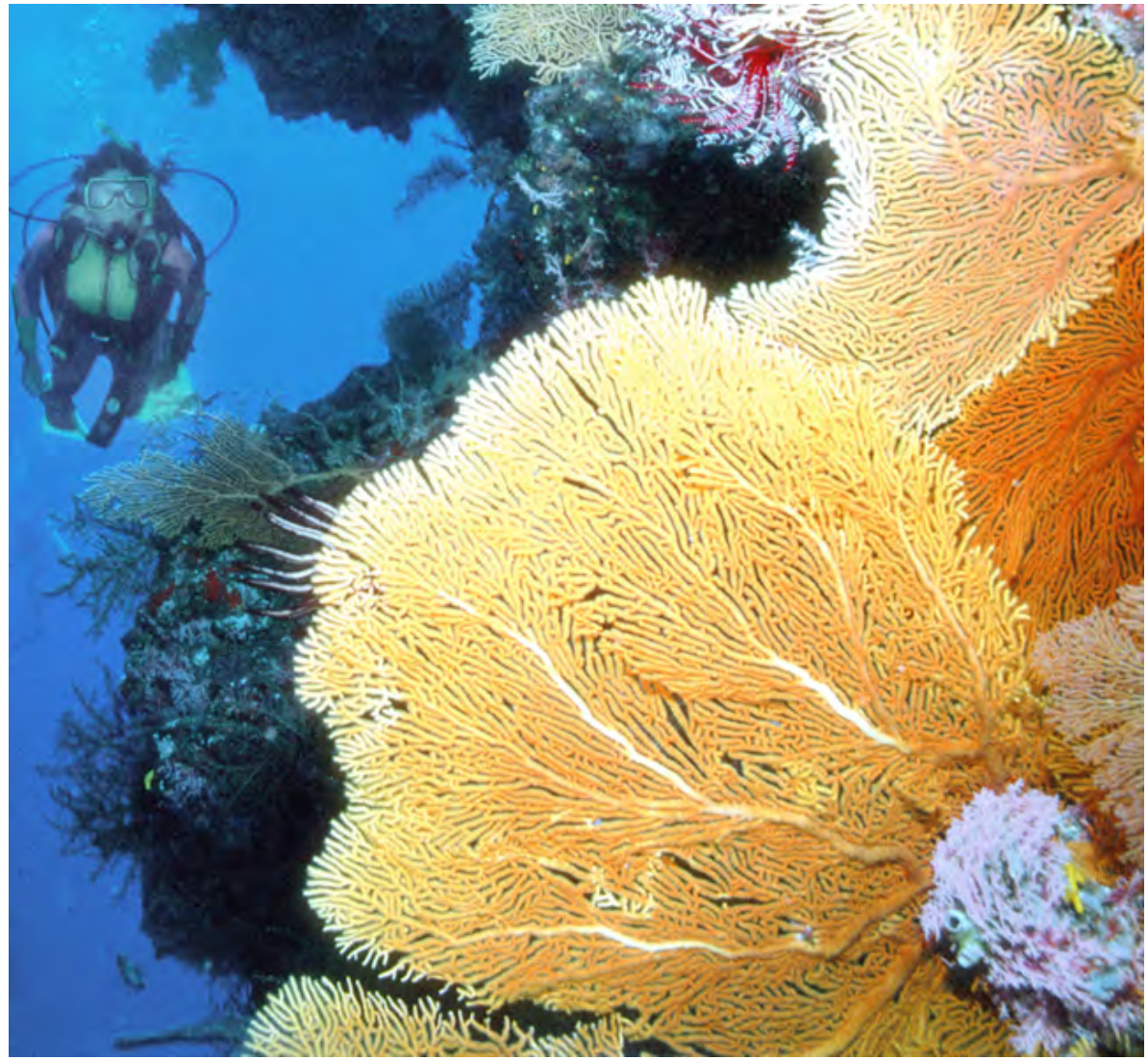
Value system	Definition	Implications when hearing people speak at stakeholder meetings.
Ecocentric	This is a value system that integrates social, spiritual and environmental dimensions; places nature as central to humanity; encourages self-restraint in human behaviour as a means for solving environmental problems; prioritises 'bio rights'	You will hear arguments such as the rights of endangered species or unique landscapes to remain untouched. You will hear arguments that non-human organisms and the natural environment as a whole deserve consideration when appraising the morality of political, economic, and social policies.
Technocentric	This is a value system that is centered on technology and its ability to control and protect the environment. Technocentrics have absolute faith in technology and industry and firmly believe that humans have control over nature.	You will hear arguments that environmental problems exist, but do not accept these problems can be solved by a reduction in industry. Their arguments are based on problems being solved using science and technology and in scientific research.
Anthropogenic	Anthropocentrism is the belief that human beings are the most important entity in the universe. Anthropocentrism interprets or regards the world in terms of human values and experiences.	You will hear arguments that encourage sustainable management of resources through taxes, regulations and legislation as a means for solving environmental problems.

appreciate the specific value systems that identified stakeholders use (i.e. ecocentric, technocentric, anthropogenic)

Genetic

Wild animals and plants are sources of genes for new adaptations.

This assists survival in a changing environment.



Ecosystems become more resilient to the loss of a species/reduction of population.

Some species are keystone species, which if removed from the ecosystem can lead to many other species becoming extinct.

Ecological

More species types and numbers increases food web complexity.

Greater biodiversity provides greater ecosystem health.

If one type of prey or one type of predator is lost, other species can fill in the gap.

For example, if one type of coral is more tolerant to pollution than another, it will replace the “weaker” type to allow continuation of the species.

In the “big picture”, habitats play a vital role as life-support services. The ocean adjacent to the land provides a place for transport of reproductive materials and stages.

For example, mangrove seeds can be dispersed, barnacle larvae can grow and migrate back to shore.

Economic

People take vacations on areas surrounded by natural beauty and national parks.

The tourism industry can flourish, bringing millions of dollars into countries economies.

As part of their holiday, they can go snorkelling, fishing, boating, sailing, hiking creating a multitude of service industry jobs.

Gas platforms drill deep into the ocean floor extracting natural gas, offloading to ships or undersea pipelines and is then processed on shore.

Harriet A gas platform

The direct value of the Great Barrier Reef

The Deloitte report investigated the economic, social and icon value of the Great Barrier Reef.

Download the report here:
https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-great-barrier-reef-230617.pdf

The Great Barrier reef provides 64 000 jobs and contributes $6.4 B ($6 400 000 000) to the Australian economy every year.

Image: © 2019 Great Barrier Reef Foundation, reproduced with permission. https://www.barrierreef.org

What is the indirect value of the Great Barrier Reef?

The Great Barrier Reef is worth $56 B to Australians who use the reef, visit the reef, or just like knowing that its there.

This is almost 9 times more than the direct contribution of the GBR to Australia's economy.

The indirect value is much more complicated to calculate as it includes "non-use" values.

The main reason Australians want to preserve the Great Barrier Reef is so future generations can visit it. This ”bequest value” is an indirect non-use benefit.

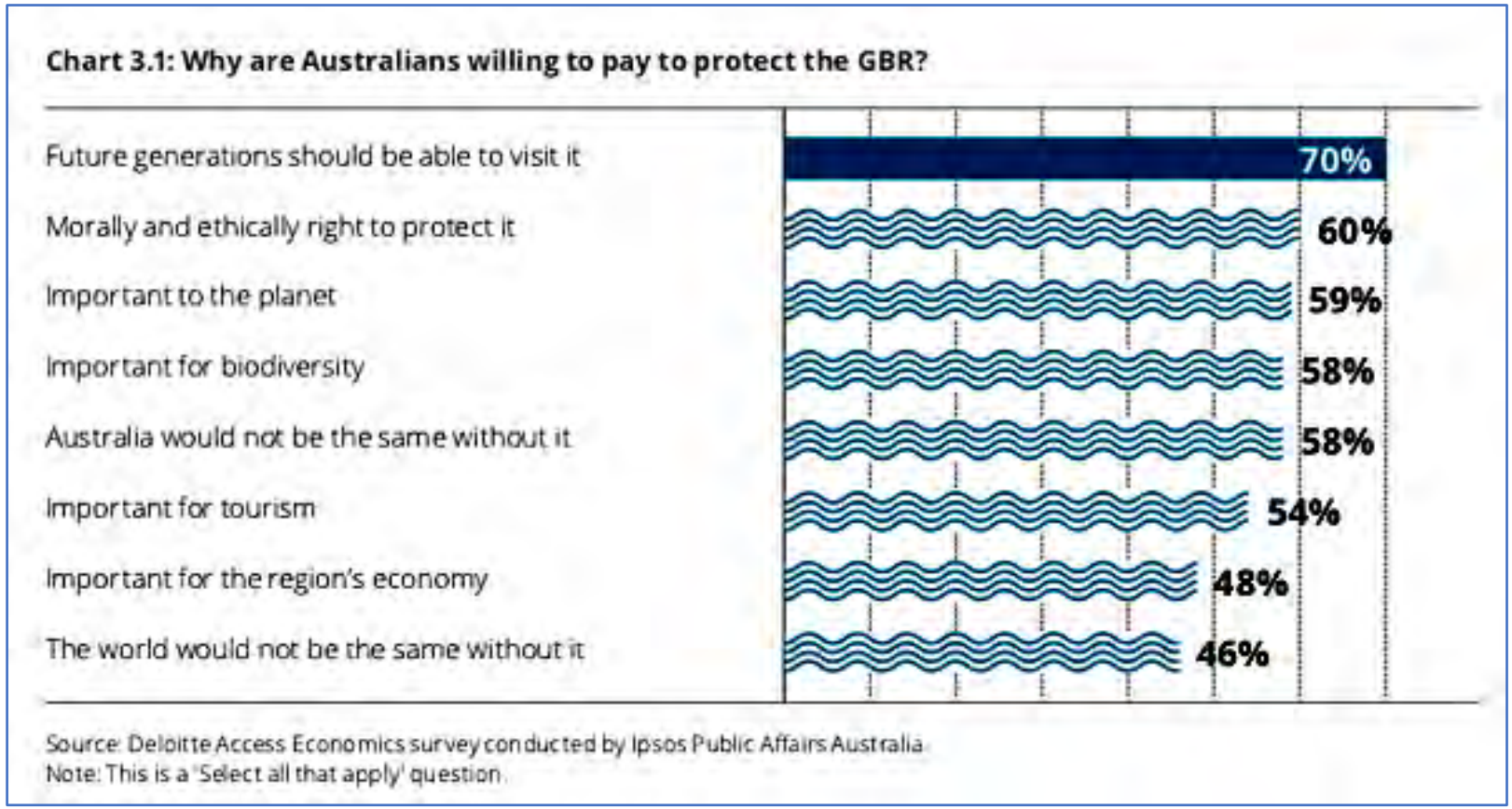


Image: O’Mahoney J, Simes R, Redhill D, Heaton K, Atkinson C, Hayward E, Nguyen M. 2017. At what price? The economic, social and icon value of the Great Barrier Reef. Deloitte Access Economics. Available: https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-great-barrier-reef-230617.pdf Reproduced with permission.

Internationally, people want to preserve the Great Barrier Reef more for its ecological values

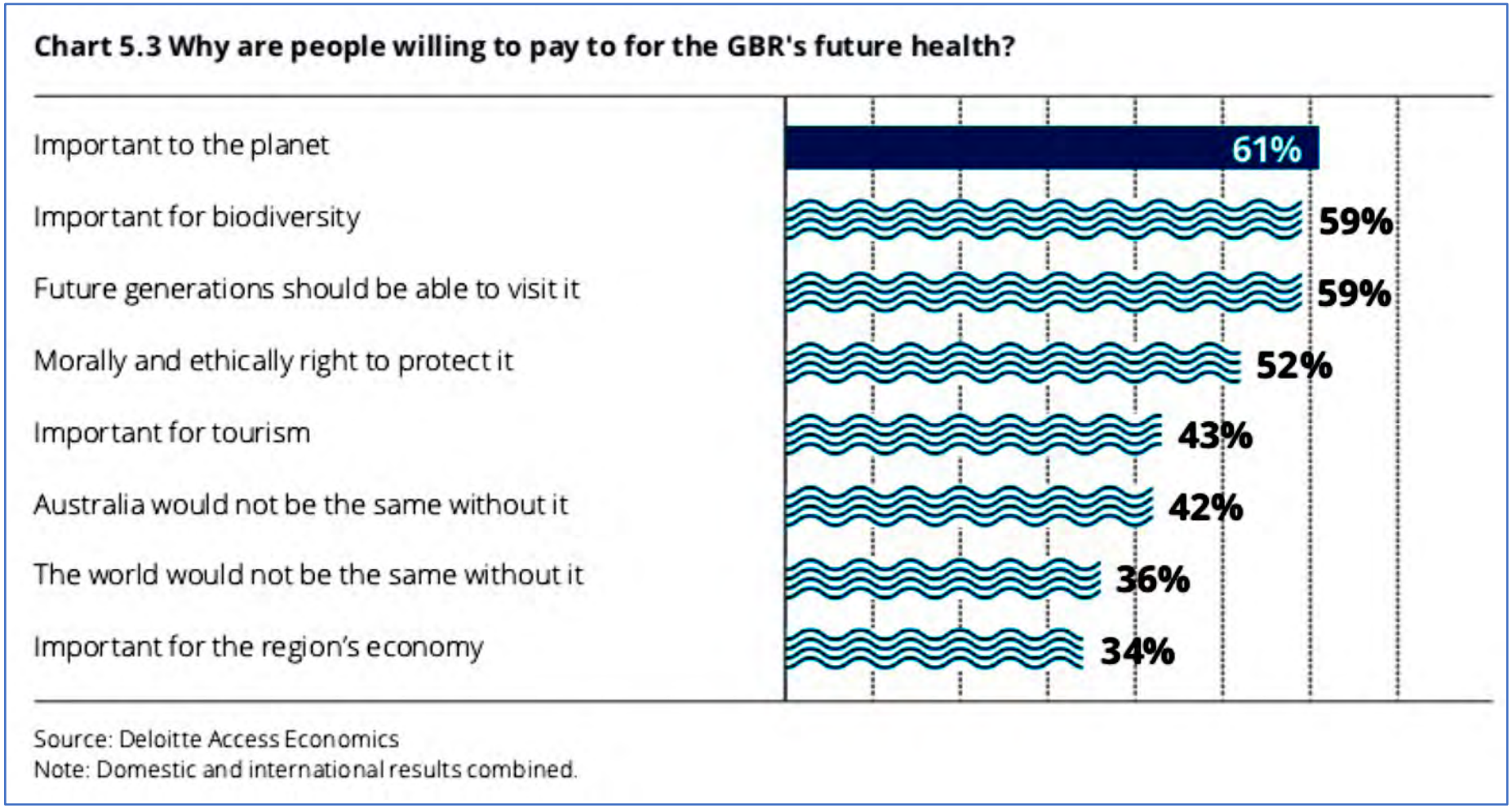


Image: O'Mahoney J, Simes R, Redhill D, Heaton K, Atkinson C, Hayward E, Nguyen M. 2017. At what price? The economic, social and icon value of the Great Barrier Reef. Deloitte Access Economics. Available: https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-great-barrier-reef-230617.pdf Reproduced with permission.

Social

Provide a place for people to socialise - Let's all go for a surf, paddle, swim – source of networking and building environmental groups.

One syllabus interpretation – what's yours?

Preserving our clean water provides a healthy environment for us all.
Australia's clean water image is promoted around the world.

Surfing Australia - reproduced with permission from the bring back Kirra campaign (thanks Steph)

Different societies need to defend environmental protection.

“Biodiversity should be preserved for its own sake as humans have a responsibility to act as stewards of the Earth”

Another syllabus interpretation

Aesthetic

The ocean is a source of beauty.

People rely on wild places for spiritual fulfillment and the ocean provides limitless opportunities.

Habitats can provide inspiration for the arts.
For example,
Music, poetry, painting, photography and stories.

Surfers have a special relationship with the sea which leads to the phrase - “only a surfer knows the feeling”.

Aboriginal and Torres Strait Islander peoples record stories and their heritage in art.

Ethical

Each species has a right to exist (a bio-right) which is unrelated to human needs.

This idea holds that some, or all, non-human animals are entitled to the possession of their own lives and that their most basic interests - such as the need to avoid suffering - should be afforded the same consideration as similar interests of human beings.

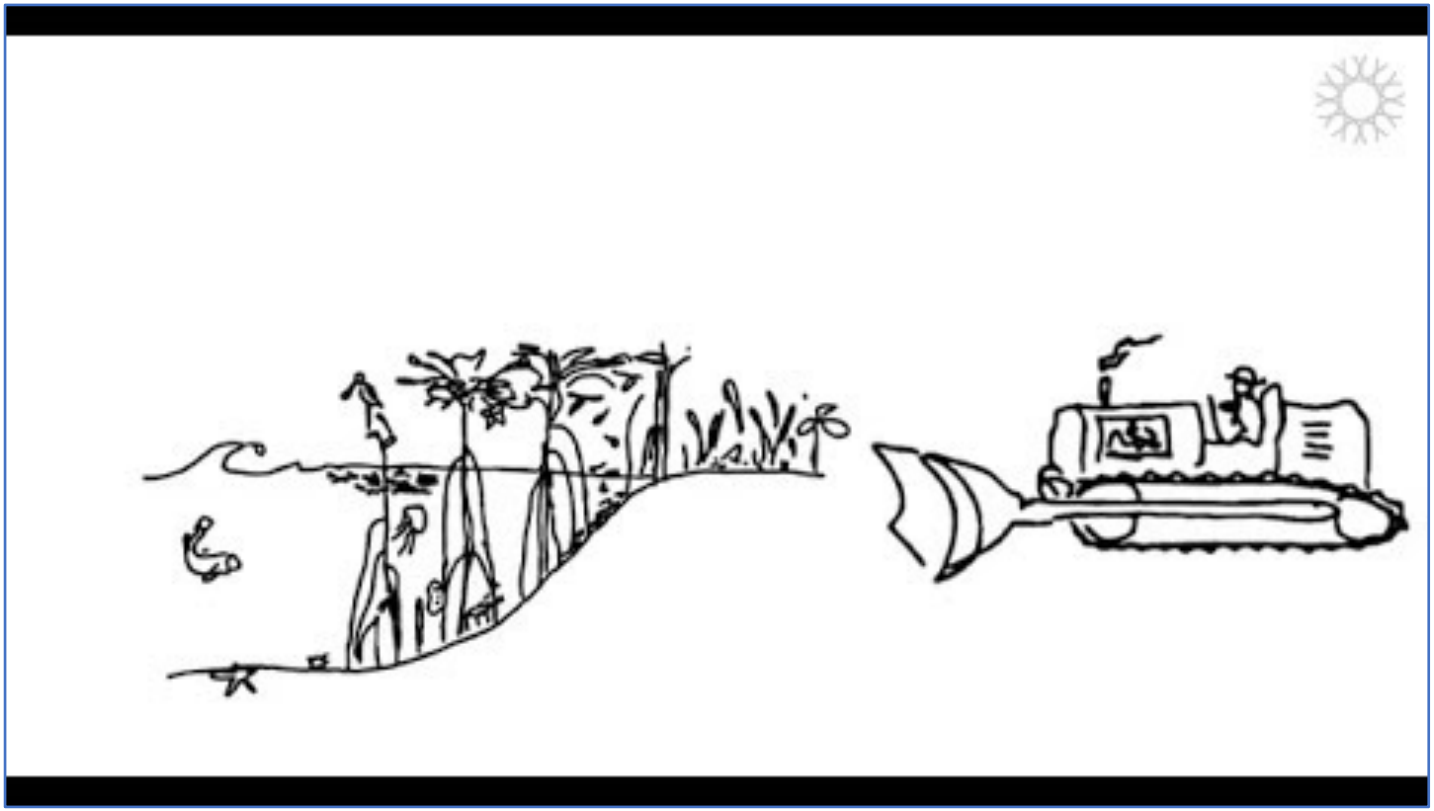
Left By Alan Wilson - www.naturespicsonline.com: [1], CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=38456823

Right By Andreas Weith - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=52745369

Habitats should be preserved for their own sake for future generations.
Humans have a responsibility to act as stewards of our oceans and land.

This YouTube video summarises direct and indirect and aesthetic values of ecosystems

https://youtu.be/BCH1Gre3Mg0



Ecosystem Services

YouTube video by California Academy of Sciences, available: https://youtu.be/BCH1Gre3Mg0

Class discussion

Here are some arguments for conserving green sea turtle.

Which type of argument do they represent?

- Sea turtles should be preserved because they are beautiful animals, and observing them in their natural habitat provides joy.
- All animals have a right to live. As humans, we have an obligation to ensure that we do not cause sea turtles to become extinct.
- Restoring the oceans where turtles live would be more expensive that maintaining them. Saving the turtles will boost the economies of coastal countries, through tourism.
- The fragile ocean ecosystem can be disrupted by small changes to the balance of species. Losing the sea-turtle would have significant effects on the ecosystem as a whole.

Entangled Sea turtle

Reference: Brackney, M., & McAndrew, F. (2001). Ecological Worldviews and Receptivity to Different Types of Arguments for Preserving Endangered Species. *The Journal Of Environmental Education*, *33*(1), 17-20. doi: 10.1080/00958960109600797

Suggested answer

Sea turtles should be preserved because they are beautiful animals, and observing them in their natural habitat provides joy.

- Aesthetic

All animals have a right to live. As humans, we have an obligation to ensure that we do not cause sea turtles to become extinct.

- Moral/ethical

Restoring the oceans where turtles live would be more expensive that maintaining them. Saving the turtles will boost the economies of coastal countries, through tourism.

- Economic

The fragile ocean ecosystem can be disrupted by small changes to the balance of species. Losing the sea-turtle would have significant effects on the ecosystem as a whole.

- Ecological

Reference: Brackney, M., & McAndrew, F. (2001). Ecological Worldviews and Receptivity to Different Types of Arguments for Preserving Endangered Species. *The Journal Of Environmental Education*, *33*(1), 17-20. doi: 10.1080/00958960109600797

Green Sea turtle hatchling

Question

Which arguments would be used to provide the strongest evidence for mangrove conservation from an ecocentric perspective?

a) economic and social
b) ecological and social
c) aesthetic and economic
d) aesthetic and ecological

Answer is b –

This is a value system that

- integrates social, spiritual and environmental dimensions;
- places nature as central to humanity;
- encourages self-restraint in human behaviour as a means for solving environmental problems;
- prioritises ‘bio rights’

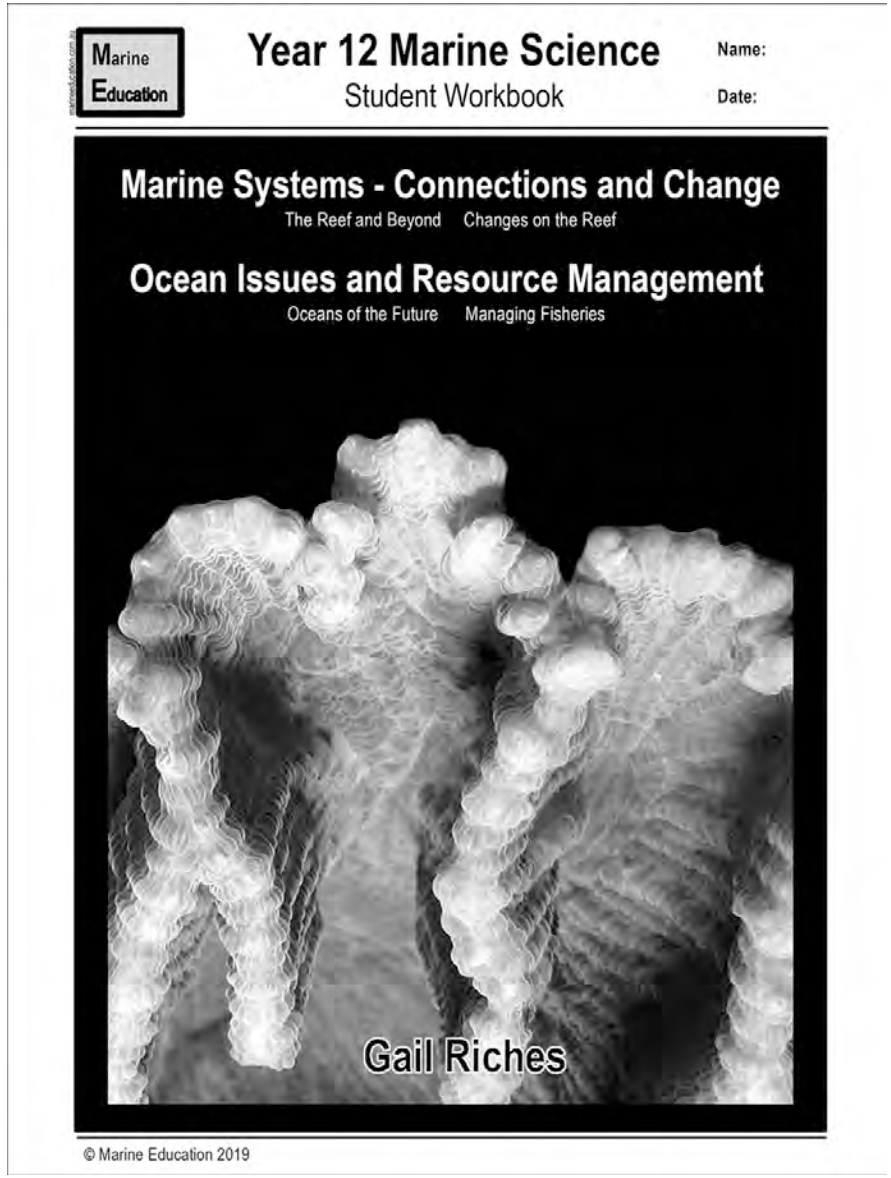
Worksheet

Project why?

by

Gail Riches

www.marineeducation.com.au



T123 MPA design criteria II

Adam Richmond

Syllabus statement

At the end of this topic you should be able to ...

Recall

and

Explain

the criteria (i.e. site selection, networking and connectivity, replication, spacing, size and coverage) used to design protected marine areas

Recall

- remember; present remembered ideas, facts or experiences; bring something back into thought, attention or into one's mind

Explain

- make an idea or situation plain or clear by describing it in more detail or revealing relevant facts; give an account;
- provide additional information

Review T067 MPA designs

In T067 MPA designs (last year), you listed three environmental criteria for places to be included into a marine park.

The guidelines

Guidance on Achieving Comprehensiveness, Adequacy, and Representativeness in the Commonwealth waters component of the National Representative System of Marine Protected Areas

The Scientific Peer Review Panel for the National Representative System of Marine Protected Areas

February 20, 2006

Purpose

The purpose of this paper is to outline the approach of the Scientific Peer Review Panel for the National Representative System of Marine Protected Areas (the Peer Review Panel) in assessing the principles of comprehensiveness, adequacy and representativeness of Marine Protected Area (MPA) proposals for inclusion in the Commonwealth waters component of the National Representative System of Marine Protected Areas (NRSMPA). The advice provided in this paper is based on national guidelines produced by the Australian and New Zealand Environment and Conservation Council (ANZECC) for establishing a comprehensive, adequate and representative MPA system[1].

Criteria

The Australian Government: Statements relating to MPA Development

The ANZECC guidelines to assist governments to develop a NRSMPA will be:

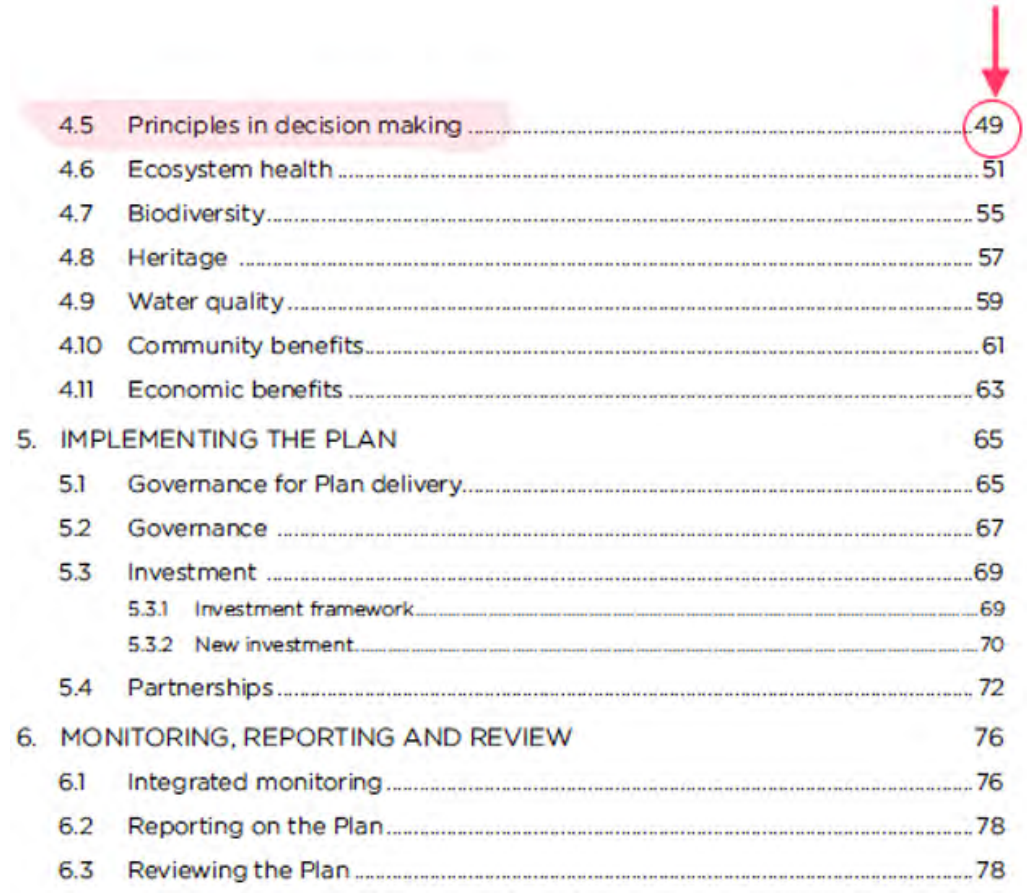
- Comprehensive: include MPAs that sample the full range of Australia's ecosystems;
- Adequate: include MPAs of appropriate size and configuration to ensure the conservation of marine biodiversity and integrity of ecological processes; and
- Representative: include MPAs that reflect the marine life and habitats of the areas they are chosen to represent.

The ANZECC documents recognize that governments will interpret the Guidelines so that they are effectively integrated with existing processes and legislation in each jurisdiction.

http://www.environment.gov.au/resource/guidance-achieving-comprehensiveness-adequacy-and-representativeness-commonwealth-waters

AND the principles in decision making

- Maintaining and enhancing outstanding universal value in every action
- Basing decisions on the best available science
- Delivering a net benefit to the ecosystem
- Adopting a partnership approach to management



http://www.environment.gov.au/marine/gbr/publications/reef-2050-long-term-sustainability-plan-2018

Now we look at the criteria used for designing marine protected areas in Australia.

i.e. site selection, networking and connectivity, replication, spacing, size and coverage.

Objectives

- List the criteria used for designing marine protected areas in Australia.
- Describe in your own words why these criteria should be considered.
- Explain why can’t we just protect the whole ocean?
- Classify scientific evidence for MPA design into the 4 CARE principles.

Definition

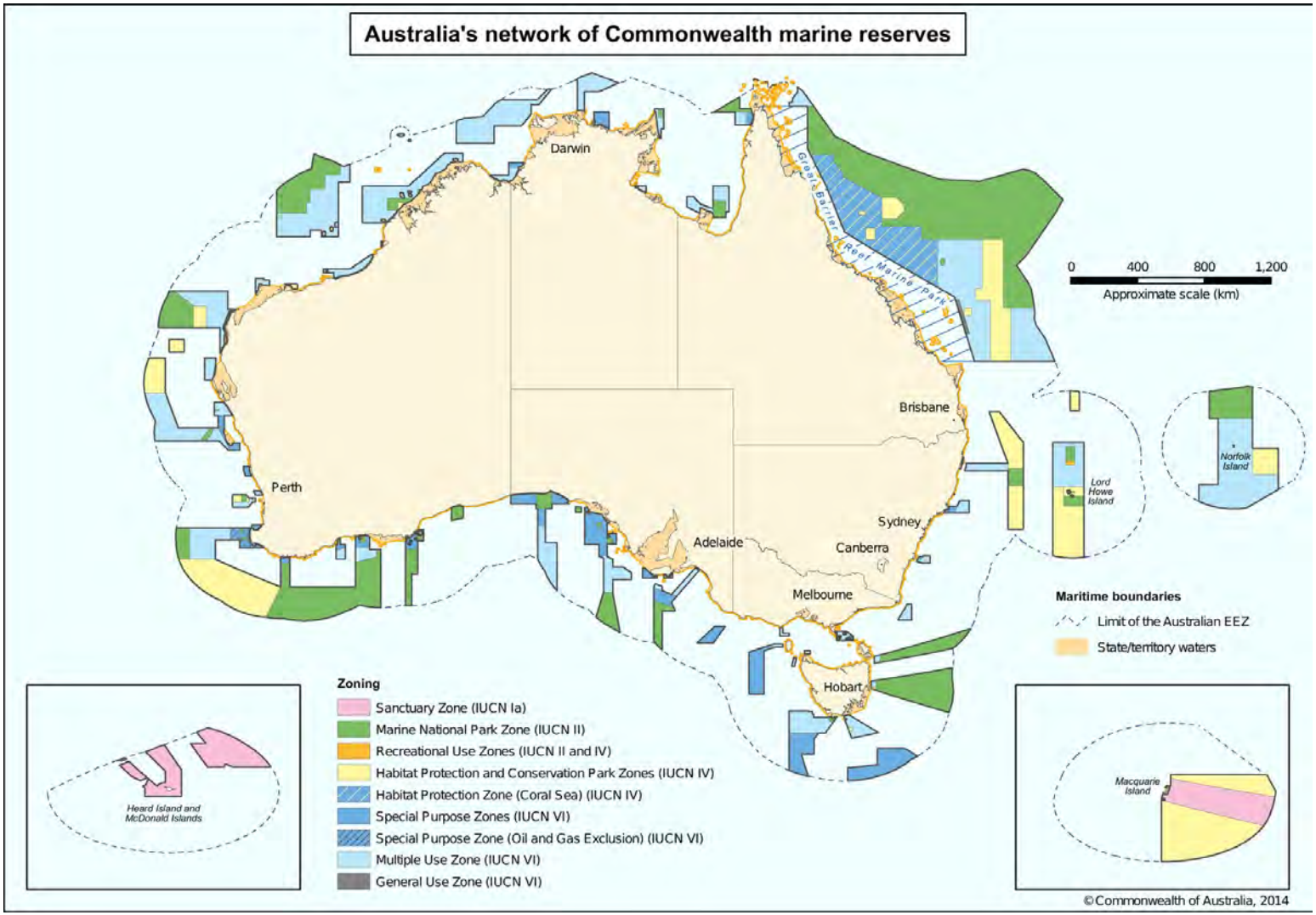
For an area to be recognised as an MPA it must meet the IUCN protected area definition:

A clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values

*The IUCN is the International Union for the Conservation of Nature

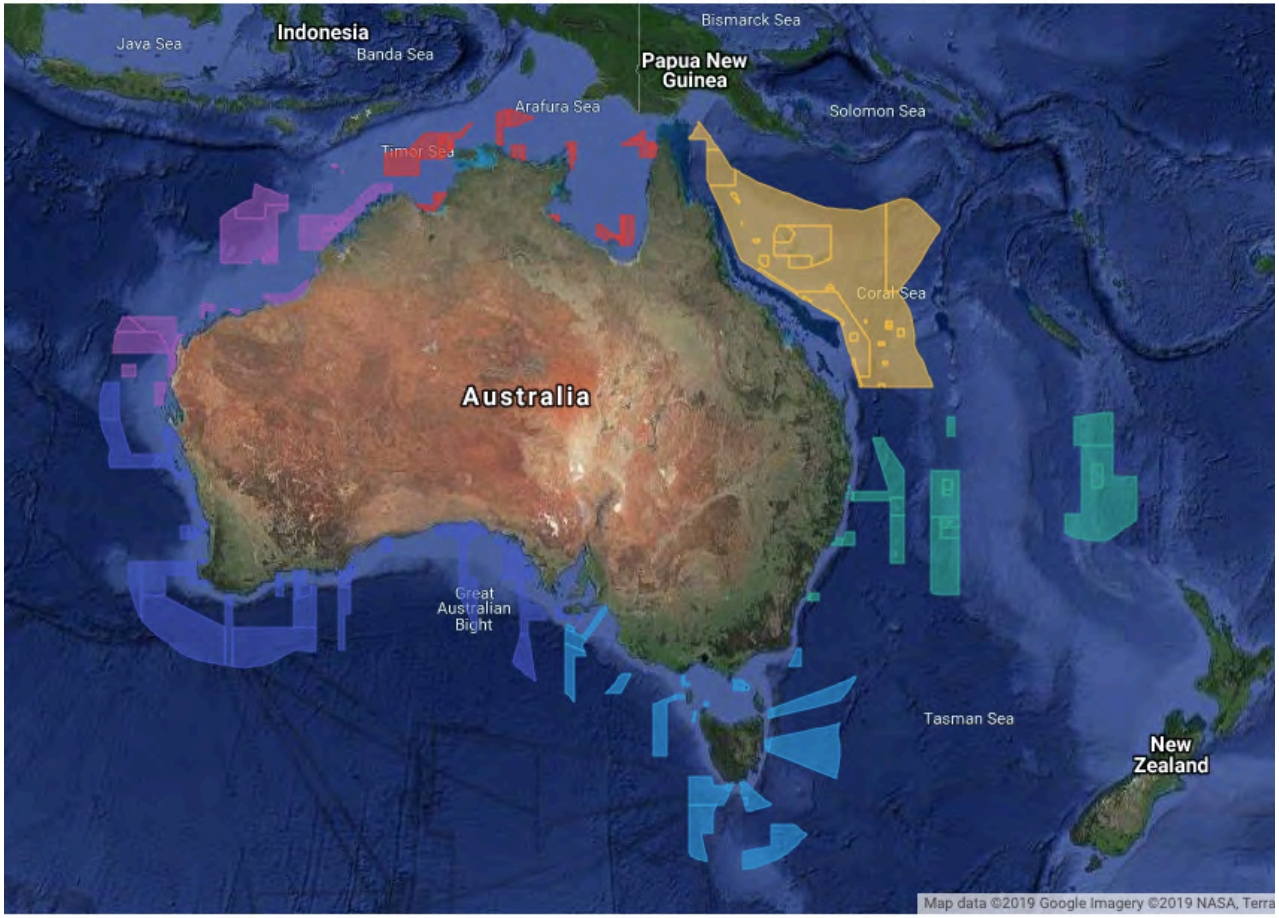
Reference: IUCN WCPA, 2018. Applying IUCN's Global Conservation Standards to Marine Protected Areas (MPA). Delivering effective conservation action through MPAs, to secure ocean health & sustainable development. Version 1.0. Gland, Switzerland. 4pp.
Available:
https://www.iucn.org/sites/dev/files/content/documents/applying_mpa_global_standards_final_version_050418.pdf

These are the Marine Protected Areas managed by the Commonwealth Government



Map of all Australian networks and marine parks

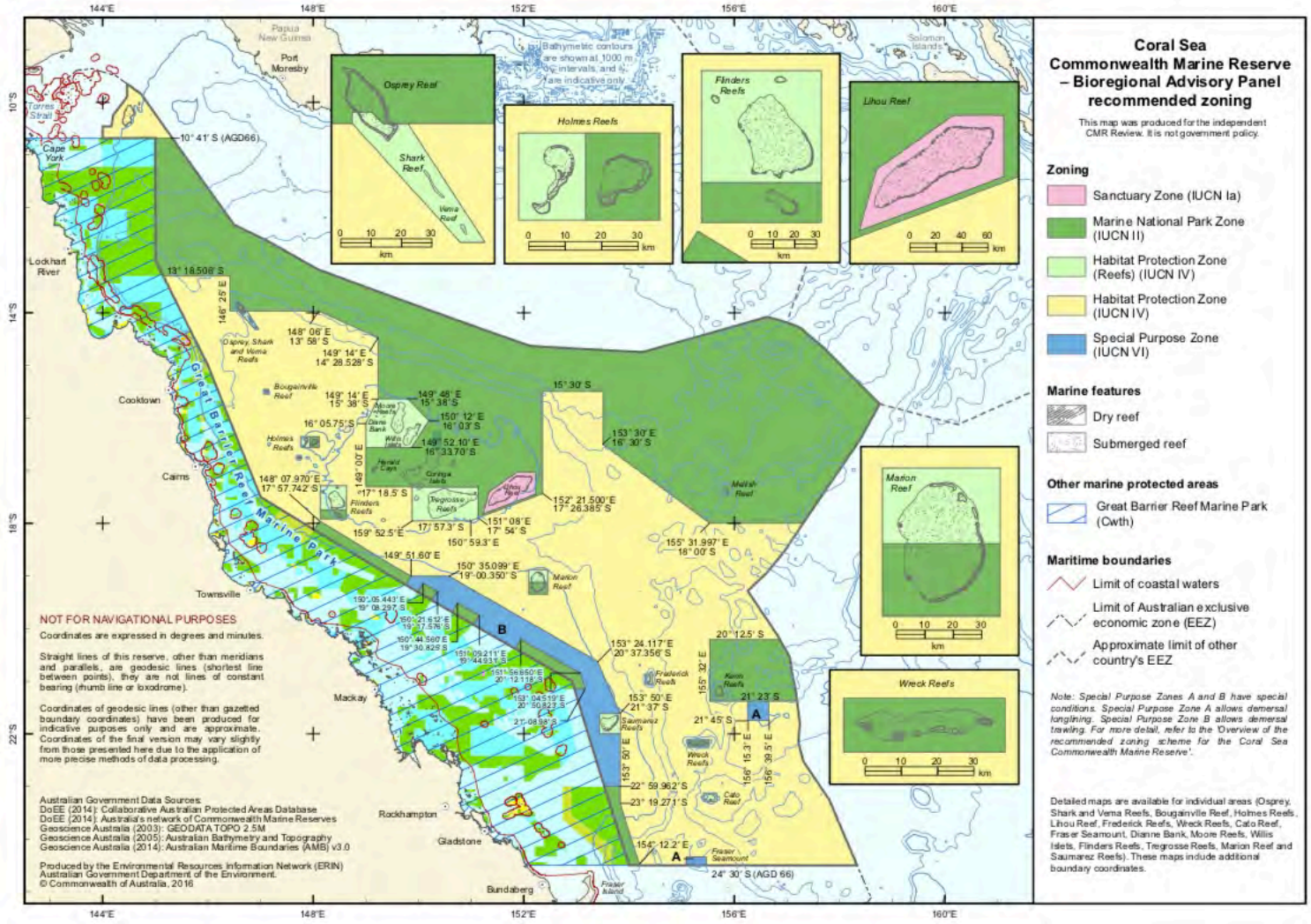
There are 58 marine protected areas- known as Marine Parks- in Commonwealth waters, over 3 nautical miles from the coast. These are managed by Parks Australia



Most of these Marine Parks are grouped into groups called “networks’

Image screen shot from: https://parksaustralia.gov.au/marine/ Copyright NASA, Google.

The Coral Sea Marine Reserve is beyond the Great Barrier Reef Marine Park



Coral Sea Commonwealth Marine Reserve

Image: © Commonwealth of Australia, 2016

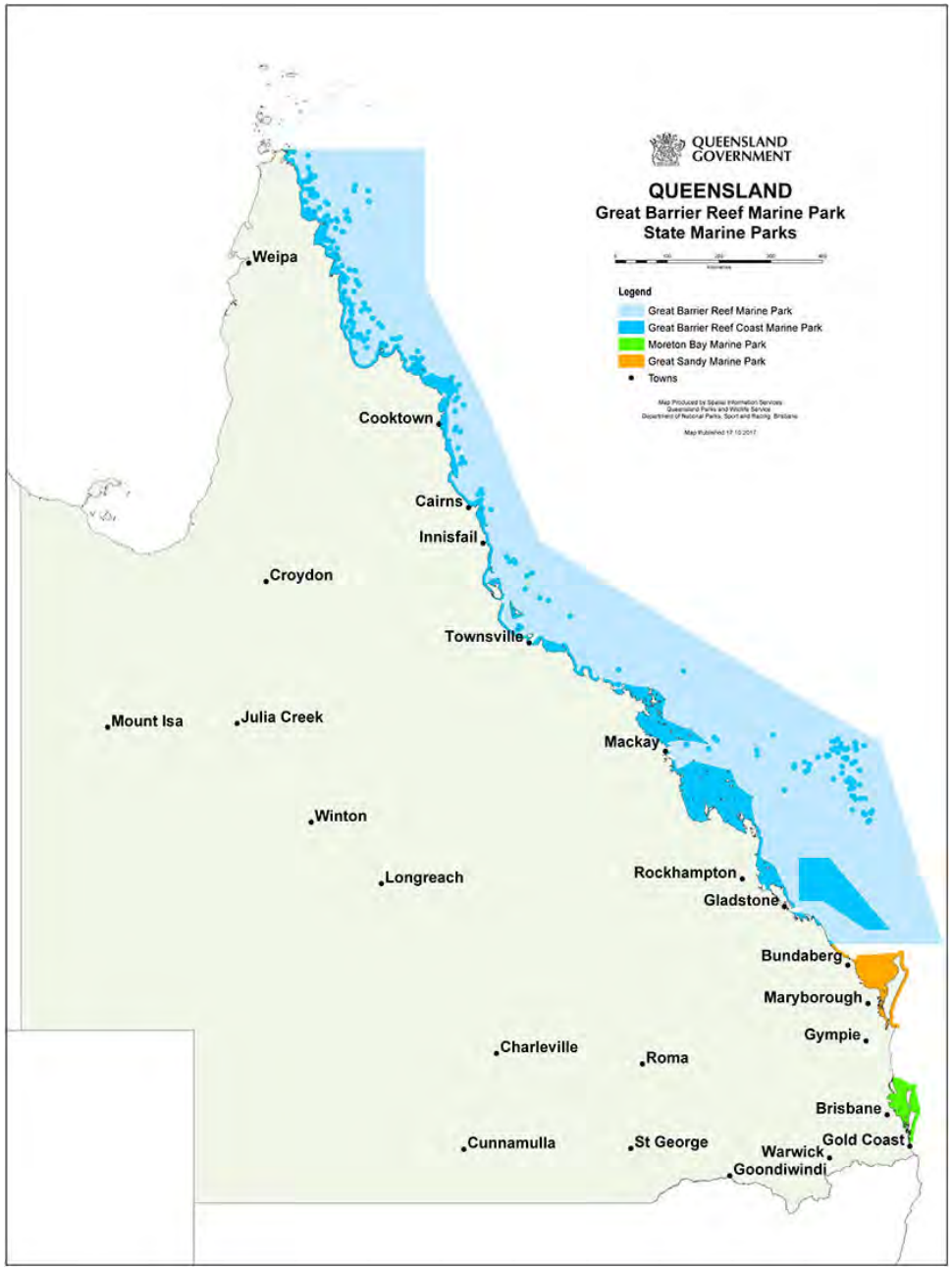
Available: http://www.environment.gov.au/submissions/reportmaps/coral_sea_cmr_review_recommended_zoning_incl_coordinates.pdf

The Great Barrier Reef Marine Park is widely recognised as one of the best managed marine protected areas in the world.

The Great Barrier Reef Marine Park Authority (GBRMPA) is responsible for the care and protection of the Great Barrier Reef Marine Park.

The Great Barrier Reef Marine Park

Available: http://hdl.handle.net/11017/869



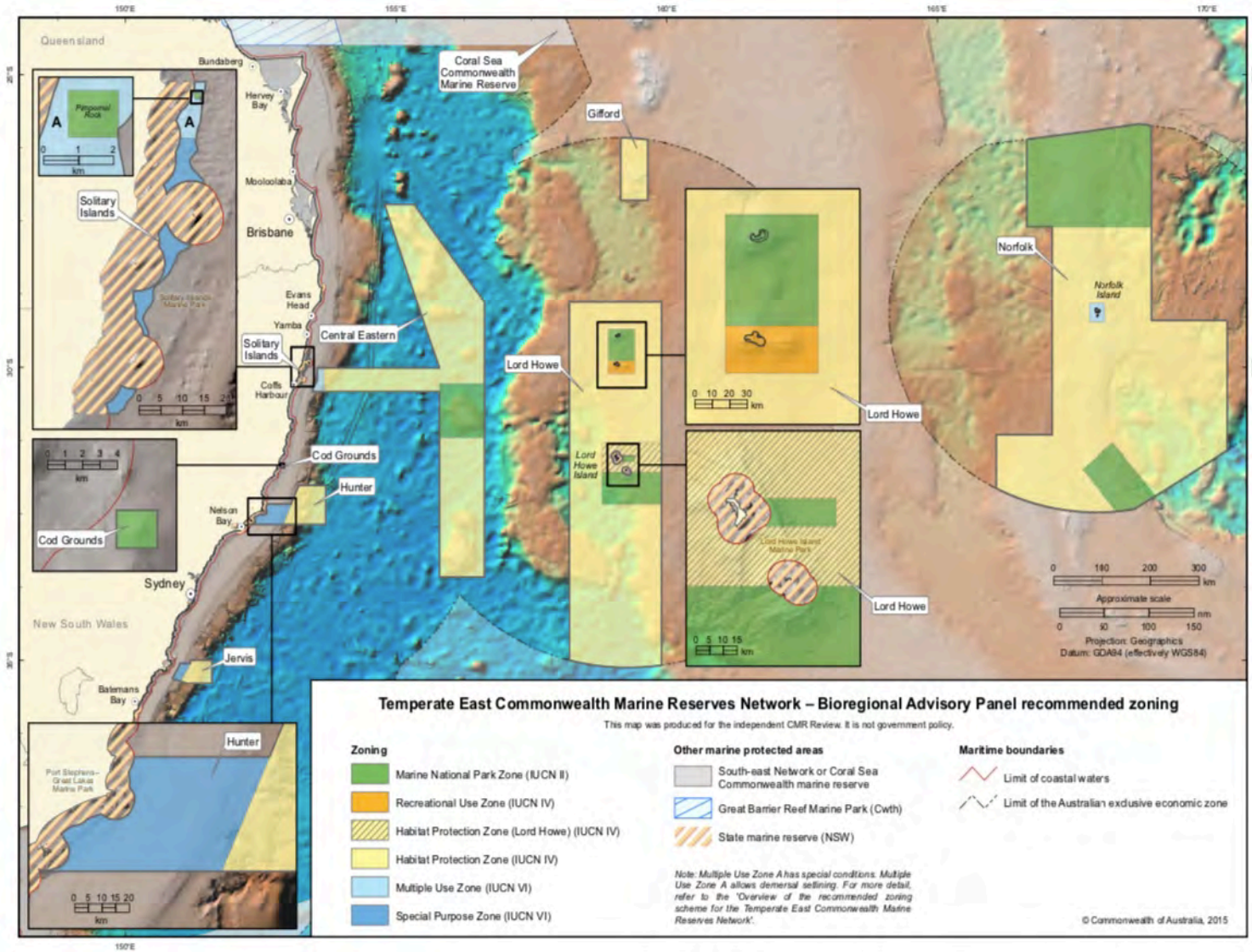
The Great Barrier Reef Coast Marine Park, Great Sandy Marine Park and Moreton Bay Marine Park are managed by the Queensland Parks and Wildlife Service.

These marine parks protect tidal lands and waters- including mangrove wetlands, seagrass beds, mudflats, sandbanks, beaches, rocky outcrops and fringing reefs.

Learn more about Queensland marine parks here:

https://www.qld.gov.au/environment/coasts-waterways/marine-parks/about

Marine science in southern Australian states involve temperate zones.



Temperate East Commonwealth Marine Reserves Network

Image: © Commonwealth of Australia, 2015
Available:
http://www.environment.gov.au/submissions/reportmaps/temperate_east_network_cmr_review_recommended_zoning.pdf

With so many different Marine Protected Areas managed by different authorities, it is useful to have a common framework.
The International Union for Conservation of Nature has created a global standard- as this YouTube video explains:

IUCN Global Standard for Marine Protected Areas

YouTube video by IUCN, International Union for Conservation of Nature
Available: https://youtu.be/g2cAVcgHjic

The Australian and State governments are developing a National Representative System of Marine Protected Areas (NRMSPA), The goals and principles are published here:

https://parksaustralia.gov.au/marine/management/resources/scientific-publications/goals-and-principles-establishment-national-representative-system-marine-protected-areas/

The four goals guide the identification of marine reserve networks:

Goal 1: Each bioregion should be represented
Goal 2: All depth ranges should be covered
Goal 3: Examples of habitats and communities should be included
Goal 4: All 21 types of seafloor should be included

See the link above for more detail.

The guiding principles are summarised below:

Location: locate marine reserves considering- the location of existing measures, and have fewer larger separate reserves (rather than many small reserves)

Selection: select areas considering capacity to mitigate threats, unique habitats or species; ecologically important features; small-scale ecosystems and sediment types; heritage sites; minimising socio-economic costs

Design: the size and shape of the reserve should include continuous depth transects; include entire geomorphic features, with replication; account for connectivity and dispersal; have simple, easily identifiable boundaries; minimising socio-economic costs.

Zoning: include highly protected areas, consider the threats posed by specific activities; apply a precautionary approach to threats and costs and benefits.

For more detail see:
https://parksaustralia.gov.au/marine/management/resources/scientific-publications/goals-and-principles-establishment-national-representative-system-marine-protected-areas/

The document *Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement* was developed to support the design and planning of NRSMPA.

It promotes the CAR principles:

C Comprehensiveness

A Adequacy

R Representativeness

Reference: The Ecology Centre, The University of Queensland (2009) Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement. 29pp.
Available:
https://ecology.uq.edu.au/filething/get/39100/Scientific_Principles_MPAs_c6.pdf

The CAR principles can be summarised as:

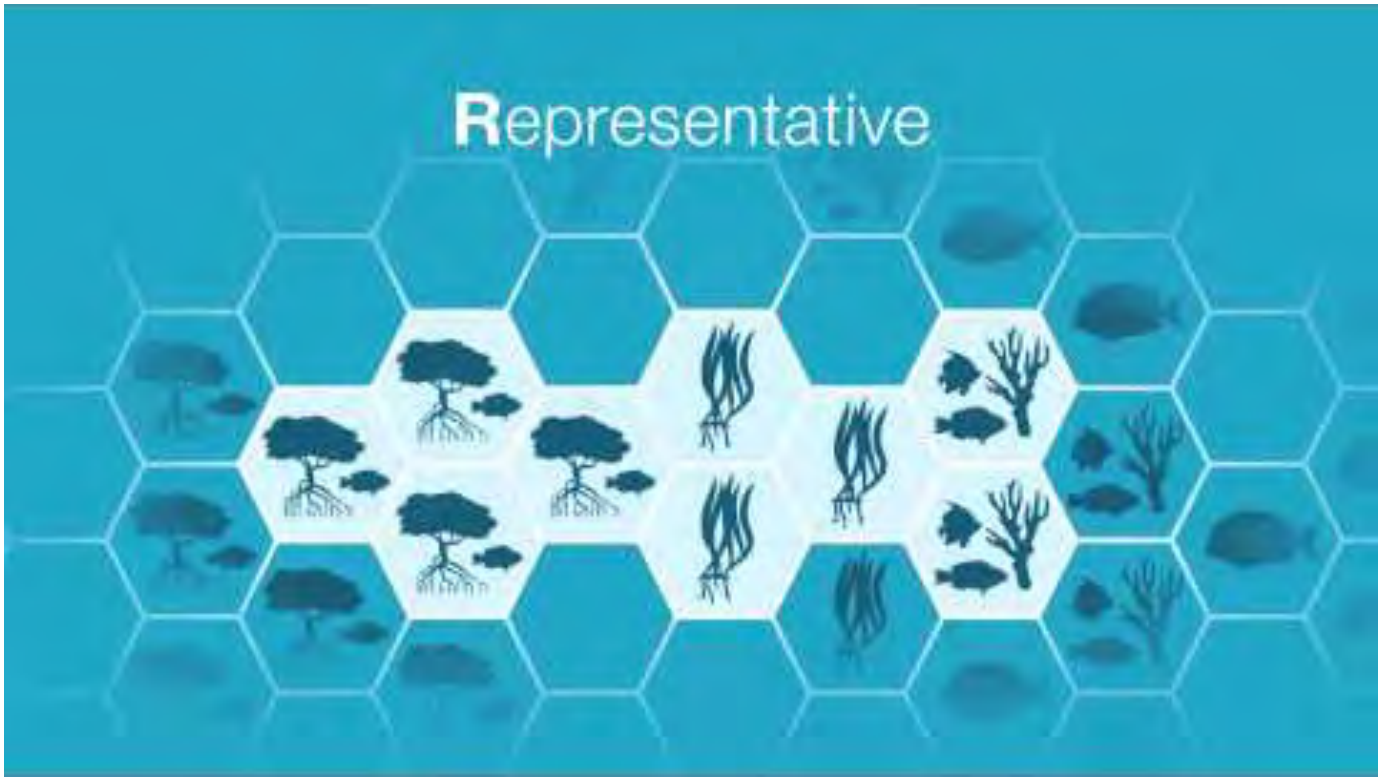
C	Comprehensiveness	include the full range of ecosystems recognized at an appropriate scale within and across each bioregion.
A	Adequacy	have the required level of reservation to ensure the ecological viability and integrity of populations, species and communities.
R	Representativeness	reflect the biotic diversity of the marine ecosystems from which they derive.

For more detail, download the guidance statement:
https://ecology.uq.edu.au/filething/get/39100/Scientific_Principles_MPAs_c6.pdf

Reference: The Ecology Centre, The University of Queensland (2009) Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement. 29pp. Available: https://ecology.uq.edu.au/filething/get/39100/Scientific_Principles_MPAs_c6.pdf

This YouTube video explains that Marine Parks should be designed with CARE Connected, Adequate, Representative, Efficient- which are similar to the CAR principles, but considering connectedness and the efficiency of the design.

https://youtu.be/-YifiHLnmWY



Protected Area Design using CARE Tropic101x - KAM 5.2.1

YouTube video by UQx Tropic101x Tropical Coastal Ecosystems, available: https://youtu.be/-YifiHLnmWY

This video explains the same CARE model, as presented by Prof Hugh Possingham, Chief Scientist The Nature Conservancy, whose work has informed the creation of many of the world's marine protected area systems.

https://youtu.be/cq3C0_JZlh8

Marine Protected Area Systems

YouTube video by UQx Tropic101x Tropical Coastal Ecosystems
Available: https://youtu.be/cq3C0_JZlh8

The CARE model is summarised here:

C	Connected	Many organisms depend on connected ecosystems, eg coral reefs, seagrass and mangroves
A	Adequate	Contains enough of every habitat and species to ensure it persists through time
R	Representative	Captures and protects replicate samples of all habitats and species-
E	Efficient	Meets the connectivity, adequacy and representativeness criteria whilst minimizing impacts

Class activity: Print and cut out the scientific evidence on pages 19- 29 of *Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement* and sort them according to where they fit in the CARE model.

C	Connected
A	Adequate
R	Representative
E	Efficient

The Ecology Centre, The University of Queensland (2009) Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement. 29pp. Available: https://ecology.uq.edu.au/filething/get/39100/Scientific_Principles_MPAs_c6.pdf

Sample answers:

C	Connected	*Provide connectivity within the network of no-take areas*
A	Adequate	*Include adequate size (larger reserves preferred to smaller reserves)*
R	Representative	*Represent a minimum amount of each 'habitat type'*
E	Efficient	*Maximise complementarity of no-take areas with human values, activities and opportunities*

Sample answers selected from: The Ecology Centre, The University of Queensland (2009) Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement. 29pp. Available: https://ecology.uq.edu.au/filething/get/39100/Scientific_Principles_MPAs_c6.pdf

The following specific criteria are mentioned in the Marine Science syllabus:

- Site selection
- Networking and connectivity
- Replication
- Spacing
- Size
- Coverage

These will be addressed individually in the next 5 slides.

Site selection

The site (or network of sites) selection must represent the full biodiversity in the region. This should include, but not be limited to threatened species or habitats.
(Representative)

Sites should be selected to preserve regions in a natural state and to help recover and restore those sites that have been impacted by human activities.

Networks should aim to provide conditions for expansion in the ranges of species that are depleted, and to accommodate changes in range as environmental conditions change.
(Connected)

Raine Island is protected for its environmental and cultural values

Image: © Queensland Government.
Available: https://eatlas.org.au/media/969

Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough.
Available:
https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region

Networking and Connectivity

A protected area network needs to be greater than the sum of its parts- protecting mangroves, seagrass and coral reefs together has a bigger impact than individually.

Connectivity affects the levels of coverage, replication, size and spacing of protected areas.

This zoning map of the Capricorn region shows are network of green zones covering different bioregions.

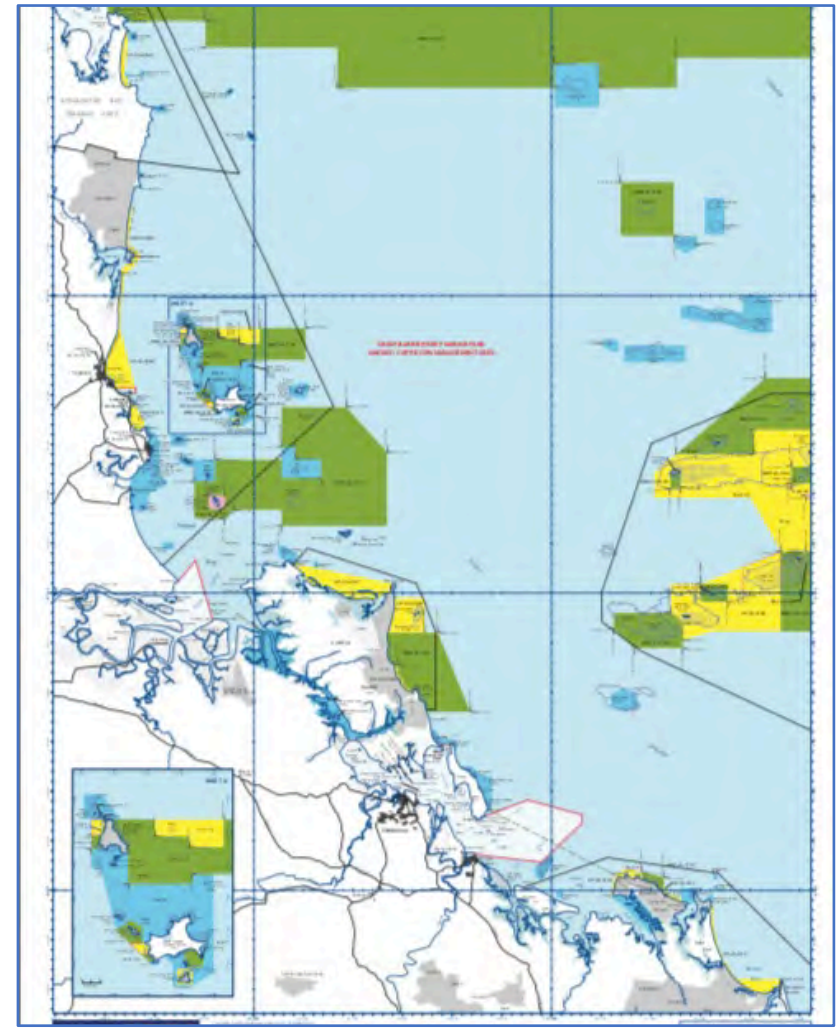


Image: © Commonwealth of Australia (GBRMPA) 2016. Reproduced with permission. Image partially cropped.

Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough. Available: https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region

Replication

Habitats should be replicated in at least three, and preferably five or more, protected areas spread throughout the region, wherever the extent and distribution of a habitat allows.

The aims of replication are to spread the benefits of protection throughout the region, and to provide insurance against human and natural impacts, and to ensure ecological connectivity among protected areas.

A proportion of each habitat type in Moreton Bay Marine Park (right) is protected in a Marine National Park (stippled)

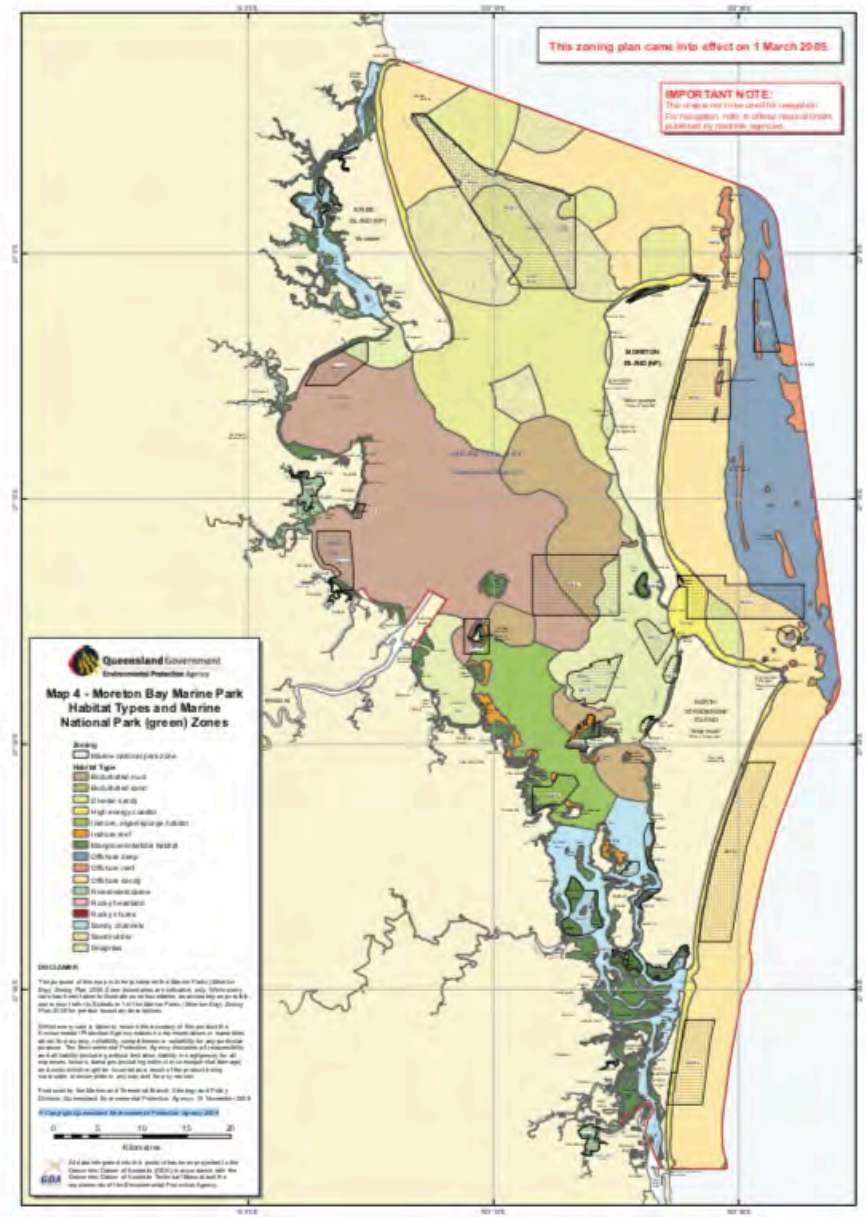


Image: © Copyright Queensland Environmental Protection Agency 2008

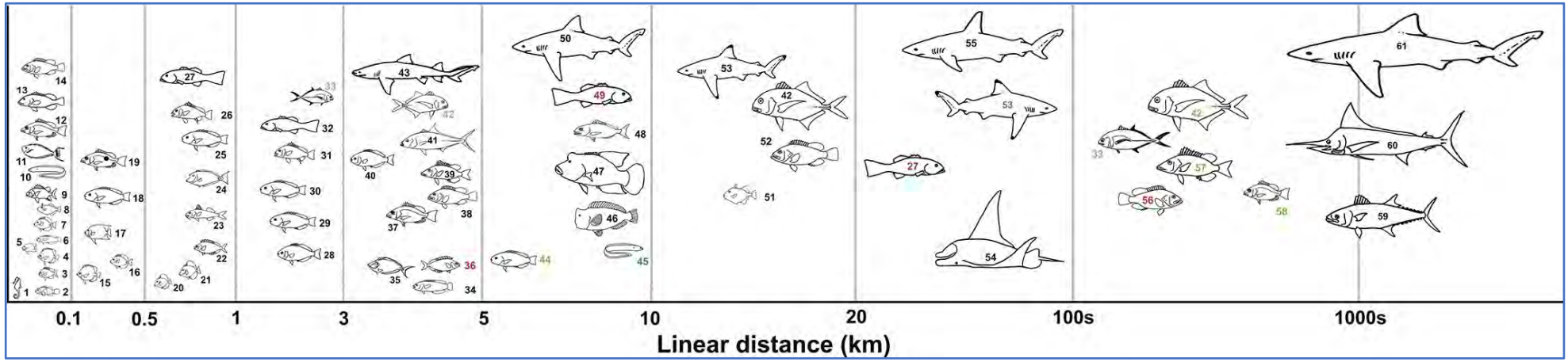
Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough.
Available:
https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region

Spacing

Ecological linkages such as ontogenetic migration and larval dispersal cover geographical scales from metres to thousands of kilometers.

For a wide range of species, those scales are typically metres to a few tens of kilometers.

To ensure ecological connectivity in the network, protected areas with similar habitats should generally be spaced from a few to a few tens of kilometers apart.

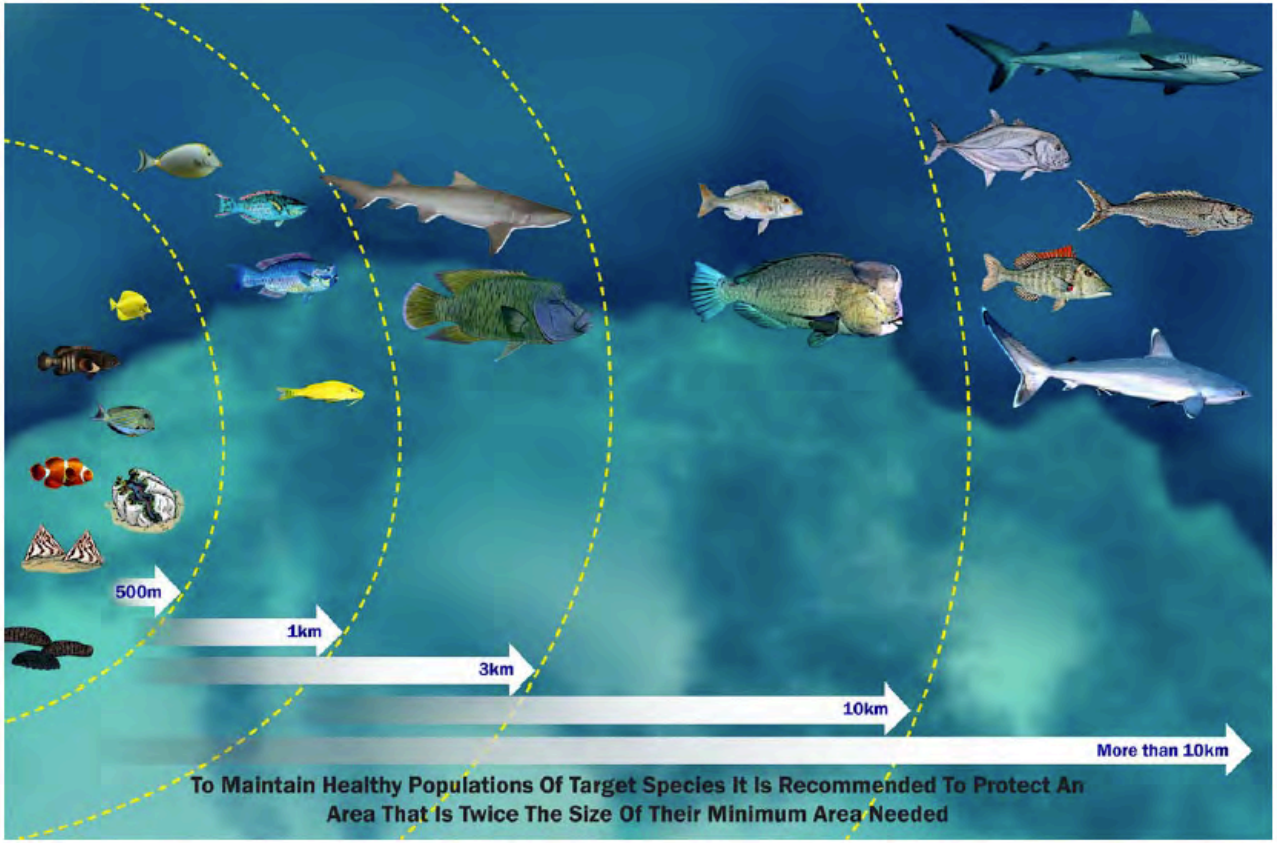


The scale of migration of adults fish ranges from metres to 100s of km.

Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough. Available: https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region
Image: Green, A., Maypa, A., Almany, G., Rhodes, K., Weeks, R., & Abesamis, R. et al. (2014). Larval dispersal and movement patterns of coral reef fishes, and implications for marine reserve network design. *Biological Reviews*, *90*(4), 1215-1247. doi: 10.1111/brv.12155, open access article, available: https://onlinelibrary.wiley.com/doi/full/10.1111/brv.12155

Size

The size of a protected area needs to consider protection goals, habitat distribution, heterogeneity and patchiness, and the mobility of species.

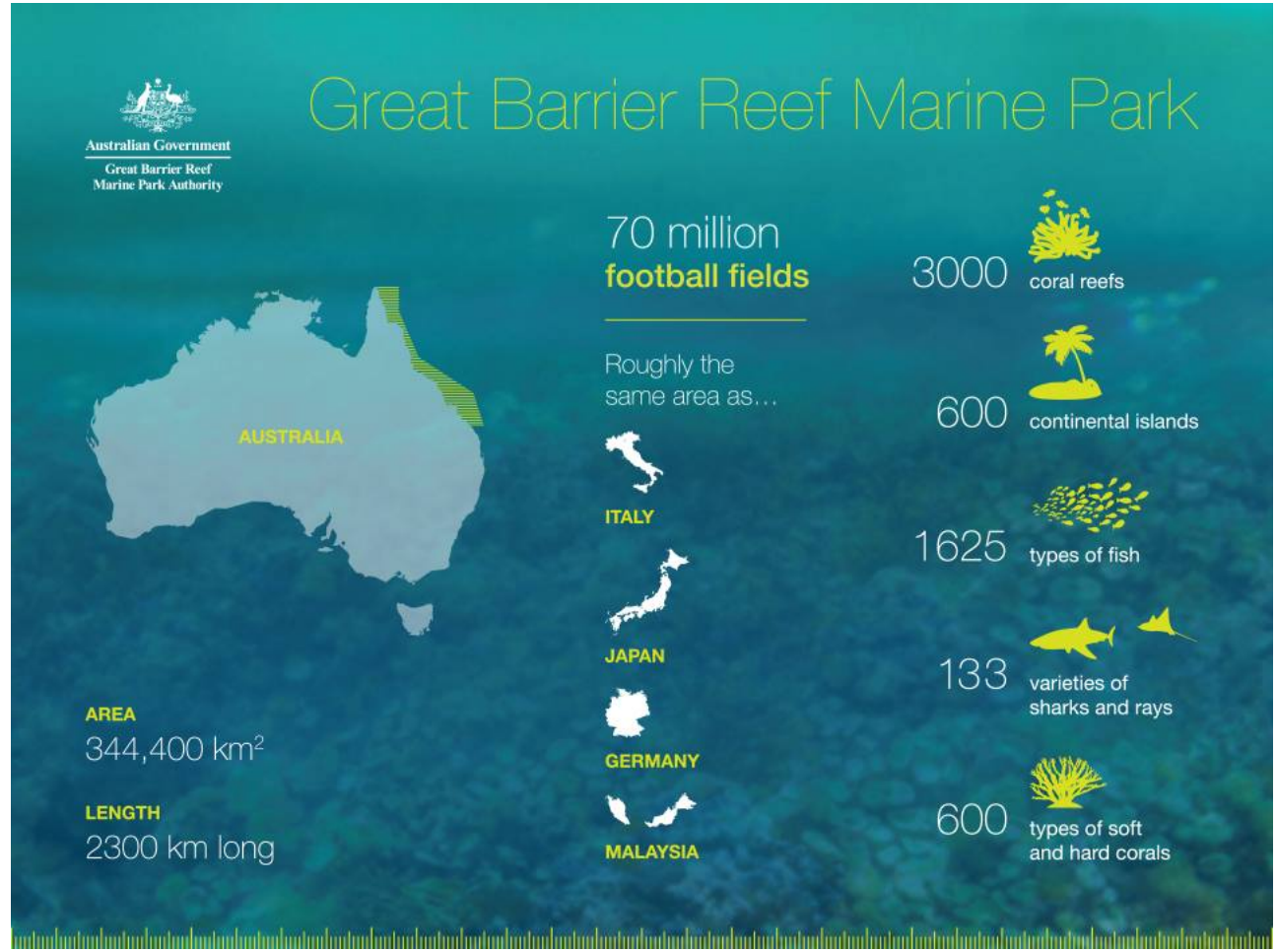


Different fish species have home ranges of different sizes, so they need different sized marine reserves.

Image: ©2013 Coral Triangle Support Partnership, from Green, A., White, A., & Kilarski, S. (2013). *Designing marine protected area networks to achieve fisheries, biodiversity, and climate change objectives in tropical ecosystems*.

Size of protected areas must be matched to the scales of mobility of the species in the habitats being considered.

Protected areas must be large enough and numerous enough to sustain long-term populations of the majority of species.



The Great Barrier Reef Marine Park is half the size of Texas

Image: © Copyright 2018 GBRMPA, available: http://www.gbrmpa.gov.au/the-reef/reef-facts

Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough. Available: https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region

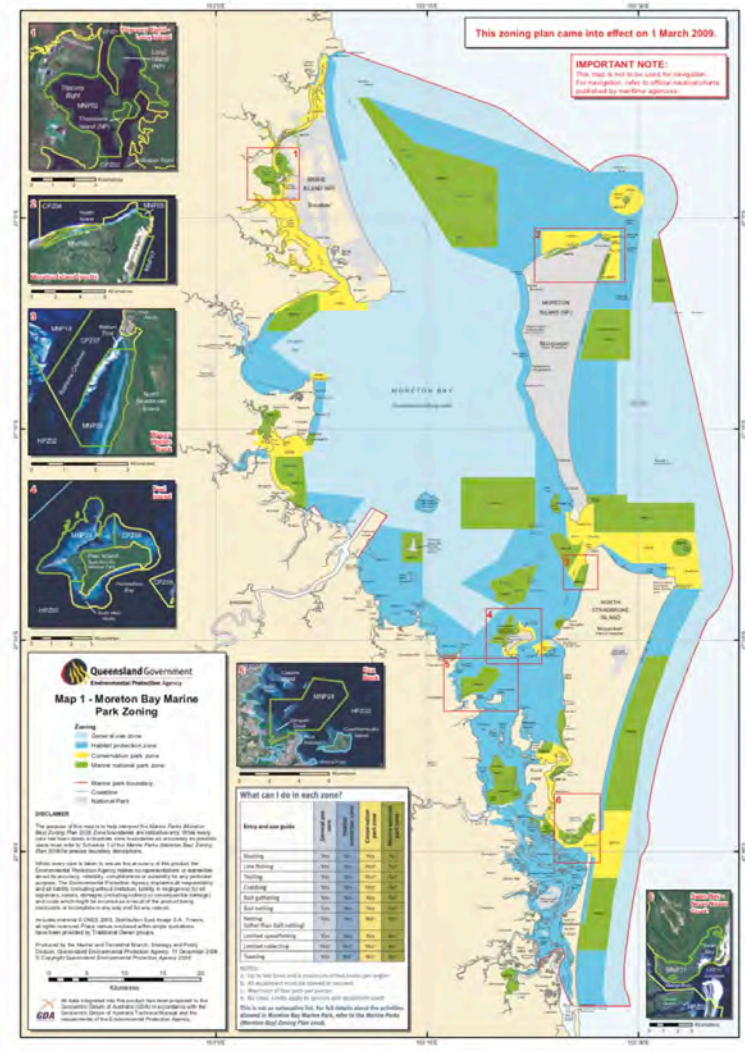
Coverage

Scientists recommend that 20 - 40% of the seas should be protected in order to represent all habitats with sufficient replication to support viable populations.

Significant levels of protection (20% and upwards) are necessary to safeguard important ecosystem processes and services over large scales.

Some habitats require greater proportional protection than others: isolated and rare habitats will require a greater % of protection than extensive, widespread habitats.
Some habitats warrant total protection.

Reference: Roberts, C. M., Gell, F. & Hawkins, J. P. 2003. Protecting nationally important marine areas in the Irish Sea Pilot Project Region. JNCC, Peterborough.
Available: https://www.researchgate.net/publication/264840019_Protecting_nationally_important_marine_areas_in_the_Irish_Sea_Pilot_Project_region



16% of Moreton Bay Marine Park is a green zone.

Image: © Copyright Queensland Environmental Protection Agency 2008
Available: https://parks.des.qld.gov.au/parks/moreton-bay/zoning/pdf/map1-zoning.pdf

If you want to know more, download this his document:

https://www.reefresilience.org/pdf/PractitionerGuide_FINAL_031113.pdf

It contains a detailed explanation of 15 design principles for MPAs

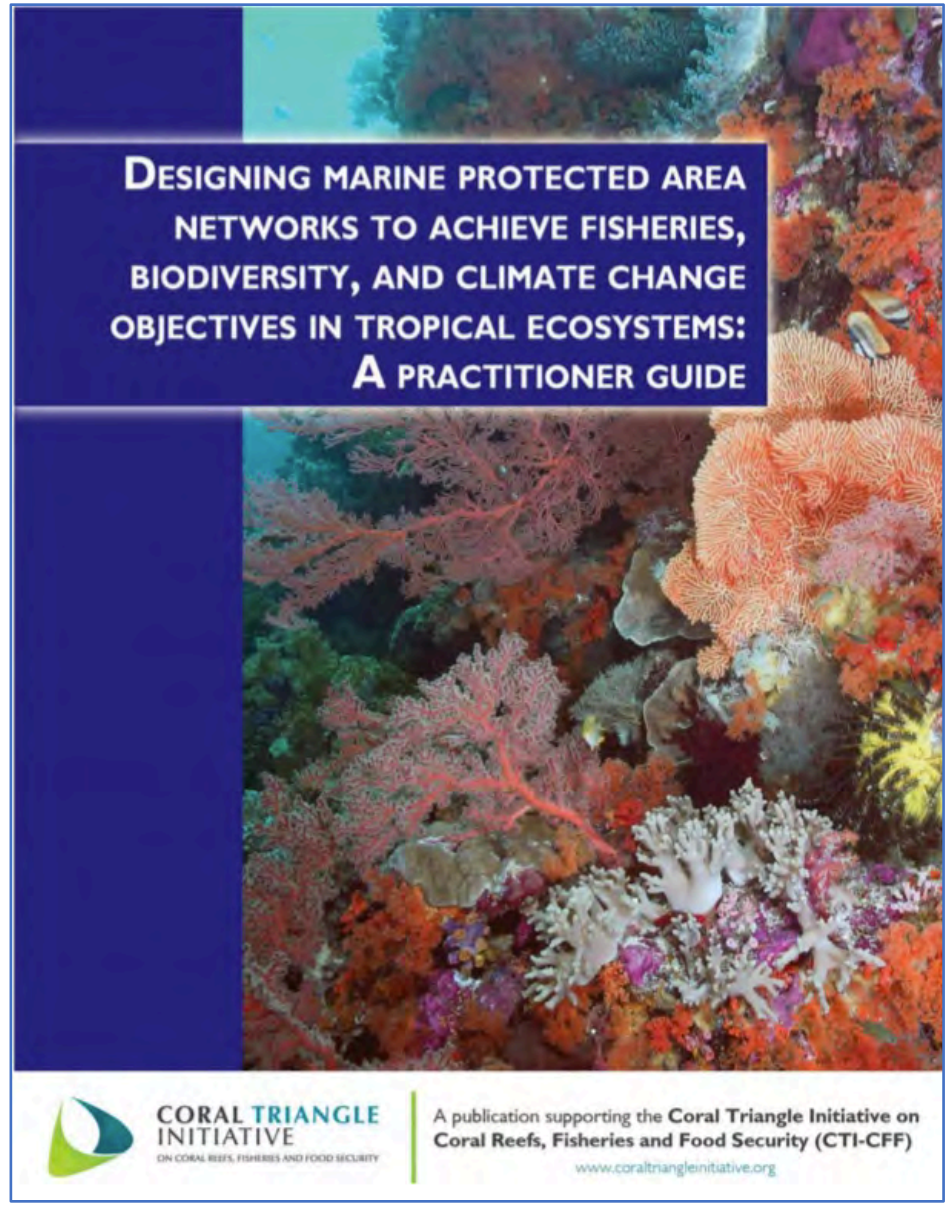


Image: ©2013 Coral Triangle Support Partnership, from Green, A., White, A., & Kilarski, S. (2013). *Designing marine protected area networks to achieve fisheries, biodiversity, and climate change objectives in tropical ecosystems*.

Further

1. List the criteria used for designing marine protected areas in Australia.

2. Describe in your own words why these criteria should be considered.

3. Explain why can’t we just protect the whole ocean?

4. Classify scientific evidence for MPA design into the 4 CARE principles.

Questions

Q1. Select the list of criteria used to design Australia's marine protected areas.

a) connectivity, fish population numbers
b) connectivity, coverage and networking
c) aesthetic value, fish population numbers
d) aesthetic value, coverage and networking

Answer is b

Reason - From the syllabus

- Site selection
- Networking and connectivity
- Replication
- Spacing
- Size
- Coverage

Q2. A marine protected area (MPA) experiences low fishing pressure and has effective monitoring and protection of adjacent fisheries.

Criteria for the establishment of this MPA would include representation of habitats at

a) 20% of habitats protected, with high level connectivity.
b) 30% of habitats protected, with low level connectivity.
c) 40% of habitats protected, with low level connectivity.
d) < 40% of habitats protected, with no levels of connectivity.

Answer is a) because high levels of connectivity are required.

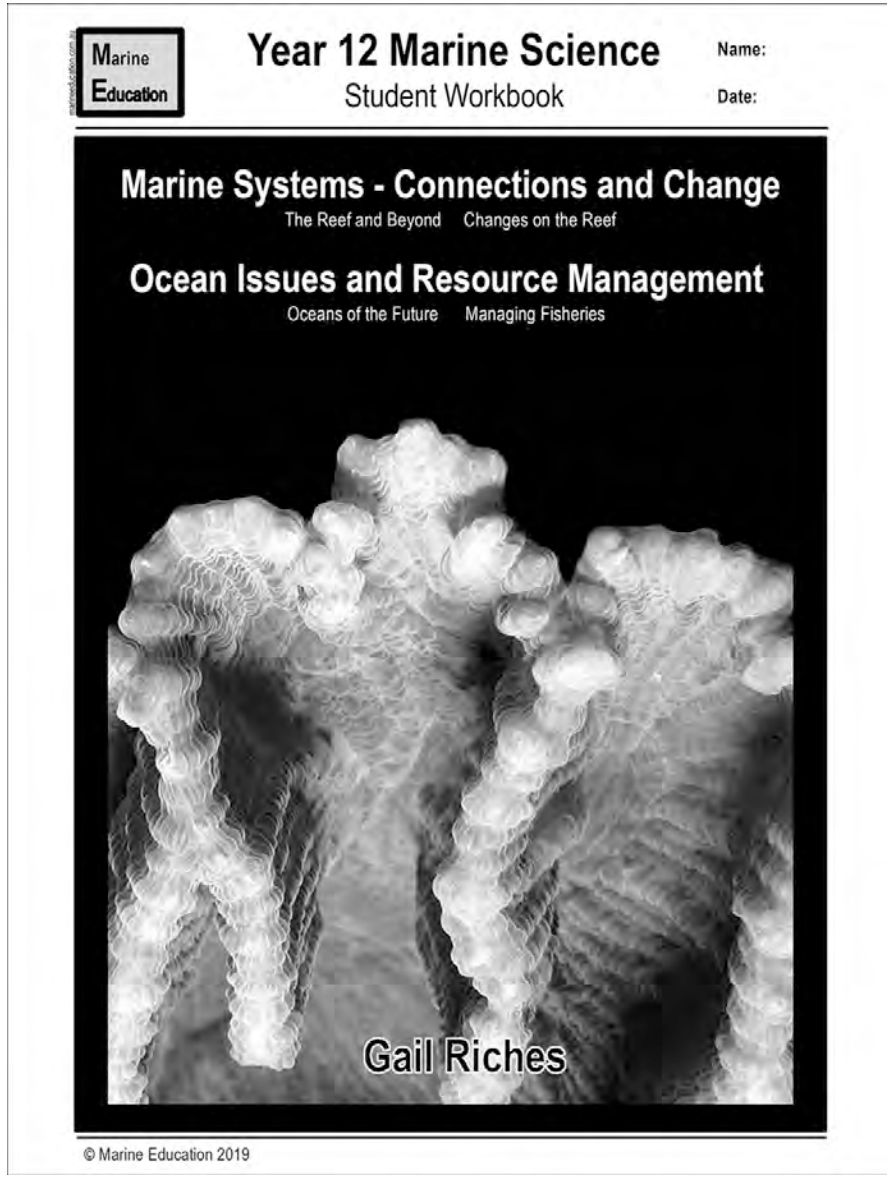
Worksheet

Project how?

by

Gail Riches

www.marineeducation.com.au



T124 Marine management strategies

Adam Richmond

Syllabus statement

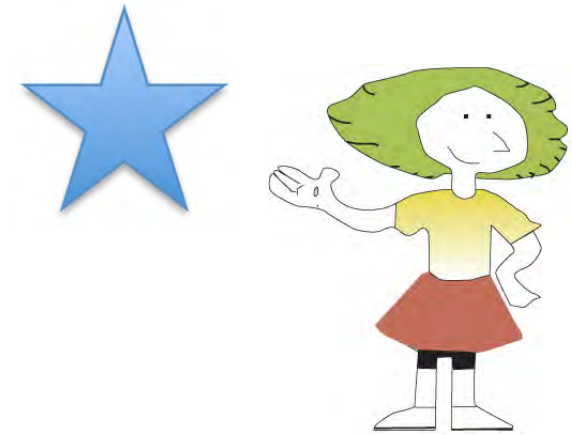
At the end of this topic you should be able to ...

Identify

management strategies used to support marine ecosystem health (e.g. managing threats, zoning, permits, plans, longitudinal monitoring)

Identify

- distinguish;
- locate, recognise and name;
- establish or indicate who or what someone or something is;
- provide an answer from a number of possibilities;
- recognise and state a distinguishing factor or feature



Objective

Recall the main features of marine management strategies, including:

- Threat management
- Zoning
- Permits
- Plans and longitudinal monitoring

A healthy, well managed marine ecosystem provides abundant resources for people.

Image: ©2013 Coral Triangle Support Partnership, from Green, A., White, A., & Kilarski, S. (2013). *Designing marine protected area networks to achieve fisheries, biodiversity, and climate change objectives in tropical ecosystems*.

Management of a healthy marine ecosystem is about managing activities that can pose a threat.

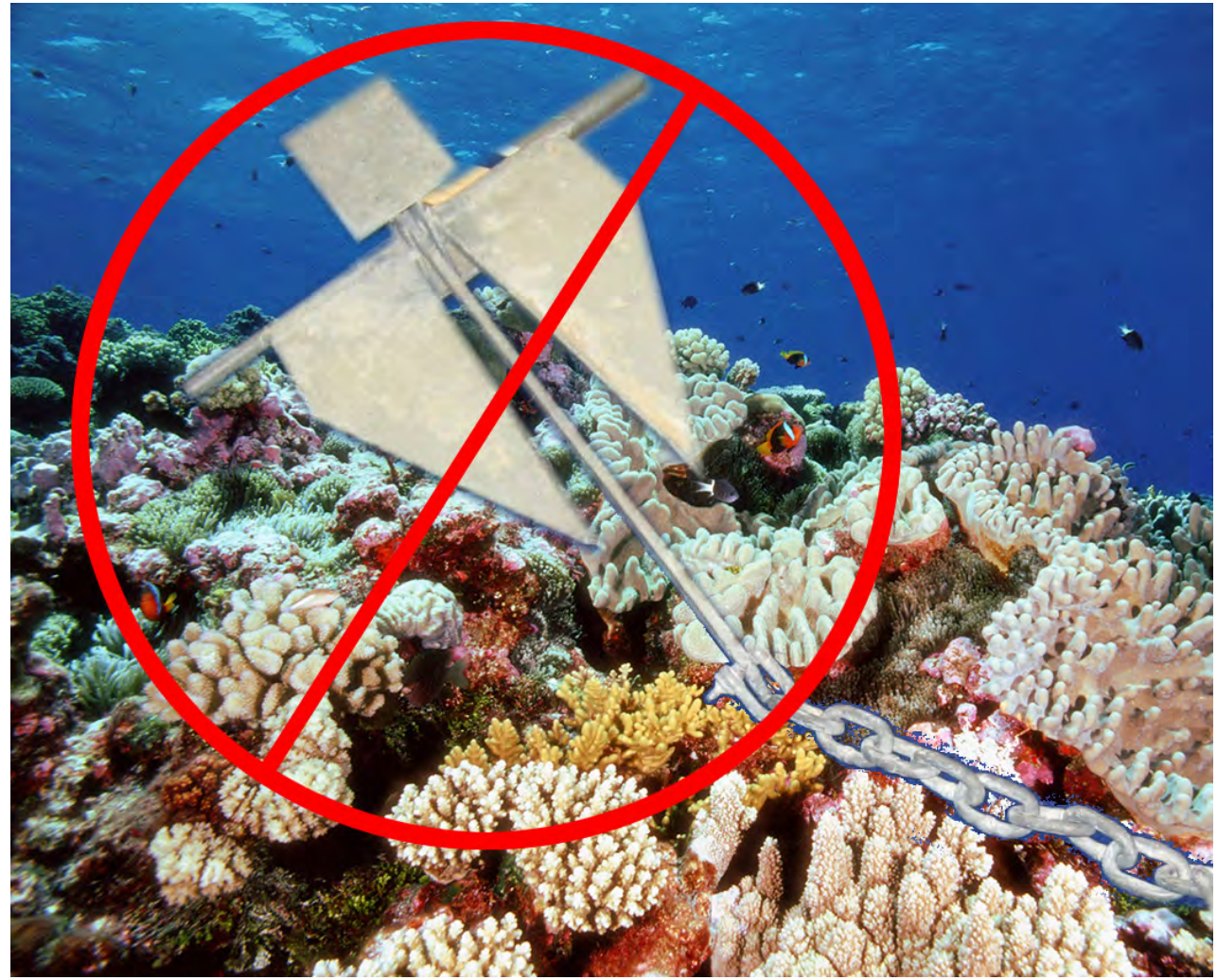
The Great Barrier Reef Marine Park Authority encourages park users to enjoy the reef in a “reef friendly” way.

Threat management

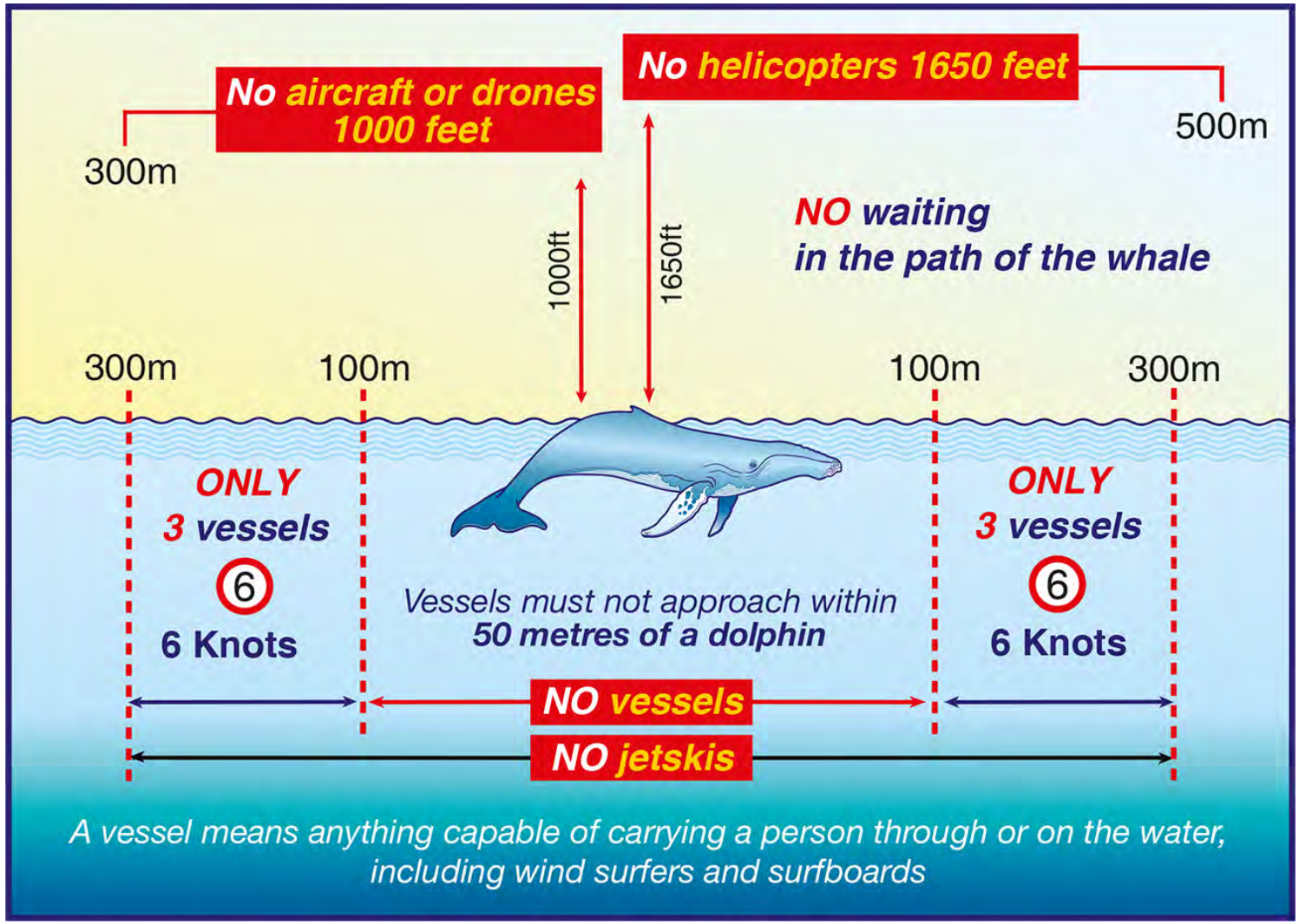
GBRMPA have developed guidelines for reducing the damage caused by everyday activities.

For example, anchoring on top of a coral reef can quickly damage or destroy the coral, which can take years to recover.

Boats should use public moorings where available.



If you see whales or dolphins, it is important to remain a safe distance away from them. This is important for their safety as well as your own.



Even snorkelling can stress or break corals. It is important to not lean on, hold onto, or stand on corals.

Snorkellers and divers need to have good buoyancy control so they don't accidentally kick corals or stir up sediment.

You can find the full list of responsible reef practices here: http://www.gbrmpa.gov.au/access-and-use/responsible-reef-practices

Standing or sitting on the coral cause physical damage

Image: Creative Commons GNU Free Documentation License
https://en.wikipedia.org/wiki/File:Divers_coming_into_contact_with_coral.jpg

No take areas

Long term (20 years +) no take areas enables heavily fished and longer lived species (eg sharks) to grow to maturity and contribute to stock recruitment.

Larger individuals are more important for long-term health of populations than smaller ones, because they produce a lot more offspring.

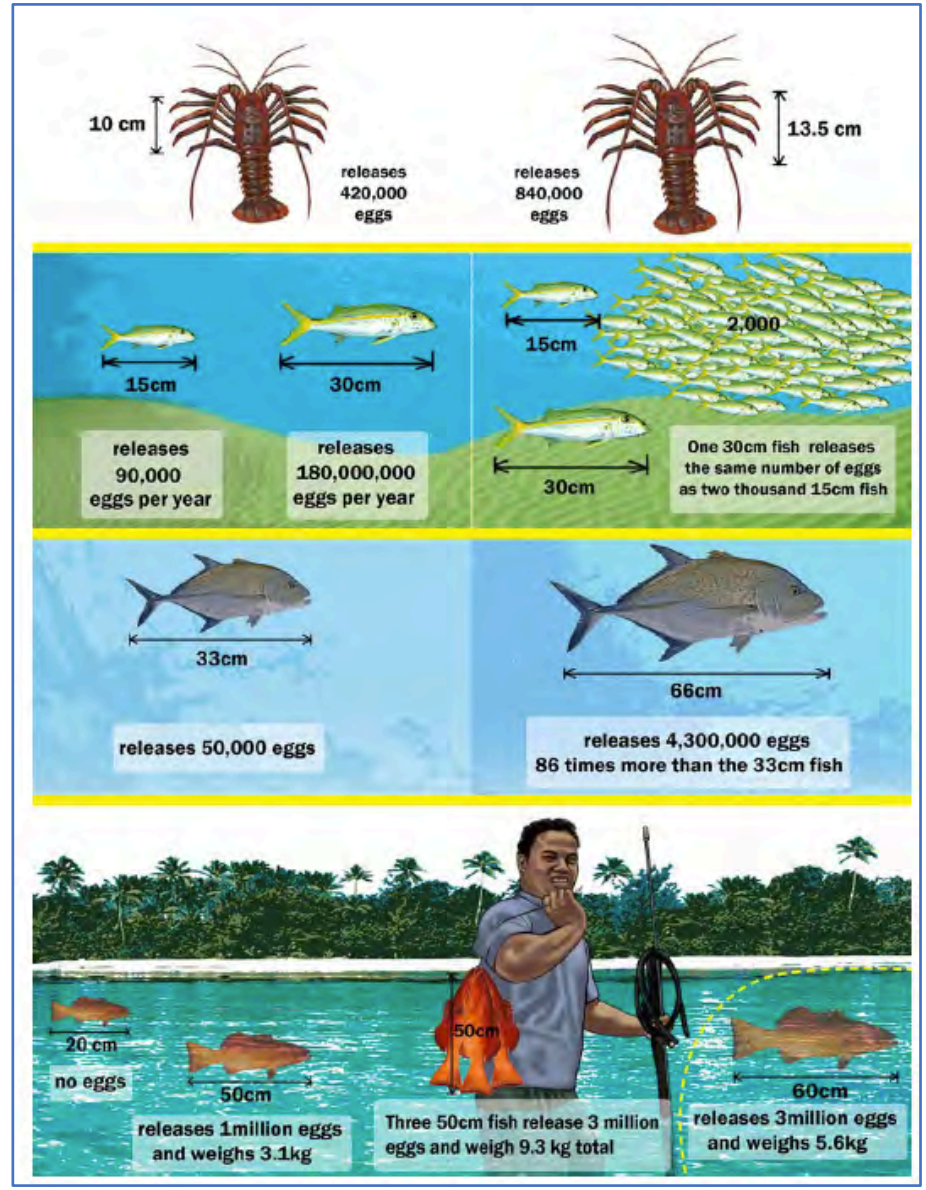


Image: ©2013 Coral Triangle Support Partnership, from Green, A., White, A., & Kilarski, S. (2013). *Designing marine protected area networks to achieve fisheries, biodiversity, and climate change objectives in tropical ecosystems*.

Minimise and reduce stressors

Prohibit destructive activities (eg mining, blast fishing and cyanide fishing)

Marine ecosystems damaged by destructive activities such as blast fishing, are unable to provide as many resources for people

Image: ©2013 Coral Triangle Support Partnership, from Green, A., White, A., & Kilarski, S. (2013). *Designing marine protected area networks to achieve fisheries, biodiversity, and climate change objectives in tropical ecosystems*.

Net threat reduction

Reduce overfishing, through quotas and improving fishing practices.

Turtle exclusion devices (TEDs) allow turtle to swim out of fishing nets if they are accidentally caught.

A turtle making use of an exclusion device

Image: U.S. National Oceanic and Atmospheric Administration [Public domain]

Reduce land based pollution and recreational impacts.

Kanapou Bay, in Hawaii, is a hotspot for marine debris accumulation

Image: NOAA Marine Debris Program, Flickr, https://flic.kr/p/cEzQ37 CC BY 2.0

Protect critical areas

Some areas are important as a source of larvae or serve as refuges, naturally more resistant to climate change, nursery grounds, breeding grounds, migration corridors, and habitats for rare and threatened species.

Mon Repos is a Conservation Park hosts the largest concentration of nesting turtles on the eastern Australian mainland.

It is protected so that people don't do things like this:

Image: [Public domain] https://commons.wikimedia.org/wiki/File:Woman_riding_turtle_at_Mon_Repos.jpg

Zoning

Here is an introduction to zoning in a Marine Park

https://youtu.be/TnA7sfc6JvU

How Zoning Works - Australian Marine Parks, Parks Australia

YouTube video by ParksAustralia, available: https://youtu.be/TnA7sfc6JvU

The Great Barrier Reef is a multiple use area protected by zones providing for a range of ecologically sustainable recreational, commercial, research and education opportunities and the continuation of traditional activities.

The map right shows the zones protecting areas around the Keppel Island group.

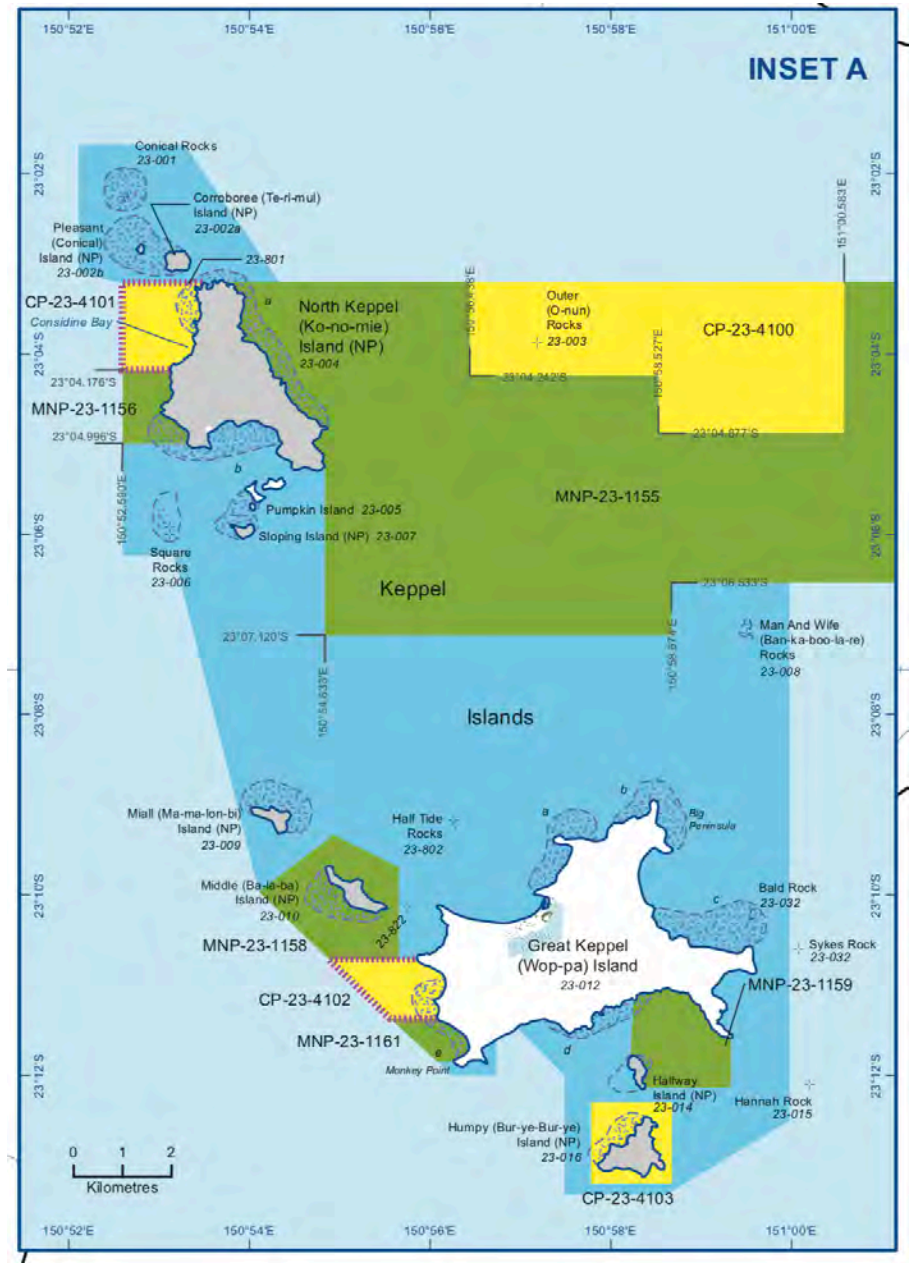


Image taken from Zoning Map 17-Capricorn, © Commonwealth of Australia (GBRMPA) 2016

Each zone has different rules for activities that are allowed, activities that are prohibited and activities that require a permit.

Zones may also place restrictions on how some activities are conducted.

The guide (right) is only an overview. See: http://www.gbrmpa.gov.au/access-and-use/zoning for comprehensive information about zones in the Great Barrier Reef Marine Park.

ACTIVITIES GUIDE

(see relevant *Zoning Plans* and *Regulations* for details)

	General Use Zone	Habitat Protection Zone	Conservation Park Zone	Buffer Zone	Scientific Research Zone[3]	Marine National Park Zone	Preservation Zone
Aquaculture	Permit	Permit	Permit[1]	✗	✗	✗	✗
Bait netting	✓	✓	✓[2]	✗	✗	✗	✗
Boating, diving, photography	✓	✓	✓	✓	✓[3]	✓	✗
Crabbing (trapping)	✓	✓	✓[4]	✗	✗	✗	✗
Harvest fishing for aquarium fish, coral and beachworm	Permit	Permit	Permit[1]	✗	✗	✗	✗
Harvest fishing for sea cucumber, trochus, tropical rock lobster	Permit	Permit	✗	✗	✗	✗	✗
Limited collecting	✓[5]	✓[5]	✓[5]	✗	✗	✗	✗
Limited spearfishing (snorkel only)	✓	✓	✓[1]	✗	✗	✗	✗
Line fishing	✓[6]	✓[6]	✓[7]	✗	✗	✗	✗
Netting (other than bait netting)	✓	✓	✗	✗	✗	✗	✗
Research (other than limited impact research)	Permit	Permit	Permit	Permit	Permit	Permit	Permit
Shipping (other than in a designated shipping area)	✓	Permit	Permit	Permit	Permit	Permit	✗
Tourism programme	Permit	Permit	Permit	Permit	Permit	Permit	✗
Traditional use of marine resources	✓[8]	✓[8]	✓[8]	✓[8]	✓[8]	✓[8]	✗
Trawling	✓	✗	✗	✗	✗	✗	✗
Trolling	✓[6]	✓[6]	✓[6]	✓[6,9]	✗	✗	✗

PLEASE NOTE: This guide provides an introduction to Zoning in the Great Barrier Reef Marine Parks.

Image taken from Zoning Map 7-Townsville, © Commonwealth of Australia (GBRMPA) 2016

One-third of the Great Barrier Reef Marine Park is zoned as Marine National Park or Green Zone where no fishing is allowed

Research is showing that green zones produce bigger fish and more of them. These fish then spillover into areas open to fishing.

YouTube video by Great Barrier Reef Marine Park Authority, available: https://youtu.be/UzW3XUVaAOE

Research conducted by the Australian Institute of Marine Science, through its Long-Term Monitoring Program, has found coral trout are now about 50 per cent more abundant in Marine National Park (Green) Zones.

A nice coral trout- not caught in a green zone!

Image: Matt Boyd, Sea Skills

Reference: Reef 2050 Long-Term Sustainability Plan—July 2018, Commonwealth of Australia 2018

Permits

Special permission is required for activities such as tourist programs, charter operations, jetties and moorings, dredging, research, educational activities.

https://youtu.be/-p4tlpP6lzo

An Introduction to Great Barrier Reef Marine Park Permits

YouTube video by Great Barrier Reef Marine Park Authority, available: https://youtu.be/-p4tlpP6lzo

For example, your school needs a Marine Parks Permit if you have a school camp at North West Island.

Plans

This video provides an explanation of management plans in the Great Barrier Reef Marine Park.

https://youtu.be/ntvBpNJ85X8

YouTube video by Great Barrier Reef Marine Park Authority, available: https://youtu.be/ntvBpNJ85X8

These plans of management provide additional protection for the ecological, cultural, heritage, aesthetic and social values of Great Barrier Reef.

An updated Reef 2050 Plan was released by the Australian and Queensland governments in July 2018.

The plan outlines management measures- including clear actions, targets, objectives and outcomes to drive short-term and long-term management of the Great Barrier Reef.

Download a copy here:
https://www.environment.gov.au/marine/gbr/long-term-sustainability-plan

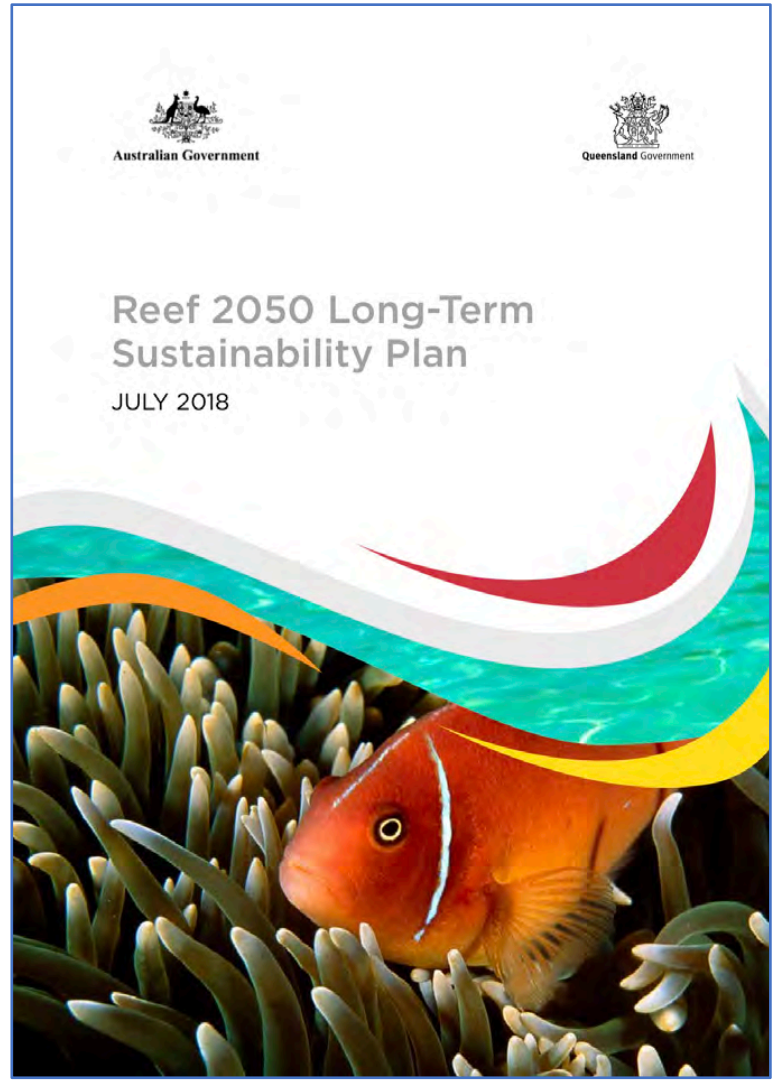


Image: © Copyright Commonwealth of Australia, 2018. CC BY

Longitudinal monitoring

The Reef 2050 Integrated Monitoring and Reporting Program is a coordinated and integrated monitoring, modelling and reporting program that tracks the progress towards targets and objectives of the Reef 2050 Plan.

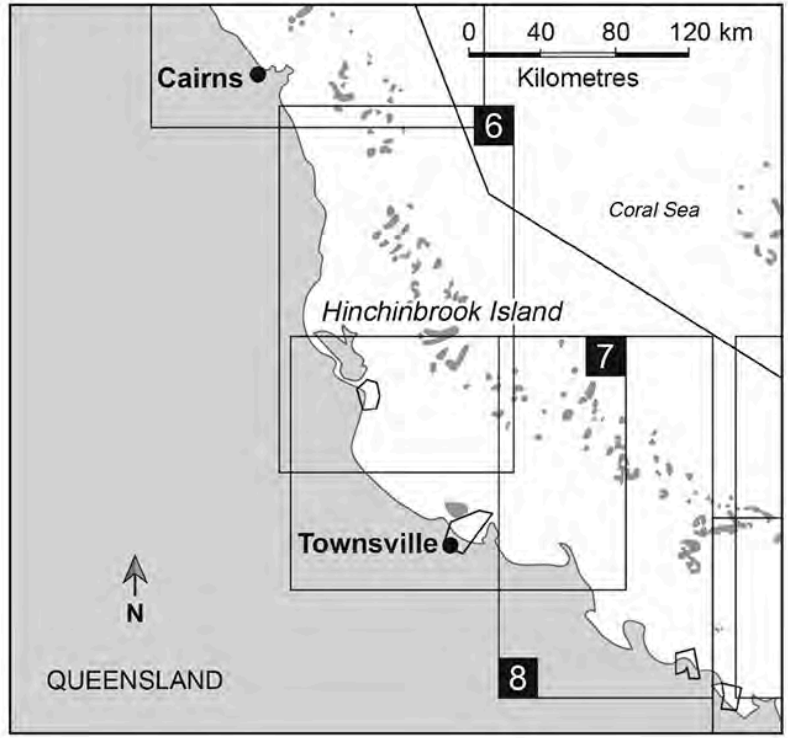
Monitoring for management

YouTube video by Great Barrier Reef Marine Park Authority, available: https://youtu.be/isK4odLBNw4

https://youtu.be/isK4odLBNw4

Question

The figure below shows a management strategy used to support ecosystem health.



The strategy shown is

(A) threat management.

(B) zoning management.***

(C) longitudinal monitoring.

(D) plan-based management.

Class discussion

Recall 4 main features of marine management strategies and give examples of each.

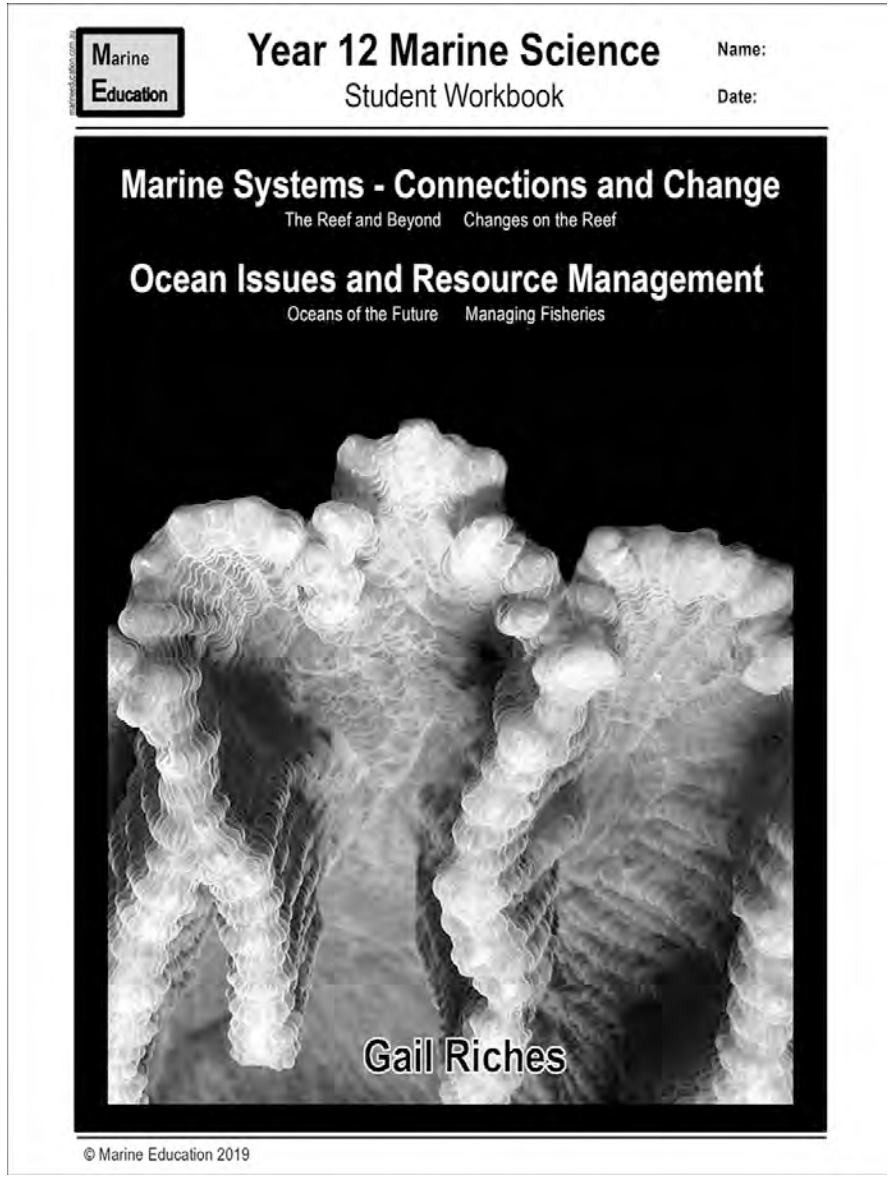
Worksheet

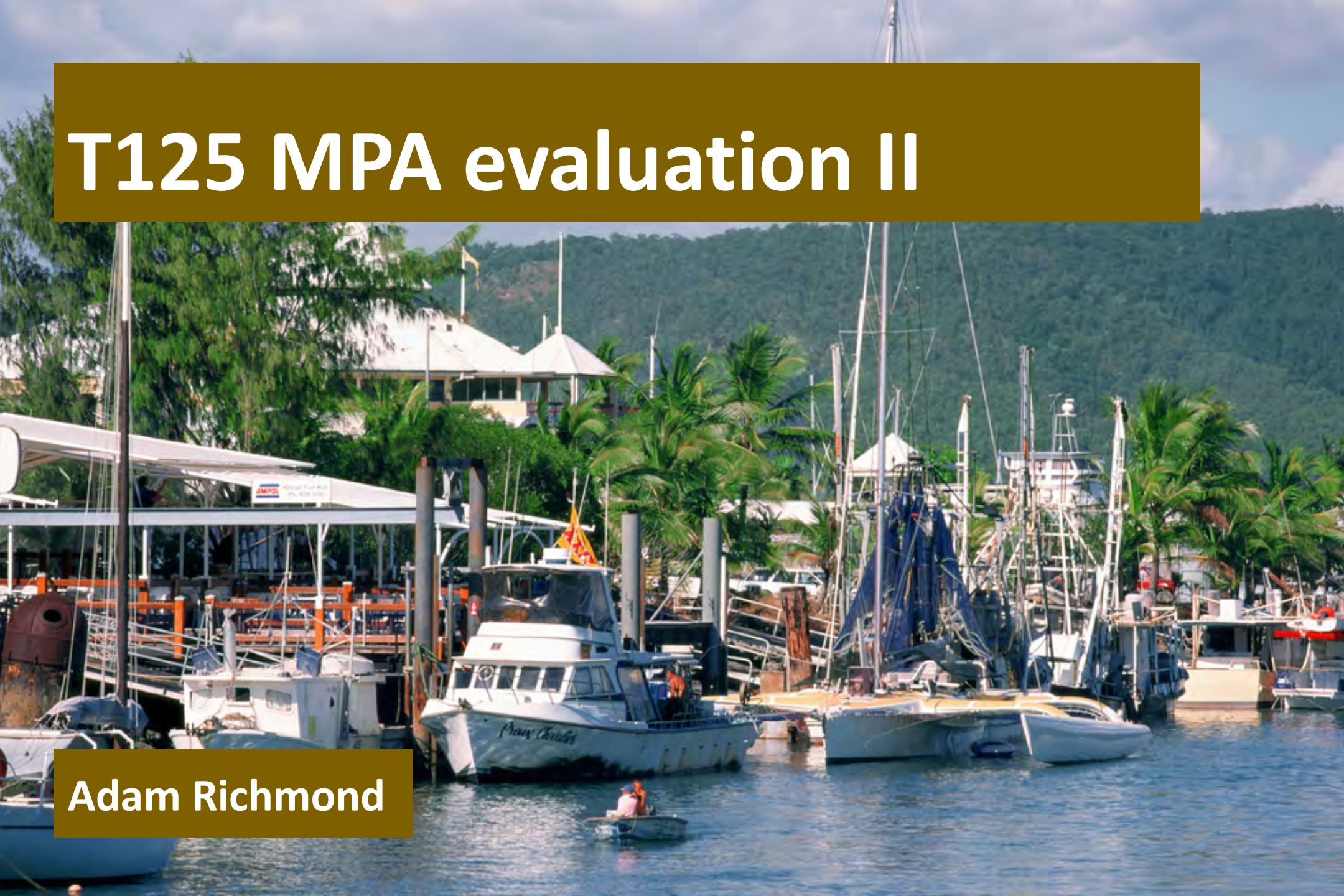
What's our plan?

by

Gail Riches

www.marineeducation.com.au





T125 MPA evaluation II

Adam Richmond

Syllabus statement

Review T069 MPA evaluation

At the end of this topic you should be able to ...

Evaluate

the success of a named protected marine area

Evaluate

- make an appraisal by weighing up or assessing strengths, implications and limitations; make judgments about ideas, works, solutions or methods in relation to selected criteria;
- examine and determine the merit, value or significance of something, based on criteria

Review T069 MPA evaluation

In T069 MPA evaluation (last year), you were able to show, by using data from a research paper, how the use of no-take zones protect coral reefs from crown of thorns outbreaks.

Current Biology Vol 18 No 14
R598

No-take reserves protect coral reefs from predatory starfish

Hugh Sweatman

The crown-of-thorns starfish, *Acanthaster planci*, is a predator of corals that is a major management issue on coral reefs [1]. It occurs throughout the Indo–Pacific and shows boom–bust population dynamics with low background densities and intermittent outbreaks. Three waves of population outbreaks have affected Australia's Great Barrier Reef (GBR) since the 1960s. The waves of outbreaks appear to start ~15°S [2] and progress southward through the central GBR (Figure 1A), causing major losses of living coral on many reefs across a large area and dwarfing losses from other disturbances such as storms or coral bleaching over the same period [3]. Humans can potentially influence starfish population dynamics by exploiting predators, though evidence to date is circumstantial. Extensive surveys in the GBR Marine Park (GBRMP) show that protection from fishing affects the frequency of outbreaks: the relative frequency of outbreaks on reefs that were open to fishing was 3.75 times higher than that on no-take reefs in the mid-shelf region of the GBR, where most outbreaks occur, and seven times greater on open reefs if all reefs were included. Although exploited fishes are unlikely to prey on starfish directly, trophic cascades could favour invertebrates that prey on juvenile starfish.

New starfish infestations arise through larval transport by the prevailing southward currents and outbreak populations die out after some years from starvation and disease [1]. Suggested (non-exclusive) causes of outbreaks [1] include greater survival of starfish larvae caused by phytoplankton blooms from nutrients in terrestrial runoff, and anthropogenic reduction of predator populations causing higher survival of juvenile and adult starfish. Two studies [4,5] have found negative relationships between outbreaks and the abundances of possible fish predators of starfish, leading to the suggestion that marine protected areas (MPAs) might reduce outbreak occurrence [6].

To address the question of whether MPAs provide protection from outbreaks of *A. planci* more directly, I compared the frequency of starfish outbreaks on no-take reefs and on reefs that were open to fishing on the GBR, based on results of an extensive monitoring program. The initial zoning plan for the GBRMP was fully implemented by 1989, with no-take zones covering 4.5% of the region [7]. Zoning largely followed existing uses. Where possible, significant areas for activities that did not remove natural resources were zoned 'no-take' and conflicting uses on individual reefs were resolved by split zoning [8]. The zoning of individual reefs was not affected by their history of starfish outbreaks (see Supplemental data available on-line with this issue). Because starfish outbreaks occur in waves, not all the reefs that were surveyed for *A. planci* in any year were equally likely to have outbreaks. For this reason, only reefs within the regions where outbreaks were present in each year were included in the analysis (see Supplemental data).

There were fewer *A. planci* outbreaks in no-take zones. The majority of outbreaks occur on reefs in the mid-section of the continental shelf (Figure 1B); after allowing at least five years for zoning to take effect, surveys between mid-1994 and mid-2004 showed that proportionately fewer mid-shelf no-take reefs were affected by outbreaks of *A. planci* (20%), compared with mid-shelf reefs that were open to fishing (75%, Figure 1C). When all reefs were considered, the corresponding values were 8% and 57% (Figure 1D).

The difference in frequency of outbreaks between no-take reefs and fished reefs is clear, but the ecological link between exploited fishes and *A. planci* remains uncertain. On the GBR, most outbreaks occur on mid-shelf and offshore reefs that are not accessible to most amateur fishers, while the primary target species of commercial fishers, coral trout

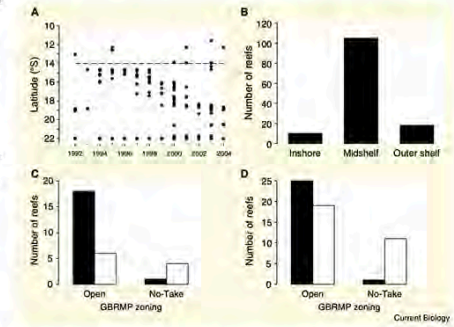


Figure 1. Crown-of-thorns starfish outbreaks on Australia's GBR.
(A) Location of reefs with outbreaks of *A. planci* 1992–2004 by latitude, showing southerly drift in the central GBR (14–21°S) and the consistent presence of outbreaks in the Swain Reefs (~22°S). (B) Number of records of outbreaks 1985–2004 on all GBR reefs grouped by position on the continental shelf. (C) Occurrence of outbreaks 1994–2004 on open and no-take reefs in the mid-shelf region of the GBR where most outbreaks occur; number of reefs with outbreaks (black bars) and without outbreaks (white bars) ($n = 29$, one-tailed Fisher's exact test $p = 0.036$). (D) As (C), but including inshore, mid-shelf and outer shelf reefs ($n = 56$, one-tailed Fisher's exact test $p < 0.003$).

"To address the question of whether
MPAs provide protection from outbreaks of *A. planci* more directly,
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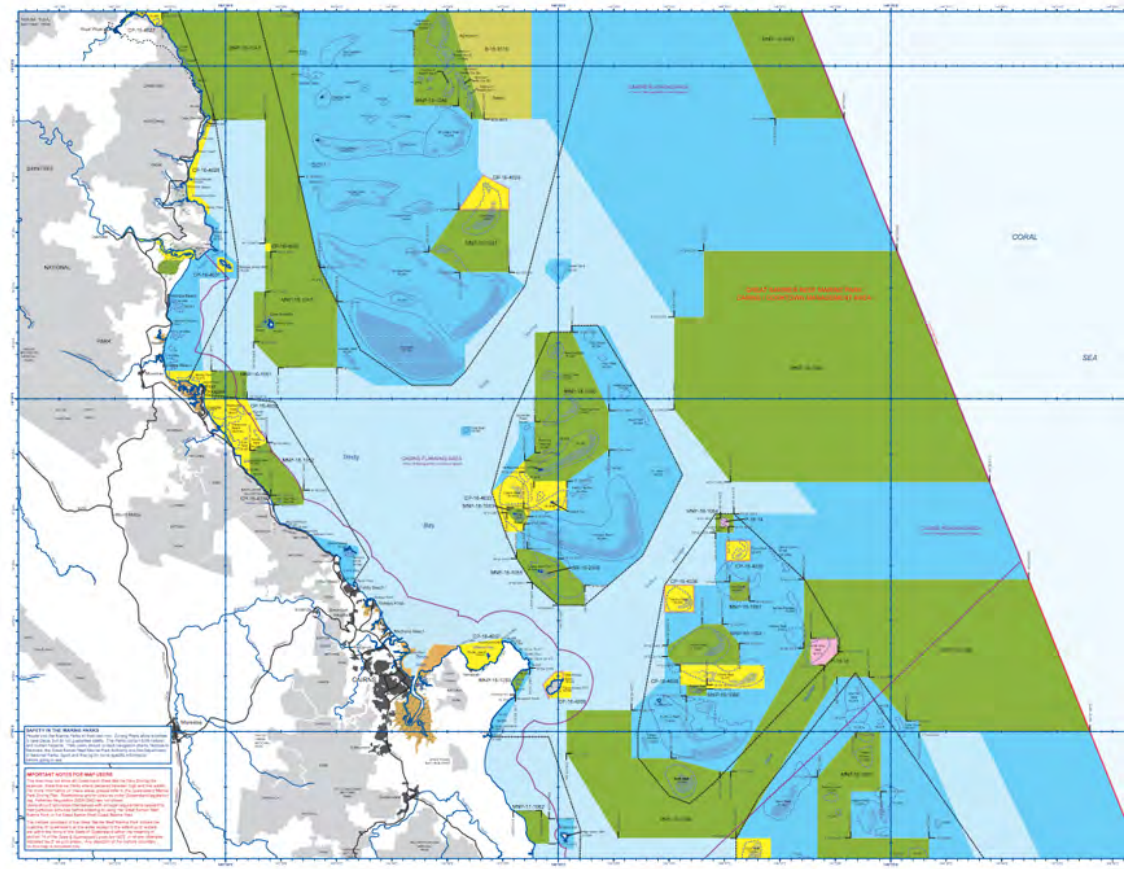
outbreaks on no-take reefs and on reefs that were open to fishing on the GBR, based on results of an extensive monitoring program".

Hugh Sweatman
Australian Institute of Marine Science



And his conclusion was yes.

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R598

No-take reserves protect coral reefs from predatory starfish

Hugh Sweatman

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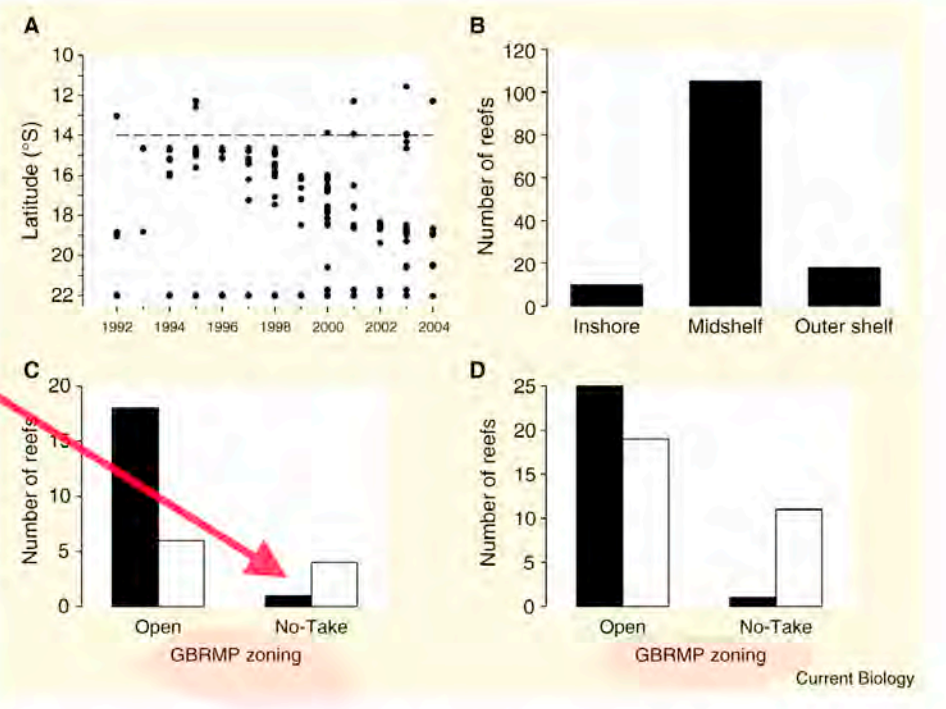

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https://core.ac.uk/download/pdf/82736474.pdf

Objective

In this topic we evaluate whether a MPA as a whole has been successful or not.

Globally, there are more than 15,000 marine protected areas, covering 7.59% of the world's marine environment.

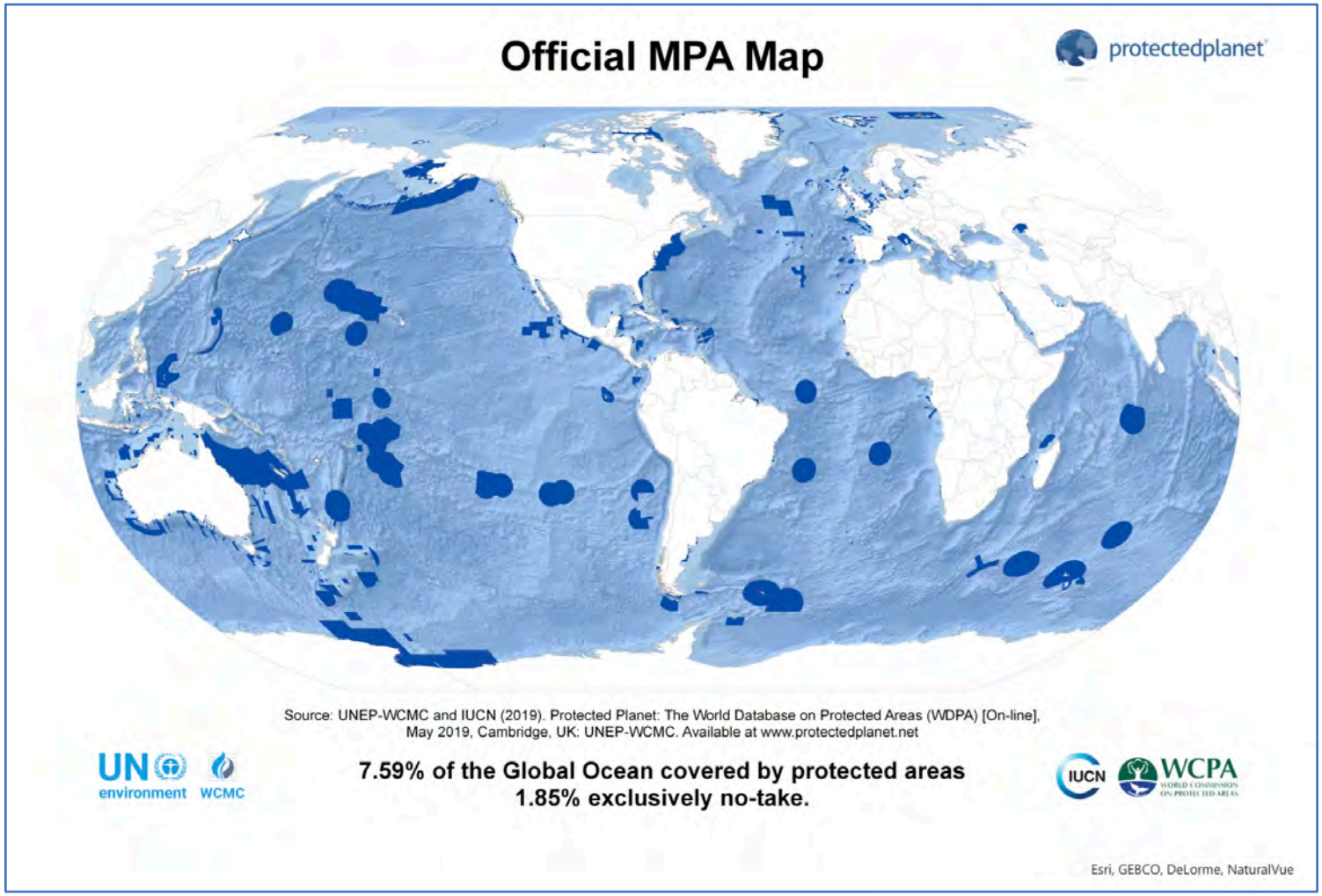


Image: UNEP-WCMC and IUCN (2019) Marine Protected Planet [On-line], [May, 2019], Cambridge, UK: UNEP-WCMC and IUCN Available at: www.protectedplanet.net

MPA's can produce ecological, economic, and social benefits.

MPA's are expensive: absorbing much of the resources allocated to marine conservation.

Thus, identifying practices that ensure MPA effectiveness is a major issue.

Balmford *et al* estimates that the cost of a global MPA network conserving 20-30% of the world seas would cost between US$ 5- 19 Billion annually.

Reference: Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R., & Charles, A. et al. (2018). Revisiting "Success" and "Failure" of Marine Protected Areas: A Conservation Scientist Perspective. *Frontiers In Marine Science*, *5*. doi: 10.3389/fmars.2018.00223 Open access CCBY
Balmford, A., Gravestock, P., Hockley, N., McClean, C., Roberts, C., & Myers, N. (2004). The Worldwide Costs of Marine Protected Areas. *Proceedings of the National Academy of Sciences of the United States of America, 101*(26), 9694-9697. https://www.pnas.org/content/101/26/9694

The aims of MPAs include ecological, social, economic, cultural, and institutional objectives. These objectives vary depending on the location and reason for the MPA.

Planning for multiple objectives requires some compromise across social, economic, and ecological domains.

The impact of cruise ships in the GBR requires careful planning

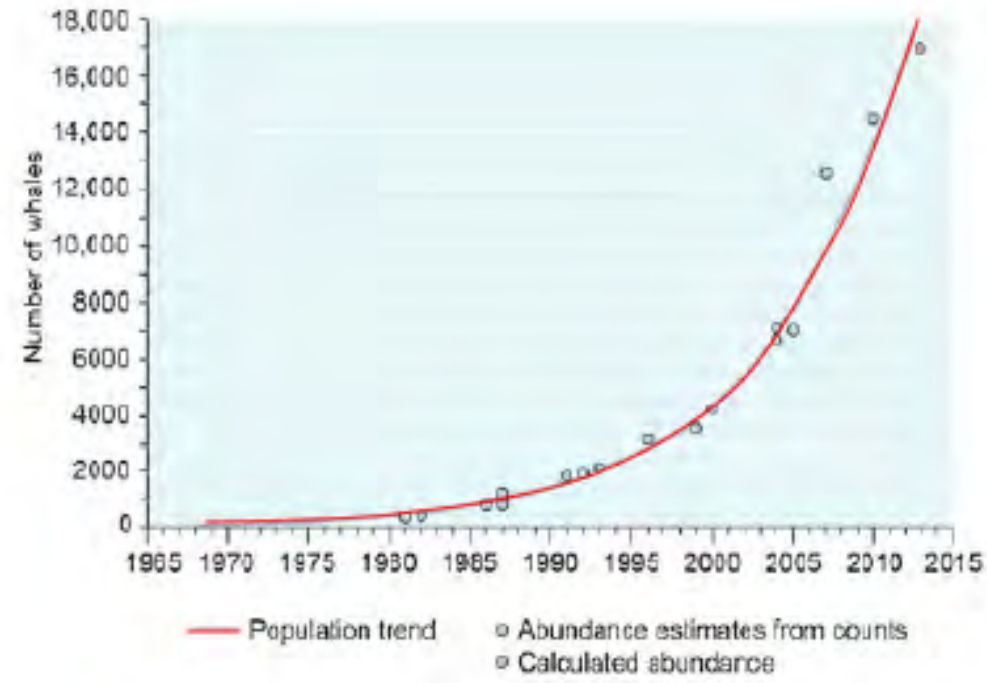
Reference: Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R., & Charles, A. et al. (2018). Revisiting "Success" and "Failure" of Marine Protected Areas: A Conservation Scientist Perspective. *Frontiers In Marine Science*, *5*. doi: 10.3389/fmars.2018.00223. Open Access CC BY

MPA effectiveness, in ecological terms, is commonly measured by comparing values of ecological or biological measures (e.g., sizes of organisms, density and biomass of fish assemblages, species richness, live cover of benthic organisms) in MPAs and adjacent unprotected areas and/or before and after an MPA is established.

Image copyright Bob Moffatt. May be used under CC BY NC SA

Reference: Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R., & Charles, A. et al. (2018). Revisiting "Success" and "Failure" of Marine Protected Areas: A Conservation Scientist Perspective. *Frontiers In Marine Science*, *5*. doi: 10.3389/fmars.2018.00223. Open access CC BY

The population of Humpback whales is recovering since commercial whaling ceased.



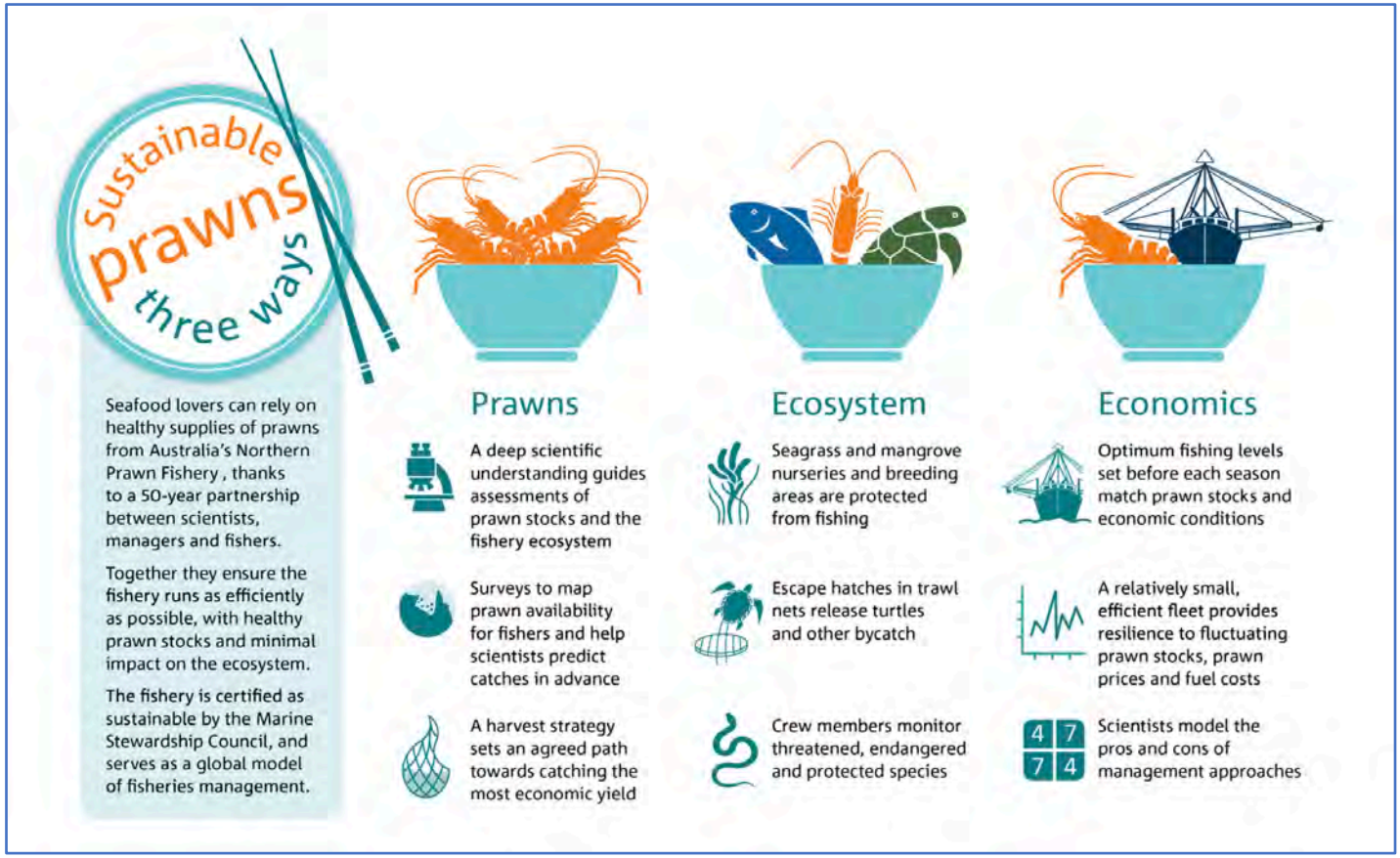
Recovery of the east Australian humpback whale population, 1981–2013

Image: Great Barrier Reef Marine Park Authority 2014, Great Barrier Reef Outlook Report 2014, GBRMPA, Townsville. CCBY3.0

An MPA can be considered a success if it accomplishes its objectives.

Conversely, an MPA would be a failure if it is “not accomplishing an aim or purpose.”

To assess the effectiveness of an MPA, the goals and objectives must be measurable.



The Northern Prawn fishery is environmentally sustainable and economically efficient.

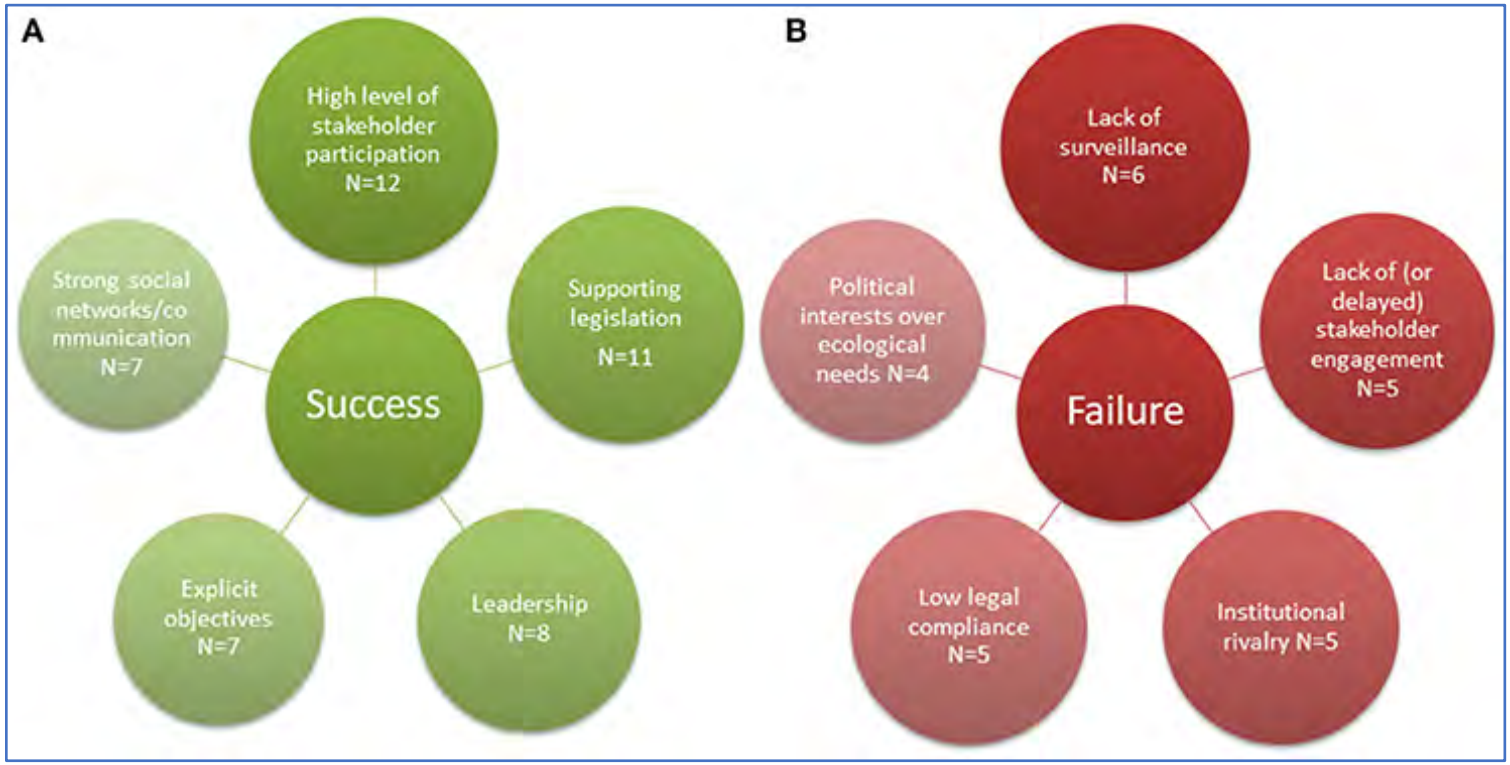
Image: © Copyright CSIRO Australia, (2017)
https://www.csiro.au/en/Research/OandA/Areas/Marine-resources-and-industries/Sustaining-Australian-fisheries/Northern-Prawn-Fishery

Success factors	Failure factors
High level of stakeholder participation	Lack of (or delayed) stakeholder engagement
Correct identification of the different stakeholder groups	Not identifying correctly different stakeholder groups
Boundary clarity	Lack of boundary clarity
Effective MPA size	Ineffective MPA size – too small or too large
Effective surveillance	Lack of surveillance
Explicit objectives	Unclear objectives
Supporting legislation	Lack of supporting legislation
Leadership	Lack of leadership
Strong social networks/communication	Lack of strong social networks/communication
Stakeholders perceive crisis in terms of reduced marine living resources	Stakeholders do not perceive crisis in terms of reduced marine living resources
Successful alternative income projects	Lack of projects for alternative income
High legal compliance	Low legal compliance
Ownership	Lack of ownership
Transparency	Lack of transparency
Strong science engagement including (or not) the use of analytical planning tool (e.g. Marxan, Zonation)	No (or low) science engagement Opportunistic selection of MPAs
Effective sanctioning mechanism	Ineffective sanctioning mechanisms
Willingness to move forward at different scales and policy levels	Political interests are prioritized over ecological needs
Institutional collaboration	Institutional rivalry
NGO involvement in stakeholder awareness and engagement	Unsuccessful NGO involvement in stakeholder awareness and engagement
Existence of conflict resolution mechanisms	Lack of conflict resolution mechanisms
Builds on existing cultural practices	Contradicts existing cultural practices
Clear consultative process	Lack of clear consultative process
Abundant available funds	Lack of funding

Researchers reviewed 27 MPA case studies and identified the following 23 factors leading to the success or failure of MPAs

Reference: Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R., & Charles, A. et al. (2018). Revisiting "Success" and "Failure" of Marine Protected Areas: A Conservation Scientist Perspective. *Frontiers In Marine Science*, *5*. doi: 10.3389/fmars.2018.00223

These were identified as the top 5 reasons that an MPA would succeed or fail:



Reference: Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R., & Charles, A. et al. (2018). Revisiting "Success" and "Failure" of Marine Protected Areas: A Conservation Scientist Perspective. *Frontiers In Marine Science*, *5*. doi: 10.3389/fmars.2018.00223. Open access CC BY

Stakeholder engagement was found to be the most important factor affecting MPA success.

The IUCN guidebook for evaluating MPA management effectiveness created a “toolbox” of indicators, useful for evaluating MPA effectiveness.

These are in three categories:

- **Biophysical**
- **Socioeconomic**
- **Governance**

You can download the guidebook here:
https://www.iucn.org/content/how-your-mpa-doing

Biophysical	Focal species abundance
	Focal species population structure
	Habitat distribution and complexity
	Composition and structure of the community
	Recruitment success within the community
	Food web integrity
	Type, level and return on fishing effort
	Water quality
	Area showing signs of recovery
	Area under no or reduced human impact

Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

Socioeconomic	Local marine resource use patterns
	Local values and beliefs about marine resources
	Level of understanding of human impacts on resources
	Perception of seafood availability
	Perception of local resource harvest
	Perception of non-market and non-use value
	Material style of life
	Quality of human health
	Household income distribution by source
	Household occupational structure
	Community infrastructure and business
	Number and nature of markets
	Stakeholder knowledge of natural history
	Distribution of formal knowledge to community
	Percentage of stakeholder group in leadership positions
	Changes in conditions of ancestral and historical sites, features or monuments

Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

Governance	Level of resource conflict
	Existence of a decision making and management body
	Existence and adoption of a management plan
	Local understanding of MPA rules and regulations
	Existence and adequacy of enabling legislation
	Availability and allocation of administrative resources
	Existence and application of scientific research and input
	Existence and activity level of community organisations
	Degree of interaction between managers and stakeholders
	Proportion of stakeholders trained in sustainable use
	Level of training provided to stakeholders in participation
	Level of stakeholder participation and satisfaction in management process and activities
	level of stakeholder involvement in surveillance, monitoring and enforcement
	Clearly defined enforcement procedures
	Enforcement coverage
	Degree of information dissemination to encourage stakeholder compliance

Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

Gallacher et al developed a framework for evaluating MPA success using 15 indicators of these indicators.

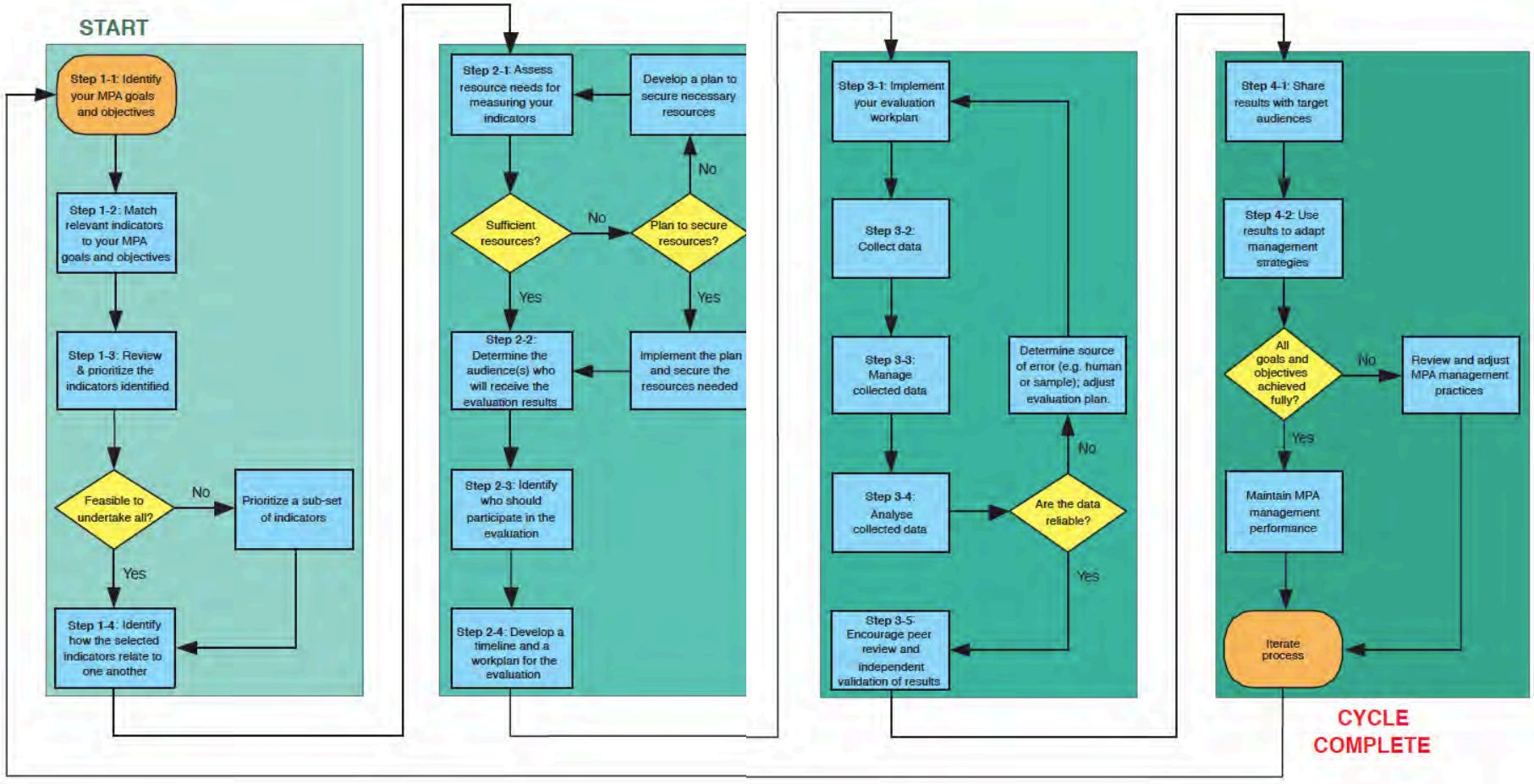
They used a traffic-light system to evaluate an MPA using secondary data. If data was positive, the indictor received a green rating, negative: red, and mixed reports: yellow.

Indicator Type	Indicator of Success	
Biophysical	Area under no or reduced human impact	
Socio-economic	Type, level and return of fishing effort	
Socio-economic	Local marine resource use patterns	
Biophysical	Species abundance	
Biophysical	Composition and structure of the community	
Governance	Level of resource conflict	
Socio-economic	Community infrastructure and businesses	
Biophysical	Protection of critical habitats such as coral reefs, mangroves, sea grass	
Governance	Local understanding of local rules and regulations	
Governance	Degree of interaction between managers and stakeholders	
Socio-economic	Local values and beliefs regarding the marine resources	
Governance	Level of stakeholder participation and satisfaction in management process and activities	
Governance	Existence and activity level of community organisation	
Governance	Existence of decision making and management body	
Socio-economic	Level of understanding of human impacts on resources	

Reference: Gallacher, J., et al., Evaluating the success of a marine protected area: A systematic review approach, Journal of Environmental Management (2016), http://dx.doi.org/10.1016/j.jenvman.2016.08.029

Evaluate an MPA

The IUCN guidebook describes shows the stages for evaluating a marine park



Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

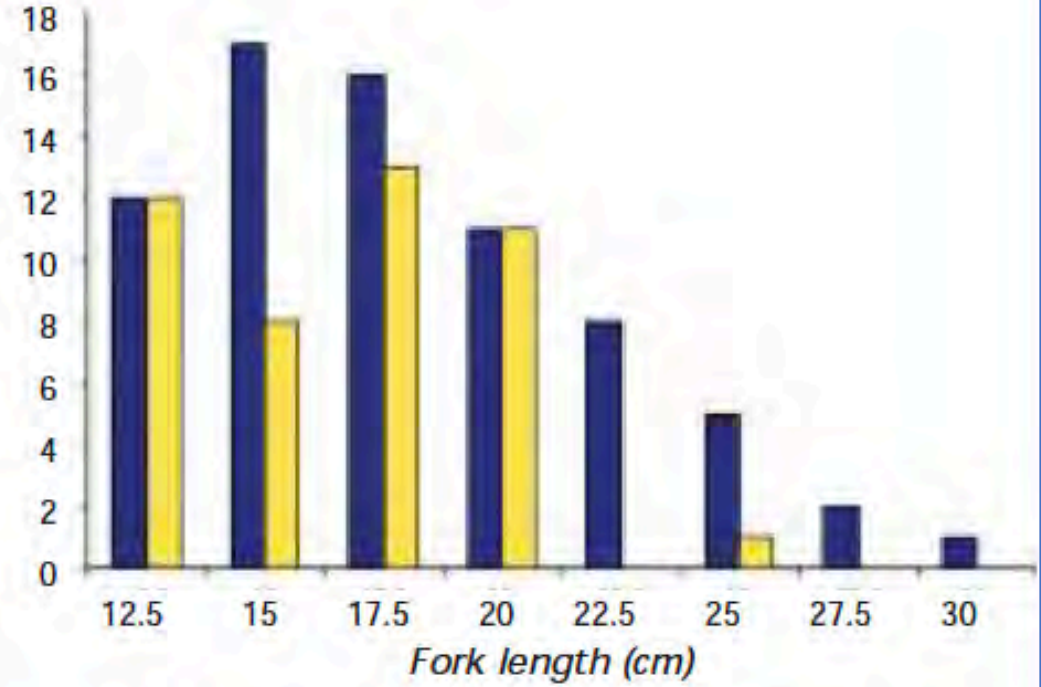
Classroom activity - Evaluate an MPA

Step 1	Select some (not too many) indicators to evaluate your choice of MPA, based on the specific goals and objectives of that marine park. These should be clearly described in the management plan.
Step 2	Research information to help you decide whether your chosen indicators have been met. This may be in an annual report or scientific paper.
Step 3	Have all (or most) of the goals been met? If so, your MPA is successful! If not, the MPA may need to be reviewed and adjusted.

This example evaluates the abundance and population structure of the bullethead parrotfish in Guam:

EXAMPLE FROM THE FIELD

A primary objective of Guam's Marine Preserve Network is to restore declining reef fish populations. At the Achang Reef Flat Preserve, an evaluation was conducted of the population structure of the bullethead parrotfish (*Chlorurus sordidus*), one of the most commonly fished species in Guam's inshore reef fishery. The evaluation team's results (right) show how larger and more abundant size classes of bullethead parrotfish were observed within the Achang Reef Flat Preserve than in adjacent control (non-protected) sites. Data collected suggest that this species appears to be experiencing population recovery within the Reef Flat Preserve, which was the Reserve Network's primary objective.



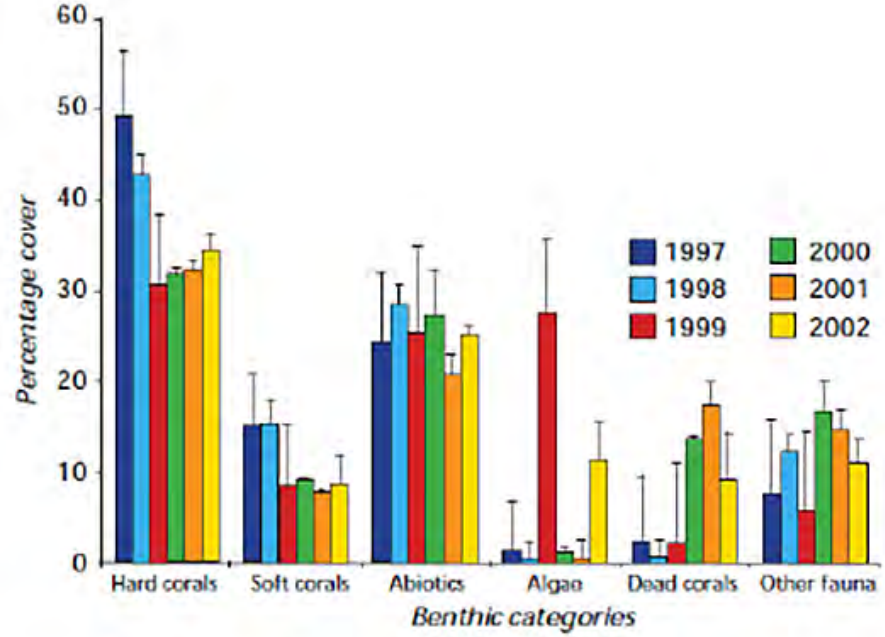
▲ ***The observed size class distribution of bullethead parrotfish within (purple bars) and outside (yellow bars) the Achang Reef Flat Preserve.***

Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

This example shows an area showing signs of recovery:

EXAMPLE FROM THE FIELD

Between the mid- and late-1990s, sharp declines were observed in the percentage of live hard coral cover located within the Tubbataha Reef National Marine Park. In part, this is thought to be due to the massive bleaching experienced throughout much of the world during 1998, contributing to an upsurge in algal cover observed in 1999. Since then, habitat surveys completed up to 2002 indicate that live reef cover appears to be gradually recovering. The protection of Tubbataha from fishing pressures is believed to have contributed to this positive trend, and some are suggesting that the habitat is exhibiting resilience to the disturbances experienced during the 1990s. The ability of the Tubbataha management team to clearly convey this story with target audiences is helping to ensure the area's future support.



▲ *The observed percentage of live cover from 1997 to 2002 of six major benthic habitat types found within Tubbataha Reef National Marine Park.*

Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

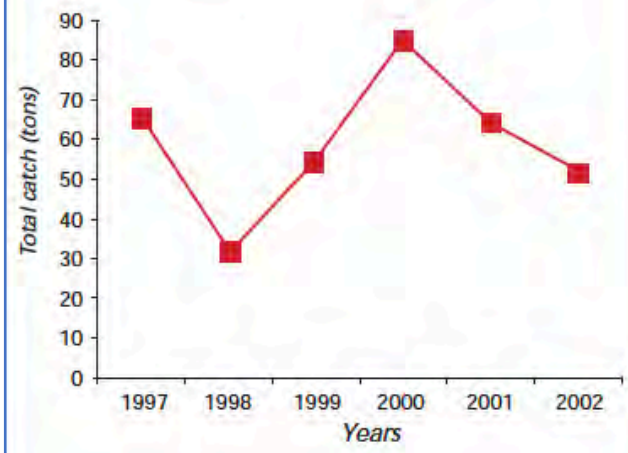
This example shows responses to changes in legislation:

EXAMPLE FROM THE FIELD

In the Galapagos Islands Marine Reserve, there are two dominant commercial lobster fisheries in operation: blue or green lobster (*Panulirus gracilis*) and red lobster (*P. penicillatus*). Fishing for these species is permitted only during a specified 4-month season. Data collected over the past six years illustrate an interesting story for the MPA. During the late 1990s, total catches rose to new highs (see Figure, below). This prompted the entry of many new fishers into the fishery during 2000 and 2001, thereby leading to a decline in the stocks and reduced harvests in 2001 and 2002. In 2002, fewer active fishers were reported (due to lowered catches the year before), leading to reduced effort. Some speculate that this may lead to increased catches in the coming years, likely followed by another influx of fishing effort. Such high-and-low cycles in commercial fisheries are not uncommon, and have prompted managers and stakeholders in similar situations to discuss the need for further limitations on fisheries in order to set a scientifically-sustainable level of catch by a limited level of effort.

Total lobster fishery catches (T) per annum from the Galapagos 1997–2001

Year	*Commercialized Catch (tons)*
1997	65.3
1998	31
1999	54.4
2000	85
2001	64.1
2002	51.4
Average	***58.55***



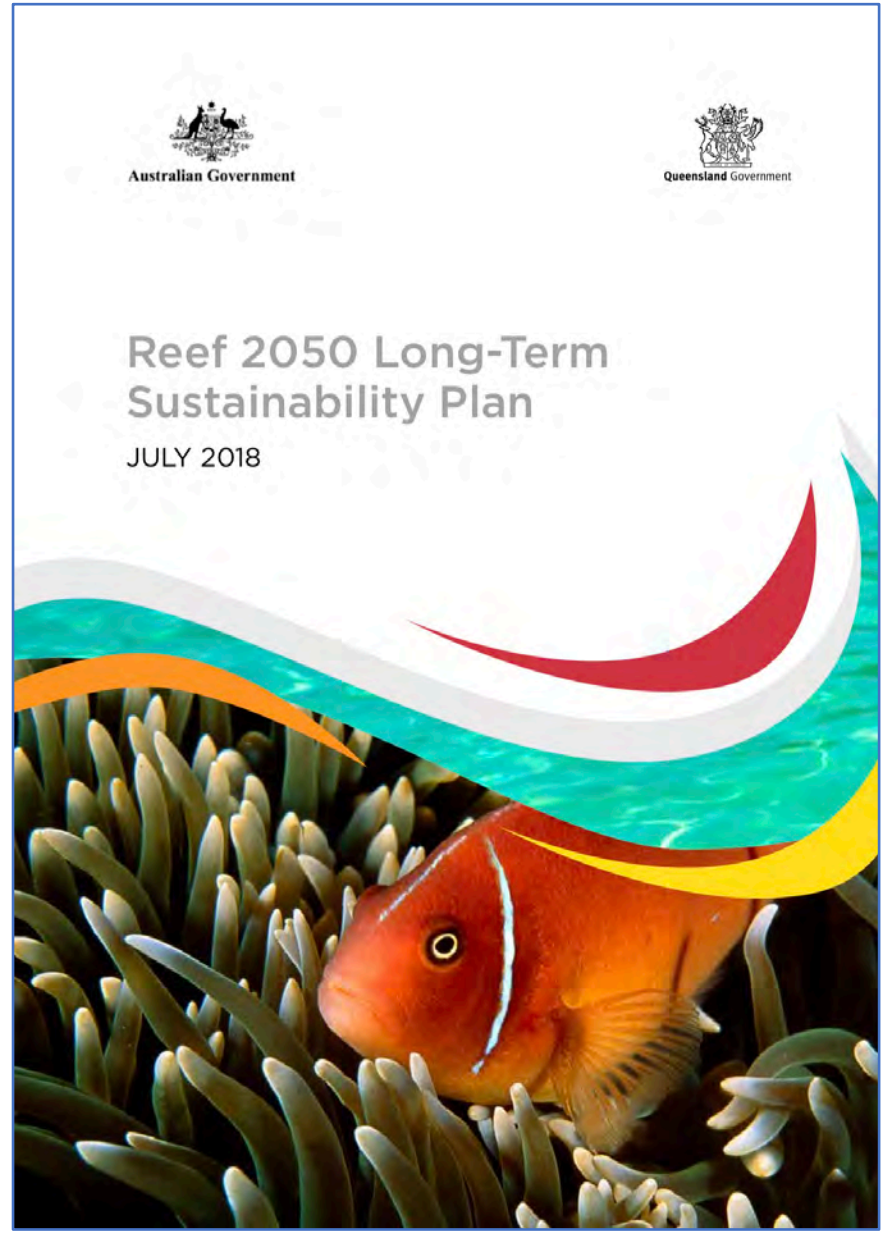
Reference: Pomeroy, R.S., Parks, J.E. and Watson, L.M. (2004). How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK.

How is GBRMPA doing?

The Reef 2050 Plan outlines the management actions, targets, objectives and outcomes of the Great Barrier Reef.

Download a copy here:
https://www.environment.gov.au/marine/gbr/long-term-sustainability-plan

This was discussed in the previous topic



The RIMReP program measures and reports on the Reef 2050 Plan's progress towards achieving the outcomes, objectives and targets.
RIMReP is based on the Driver, Pressure, State, Impact and Response (DPSIR) Framework.

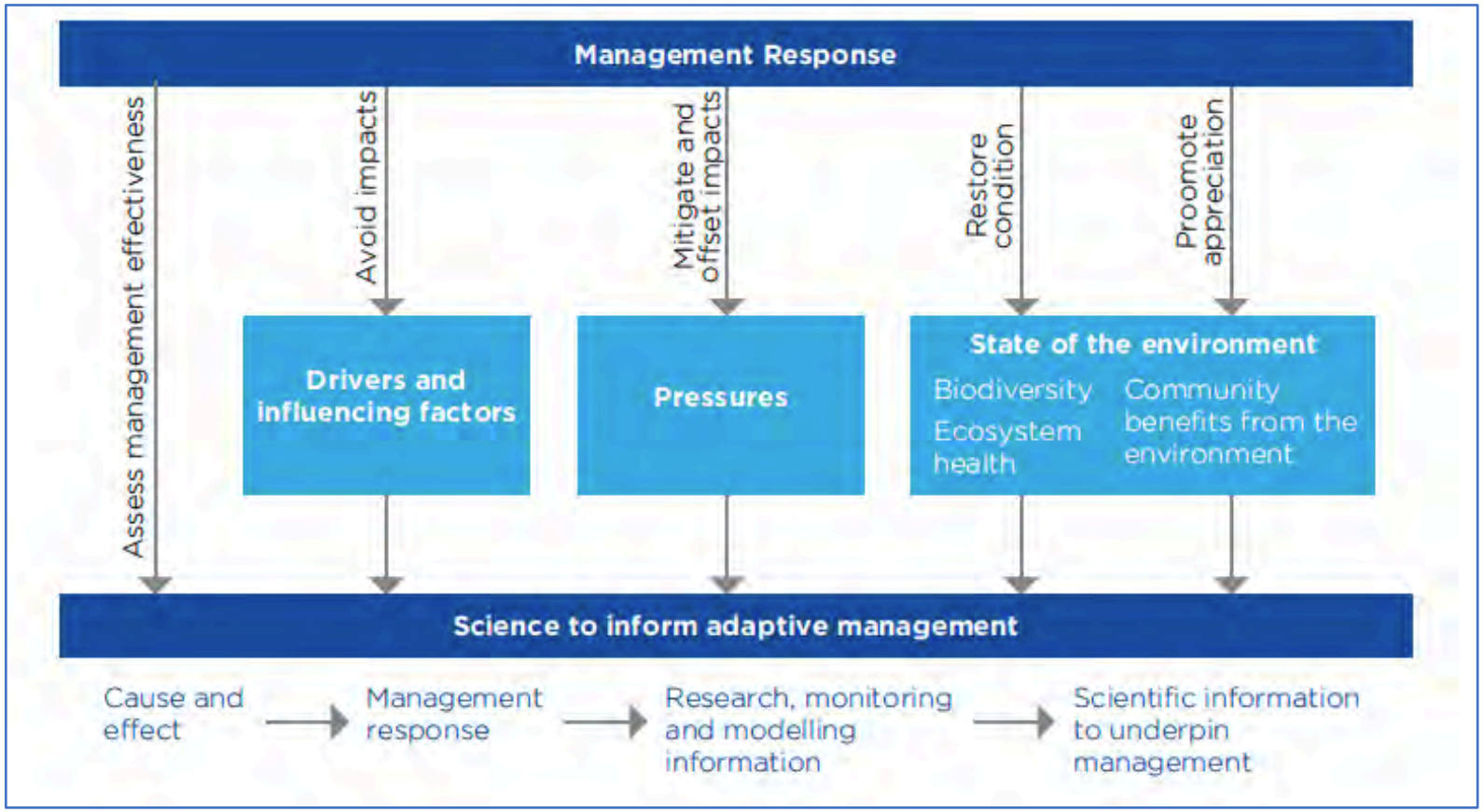


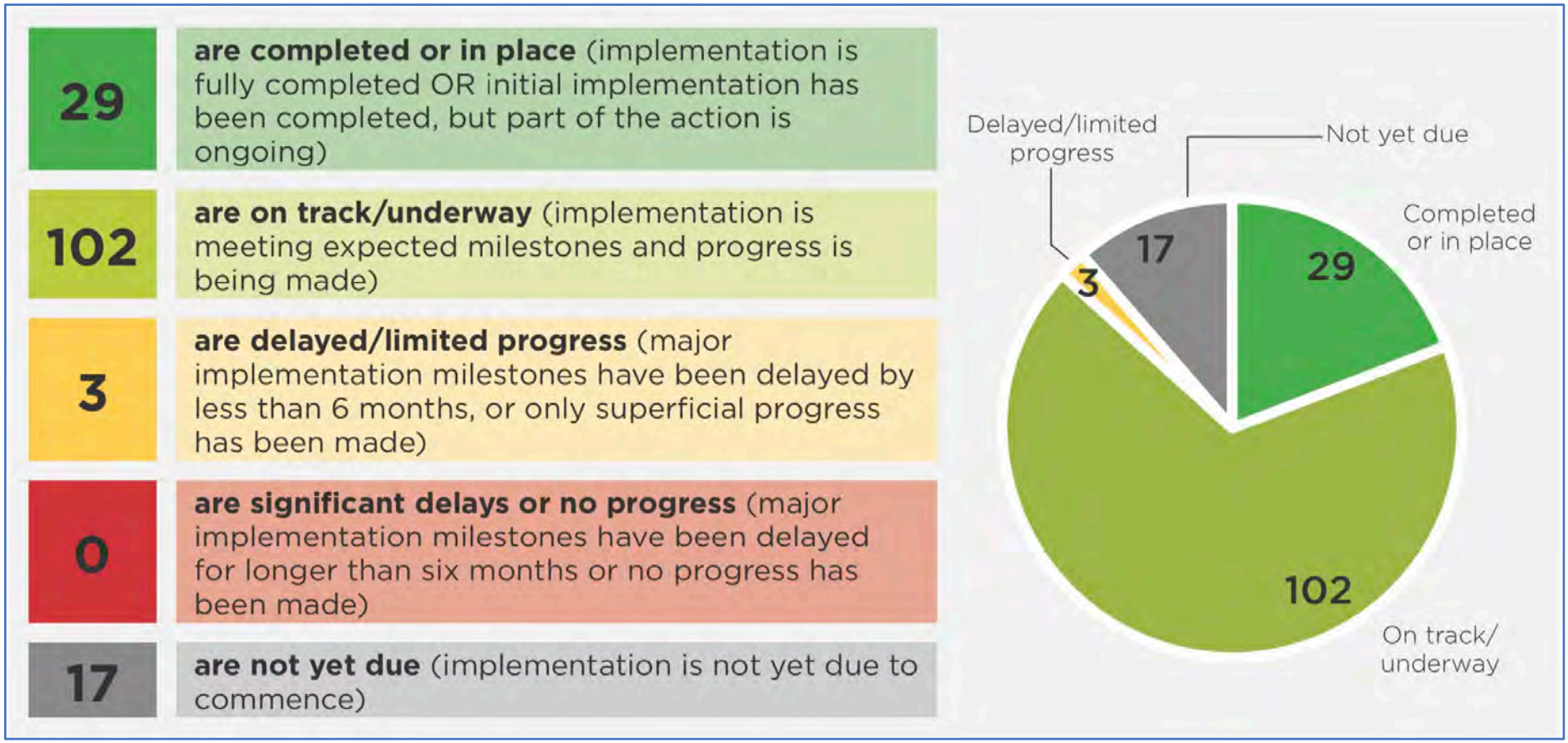
Image: Reef 2050 Long-Term Sustainability Plan—July 2018, Commonwealth of Australia 2018. CC 4.0 BY

Progress in implementing the Reef 2050 plan is reported in an Annual report.

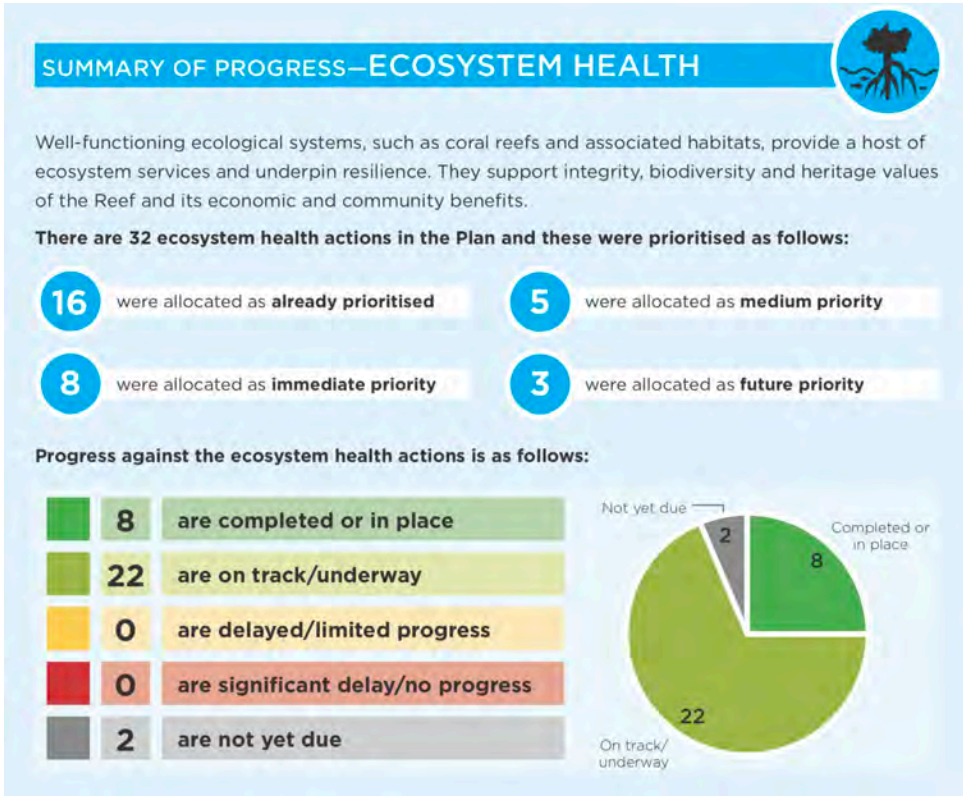
This report provides and overview of progress towards 151 actions in 7 themes:

1. Ecosystem health
2. Biodiversity
3. Heritage
4. Water quality
5. Community benefits
6. Economic benefits
7. gGovernance

As in the 2016 report.



Progress in each theme is reported separately:



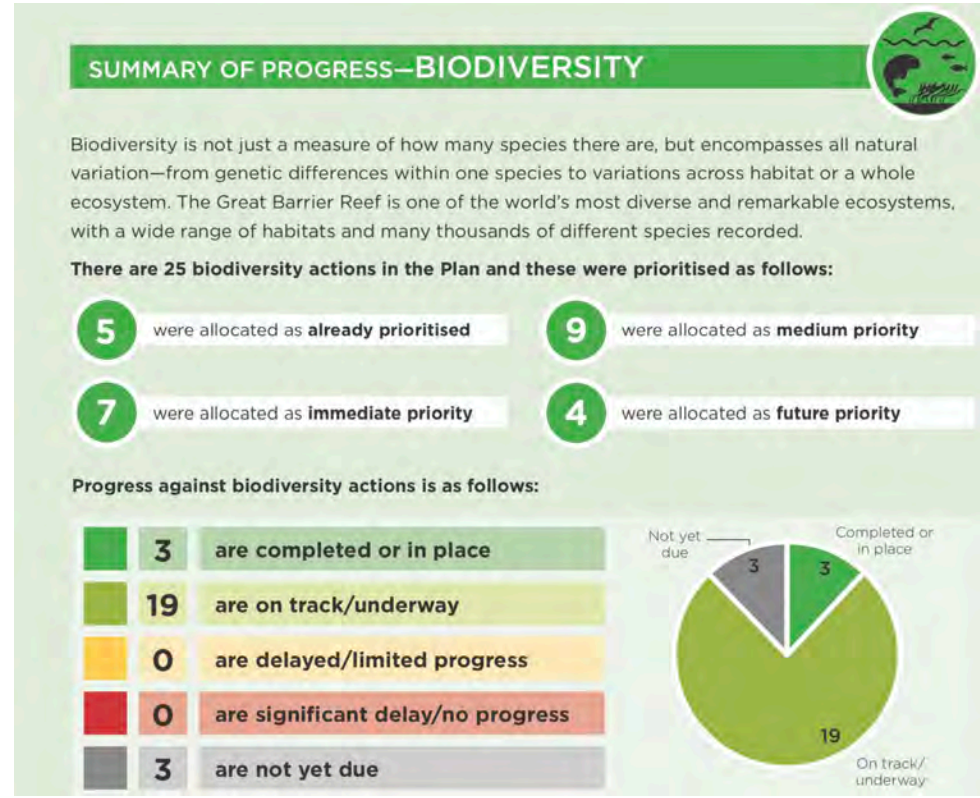
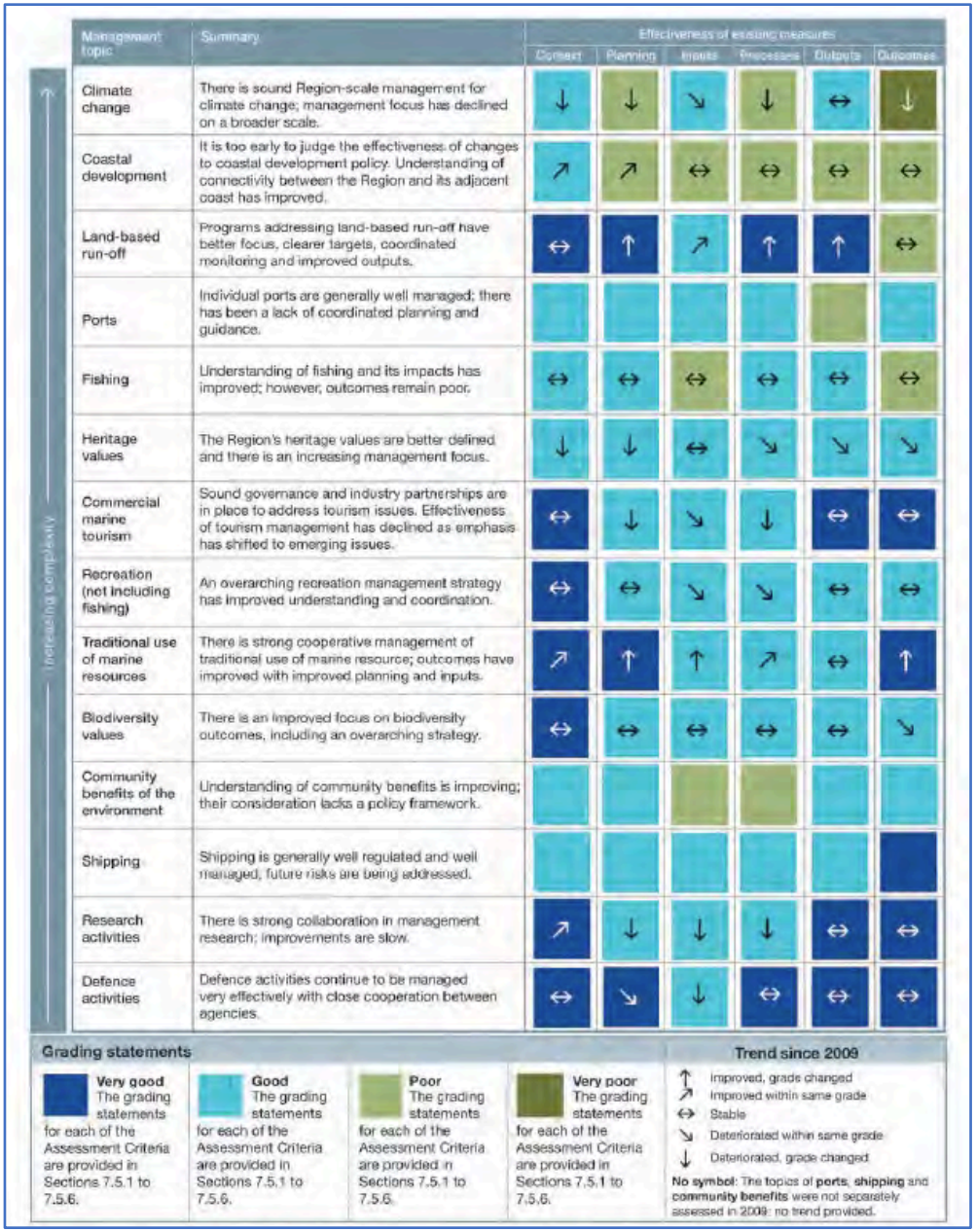


Image: © Copyright Commonwealth of Australia, 2016. From *Reef 2050 Plan—Annual report and implementation strategy, Commonwealth of Australia 2016 CC BY 4.0*

You can download the annual report, or the more detailed addendum here:
https://www.environment.gov.au/marine/gbr/publications/reef-2050-plan-annual-report-implementation-strategy

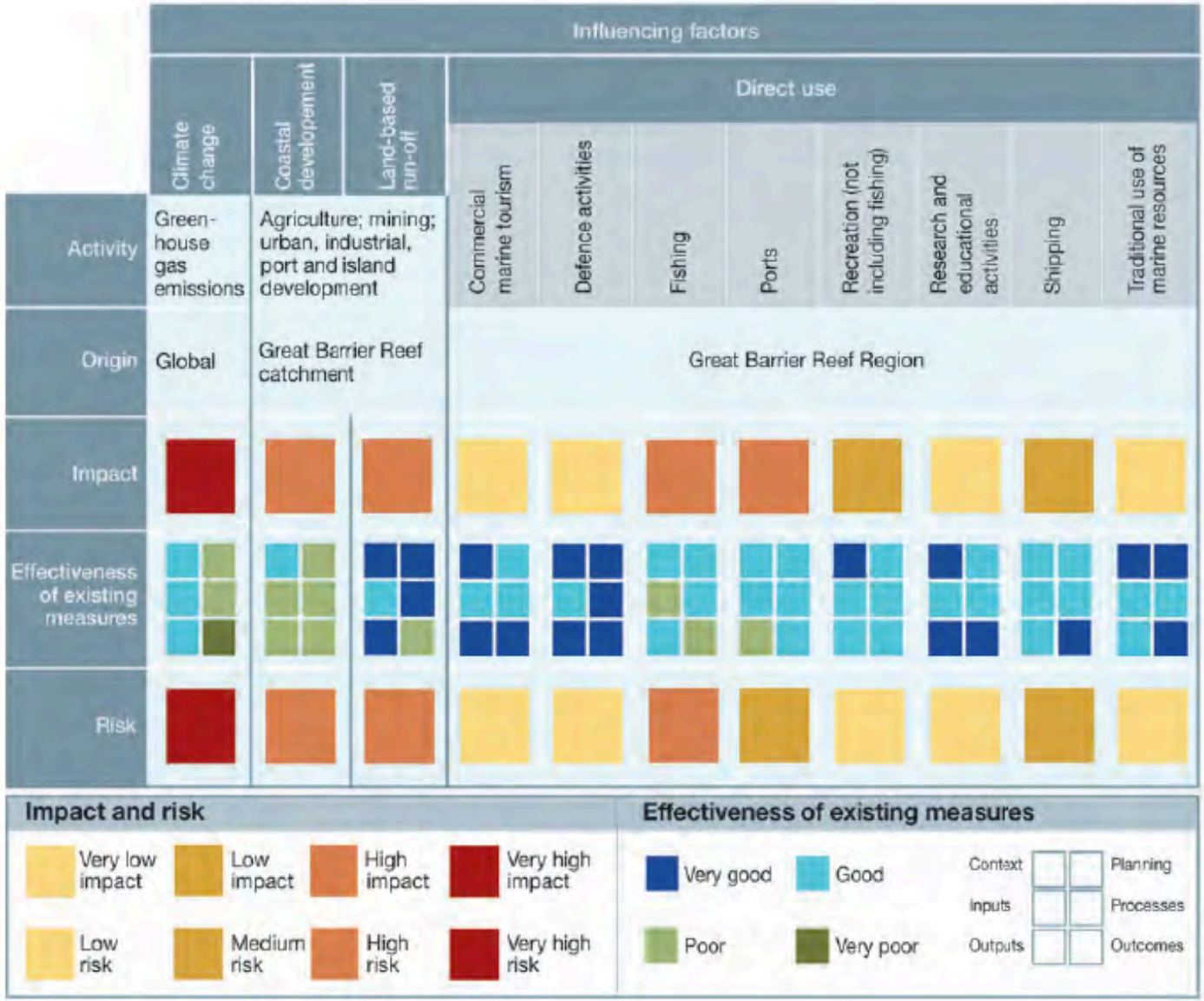


Overall assessment of the effectiveness of existing measures to protect and manage the Great Barrier Reef Region's values

The Outlook report reports recovery in the ecosystem:

2009 Grade	Current summary and assessment components	Assessment grade and trend				Confidence	
		Very good	Good	Poor	Very poor	Grade	Trend
	Recovery in the ecosystem: Some disturbed populations and habitats have demonstrated recovery after disturbance (for example lagoon floor, loggerhead turtles, humpback whales). For some species recovery is not evident (black teatfish, dugongs) and is dependent on the removal of all threats. Increasing frequency and extent of some threats are likely to continue to reduce the resilience of species and habitats in the Region.			↓			
	Coral reef habitats: Increases in frequency and severity of disturbances, such as cyclones, flooding, crown-of-thorns starfish outbreaks have reduced the capacity for coral reefs to recover since 2009. There is evidence of recovery at a local scale.			↓		●	◐
	Lagoon floor habitats: Ongoing management arrangements mean that some lagoon floor habitats previously at risk are continuing to recover from disturbances. There is little monitoring of lagoon floor condition or recovery.		↔			◐	◐
	Black teatfish: Based on recent modelling, populations of black teatfish in the Region are likely to be slowly recovering. Populations have recovered in Torres Strait.				↑	◐	◐
	Coral trout: Coral trout populations demonstrate a strong ability to recover and increased reproduction in zones closed to fishing disperses beyond those zones. There are emerging concerns about the overall condition of coral trout populations.		–			◐	◐
	Loggerhead turtles: Loggerhead turtle populations are recovering. There are comprehensive management arrangements in the Region, but some threats remain. Pressures from outside Australian waters are likely to influence their full recovery.			↑		●	●
	Urban coast dugongs: The urban coast dugong population has declined further since 2009, affected by the loss of seagrass from cyclones and flooding. Continued effective implementation of all management arrangements is required to reduce direct threats.				↓	●	◐

Image: Great Barrier Reef Marine Park Authority 2014, Great Barrier Reef Outlook Report 2014, GBRMPA, Townsville. CCBY3.0



The Outlook report summarises management effectiveness, impacts and risk associated with factors influencing the Region's values

Image: Great Barrier Reef Marine Park Authority 2014, Great Barrier Reef Outlook Report 2014, GBRMPA, Townsville. CCBY3.0

Question

A fish survey of four reef habitat areas and three mangrove habitat areas was conducted. The aim was to determine the mangrove habitat with the highest level of connectivity for juvenile and adult reef fish. The mangrove habitats were ranked on their nursery function.

	Reef habitat area number				
	I	II	III	IV	
Mangrove habitat area	**Number of juvenile fish in location**				**Overall connectivity to coral reefs**
A	13	13	13	13	52
B	0	52	0	0	52
C	68	5	56	67	196
Overall connectivity to mangrove habitat	81	70	69	80	

Using the information above, identify which mangrove habitat would be the most crucial in this situation. Give reasons to support your response.

Suggested answer

Mangrove habitat area C would be most crucially linked.

Mangrove habitat area A is connected to each reef but only provides a small proportion (16–19%) of the total nursery habitat to each reef.

Mangrove habitat area B is only connected to one reef habitat.

Mangrove habitat area C contributes a high proportion of nursery habitat to several reefs.

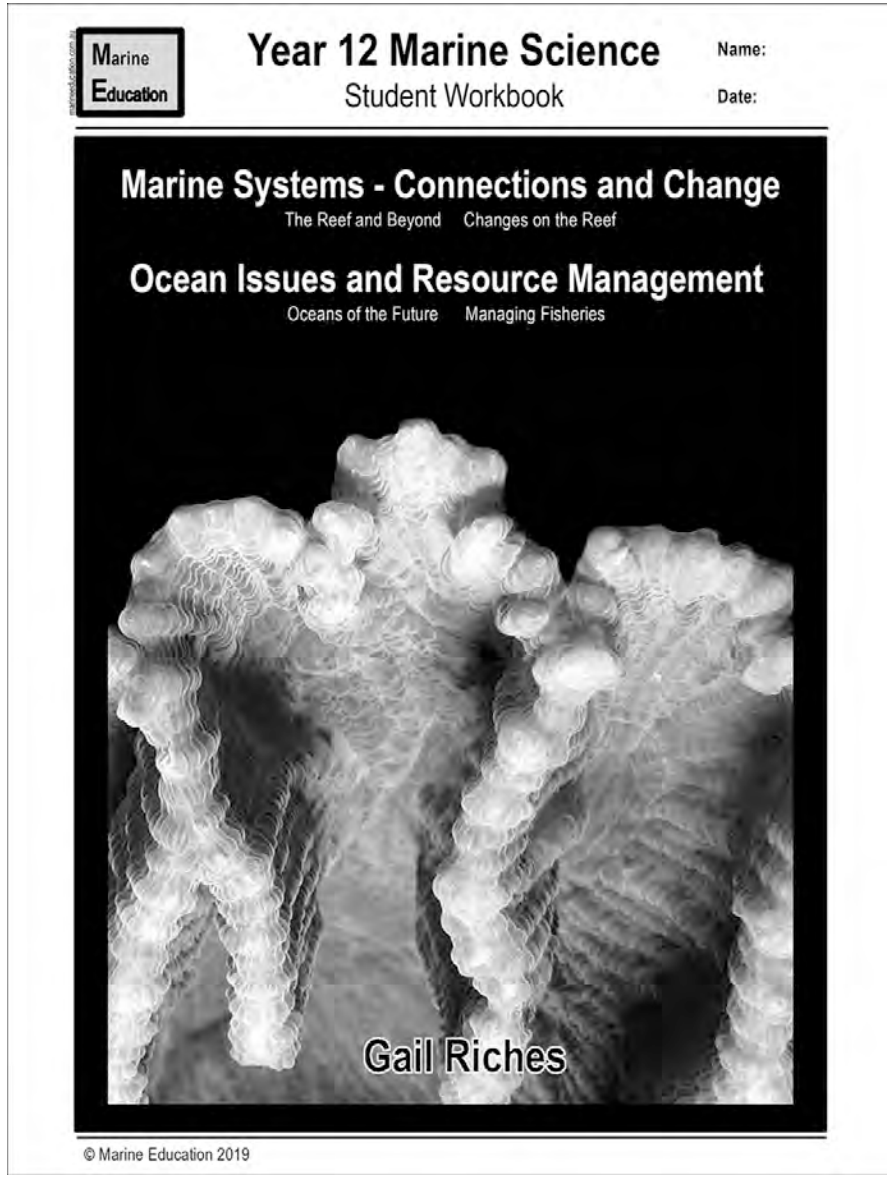
Worksheet

Did it work?

by

Gail Riches

www.marineeducation.com.au



T126 Government and NGO management roles

Adam Richmond and Bob Moffatt

Syllabus statement

At the end of this topic you should be able to ...

Compare

the roles of government and non-government organisations in the management and restoration of ecosystems and their relative abilities to respond (e.g. speed, diplomatic constraints, political influence, enforceability).

Compare

- display recognition of similarities and differences and recognise the significance of these similarities and differences

Definitions

A government is the system or group of people governing an organized community, often a state.

In the case of its broad associative definition, government normally consists of legislature, executive, and judiciary.

Government is a means by which organizational policies are enforced, as well as a mechanism for determining policy.

Read more at

https://en.wikipedia.org/wiki/Government

What are NGOs?

The term *NGO* stands for nongovernmental organisation, and it includes a variety of organizations such as “private voluntary organizations,” “civil society organizations,” and “non-profit organizations” [1]

“Groups of individuals organised for the myriad of reasons that engage human imagination and aspiration. They can be set up to advocate a particular cause, such as human rights, or to carry out programs on the ground, such as disaster relief. They can have memberships ranging from local to global.” [2]

Reference: 1 Dhanda, K., & Young, S. (2013). *Sustainability*. Thousand Oaks, Calif.: SAGE Publications.
2. Charnovitz, 1997, cited in Esty, Daniel C & Ivanová, Mária H & Yale Center for Environmental Law and Policy & Yale University. School of Forestry and Environmental Studies (2002). *Global environmental governance : options & opportunities*. Yale School of Forestry & Environmental Studies, [New Haven, CT]

The Australian Environmental Grantmakers Network (AEGN) brings together philanthropists who care about the environment and enables them to become better at what they love doing.

Some Australian Environmental NGOs (eNGOs):

Source
https://www.aegn.org.au

Australian Coastal Society Ltd
Australian Conservation Foundation
Australian Coral Reef Society Inc
Australian Marine Conservation Society
Australian Marine Environment Protection Association Incorporated
Australian Marine Wildlife Research Rescue Organisation Inc
Australian Network of Environmental Defenders Offices Inc (ANEDO)
Australian Oceans Institute
Australian Seabird Rescue Inc
Australian Whale and Dolphin Conservation
Australian Zoo Wildlife Warriors Worldwide Ltd
Birdlife Australia Ltd
Bush Heritage Australia
Cairns and Far North Environment Centre
Centre for Environment Education
Climate Council
Earthwatch Institute Australia
Ecosystem Science Council
Fauna & Flora International Australia
Good Environmental Choice Australia
Great Barrier Reef Foundation
Great Barrier Reef Research Expedition Inc
Greenpeace Australia Pacific
International Fund for Animal Welfare (IFAW)
Keep Australia Beautiful Council (QLD) Inc
Magnetic Island Nature Care Association Inc
MangroveWatch
Marine Education Society of Australasia
Marine Life Society of South Australia
Marine Stewardship Council Asia-Pacific Pty Ltd
National Parks Association of Queensland
National Parks Australia Council Inc
National Toxics Network
Ocean N Environment Limited
Ocean Planet
OceanWatch Australia
ORRCA Inc
Paddy Pallin Foundation Trust
Pelican and Seabird Rescue Inc.
Purves Environmental Fund
Queensland Conservation Council
Reef Check Foundation Limited
Reef Life Survey Foundation Incorporated
Sea Shepherd Australia
Sea Turtle Foundation
Society for Responsible Design
Southern Oceans Seabird Study Association Inc (SOSSA)
Surfrider Foundation Limited
Tangaroa Blue Foundation
The Change Agency
The Lizard Island Reef Research Foundation
The Pew Charitable Trusts
The Wilderness Society Inc
Total Environment Centre Inc
Twinnies Pelican and Seabird Rescue Inc.
Wentworth Group of Concerned Scientists Foundation
Wettenhall Environment Trust
Wild Mob Trust
Wildlife Preservation Society of Queensland
World Wide Fund for Nature Australia (WWF)

Objectives

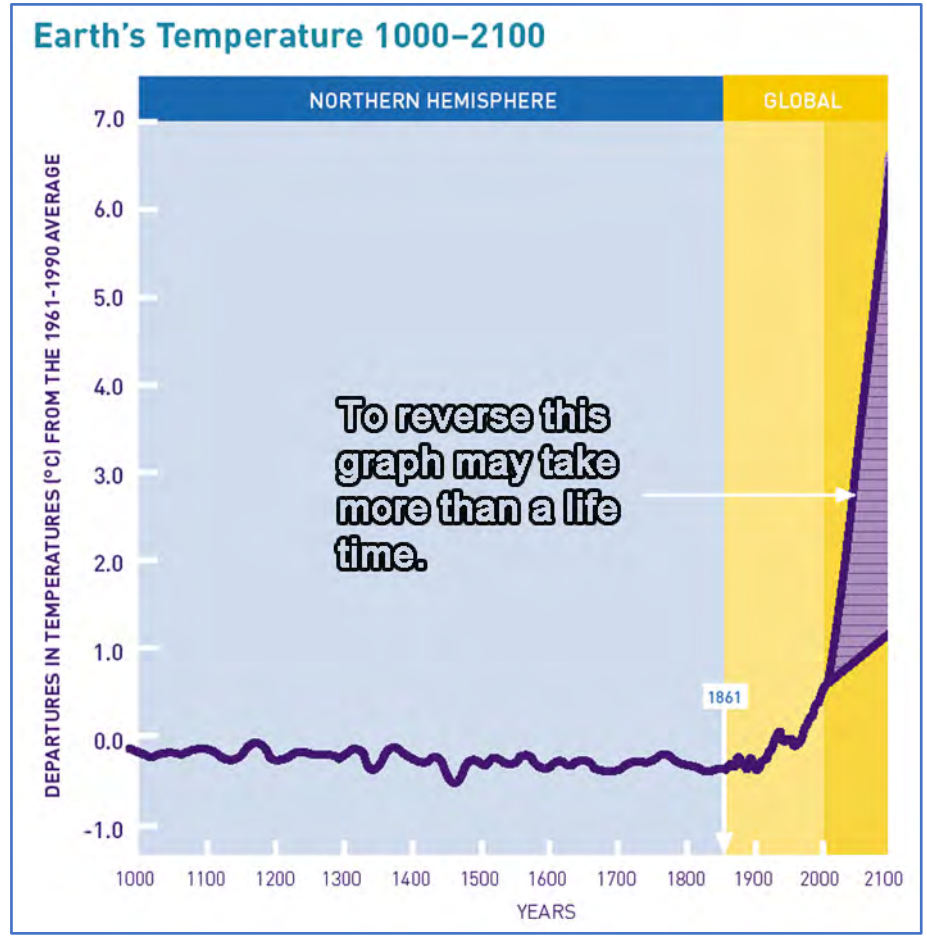
To use a table to compare the speed, diplomatic constrains, political influences and enforcement capabilities of local government non-government agencies as they attempt the restoration of a damaged ecosystem in the following case studies;

A. Fuel spill from a boat
B. Oil spill from a ship hitting a reef
C. Restoration of a local creek impacting water quality on an adjacent marine park
D. Australian Marine Conservation Society

Case study	Response criteria	Non-government	Government
	Speed		
	Diplomatic constraints		
	Political influences		
	Enforcement		

Note:

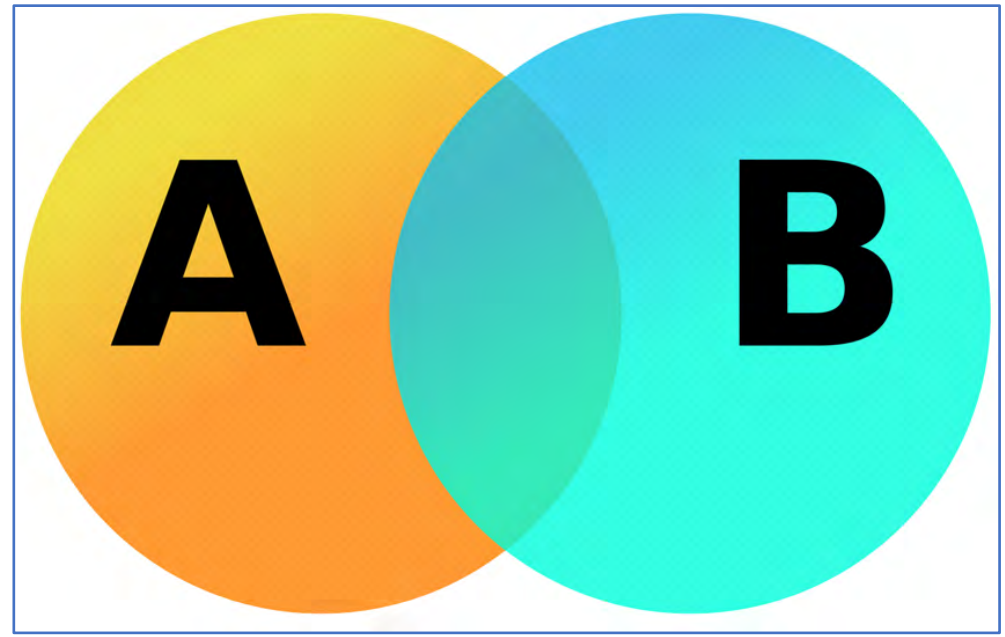
Time-frames for the roles government and non-government organisations play in the management and restoration of ecosystems can vary from hours, to days, to months to years and even to life times.



Note also:
Your teacher may use other methods of comparison, for example a Venn diagram .

This is a diagram that shows all possible logical relations between a finite collection of different sets.

Sets A (creatures with two legs) and B (creatures that can fly)



Case study A
Fuel spill from a boat

Operator looses control of the nozzle and fuel overflows into the air sea rescue marina.

A local fisheries patrol is passing and observes the incident. About 10 litres of fuel is spilled and no attempt is made to clean up the fuel. The marina is next to the local fishing fleet and fish habitat reserve

Construct and complete the table to compare the roles government and non-government organisations play in the management and restoration of local ecosystems.

Case study **Fuel spill from a boat**	Response criteria	Non-government	Government
Operator looses control of the nozzle and fuel overflows into the air sea rescue marina. **A local fisheries patrol is passing and observes the incident. About 10 litres of fuel is spilled and no attempt is made to clean up the fuel. The marina is next to the local fishing fleet and fish habitat reserve**	Speed	Quick – the local air sea rescue is out with fuel absorbent rags.	Fisheries patrol alerts local council officers to deploy pollution beams. Local council pollution action plan enacted.
	Diplomatic constraints	Operator is not interested in cleaning it up, becomes abusive and drives off. Action limited.	Fisheries gives chase apprehends suspect, needs to call police as operator appears to be under the influence of drugs or alcohol.
	Political influences	Limited apart from ability to take photographs and possibly shame on social media – this could be morally incorrect.	Government will have set regulations and have issued a BoatSafe licence which mandate knowledge of pollution laws. BoatSafe training providers may be audited.
	Enforcement	Limited, could undertake citizens arrest till water police arrive.	Operator delt with according to law. Could range from fine to arrest for illegal drug or alcohol use. See what happens when you spill some fuel!

Case study B
Oil spill from stricken ship

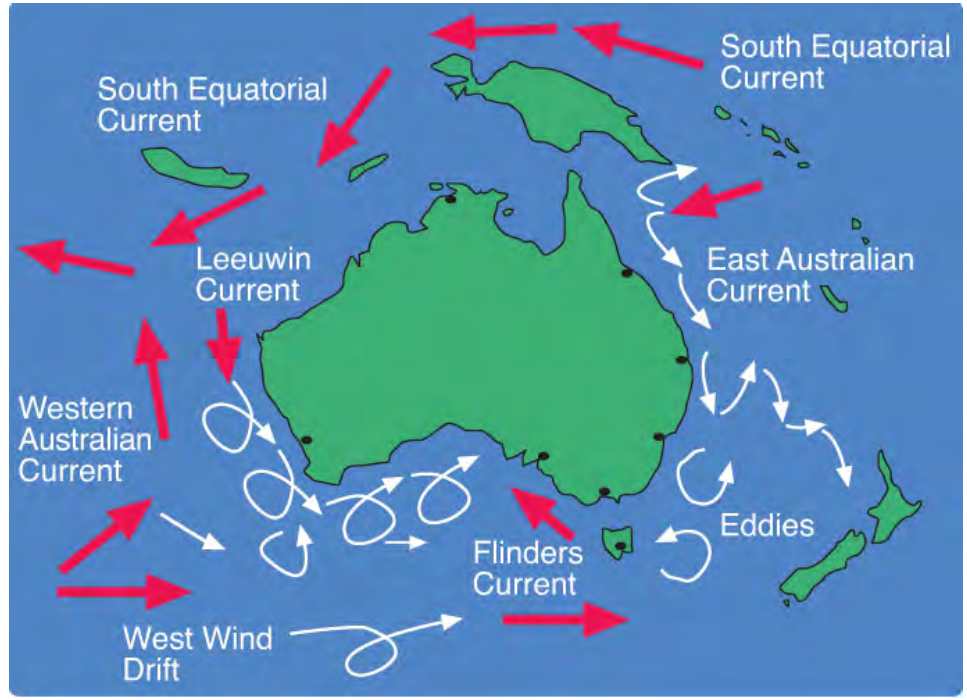
During a severe storm an oil carriers hull breaks off a large barrier reef. During the storm thousands of litres of oil pour out and the ship.

AMSA receives a mayday and the crew are rescued during the storm, but the stricken ship is drifting towards the reef.

Issues

However an oil spill can take many days or weeks to respond to depending on factors such as

- Proximity to land
- Weather conditions
- The availability of trained responders
- Winds and currents
- The type of oil or pollutants involved



Response times are even greater and cost more if an oil spill reaches a beach or bird colony.

Case study B Oil spill from ship that's hits a reef	Response criteria	Non-government	Government
During a severe storm an oil carriers hull breaks off a large barrier reef. During the storm thousands of litres of oil pour out and the ship. AMSA receives a mayday and the crew are rescued during the storm, but the stricken ship is drifting towards the reef.	Speed	If offshore – difficult to be involved as equipment and human resources untrained and unfunded. If oil makes shore – well equipped and able to be mobilized – seabird protection society could be lead agency.	Offshore – quick, resources are well equipped to deal with laying of containment booms, dispersants and if a vessel had hit a reef, tugs or ships could be dispatched to pull the ship off. If oil spreads to shore mobilise action plans.
	Diplomatic constraints	NGOs need to be coordinated by Government agencies	Australian Maritime Safety Authority - AMSA (Federal agency) would lead clean up operation. State environmental agencies (EPA'S) may coordinate local government. The constraint is how well the whole of government approach works.
	Political influences	Level of environmental activism can influence law making decisions. Proximity to elections would have an effect. Opposition parties would take political advantage of situation.	Legislation need to keep up with offences. AMSA seaworthiness of ship, compliance with marine orders from Canberra, shipping regulations, double hull compliance. The influence is to resource the research to restoring of the reef ecosystem. To continue to fund programs that enable reefs to be photographed and long term data sets obtained.
	Enforcement	Assist with monitoring of damaged reef, collection of research evidence on magnitude of disturbance.	Easy / difficult depending on legislation. Ship's master to face court. Legislation tested. Fines imposed on shipping companies. Clean up and restoration of reef monitored. The question becomes was the ecosystem restoration process completed to a satisfactory standard if in fact standards existed for that reef.

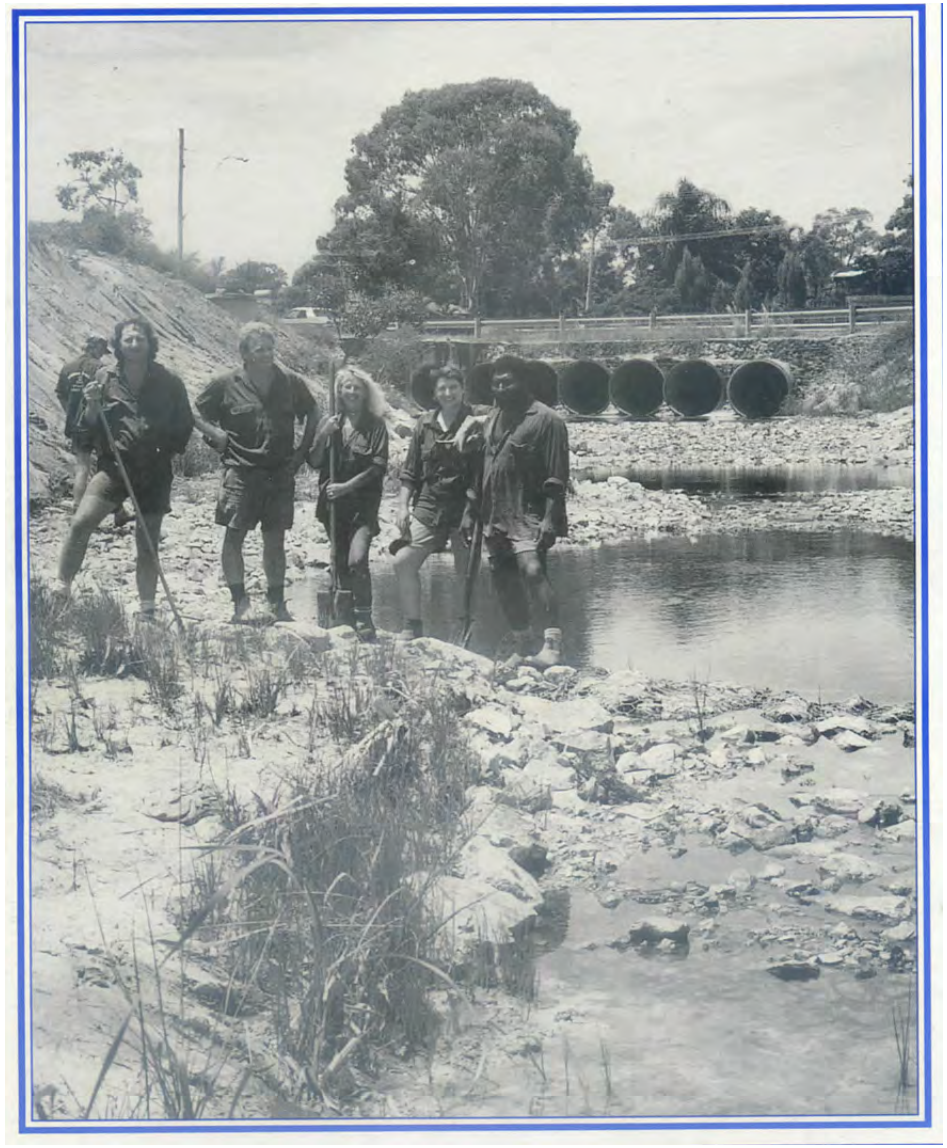
Case study C:
Restoration of a local creek impacting water quality on an adjacent marine park.

Compare the application and approval processes and the roles of government and non-government organisations in the management and restoration of a local creek and their relative abilities to respond (e.g. speed, diplomatic constraints, political influence, enforceability).

Restoration of a local creek to improve the water quality of a adjacent marine ecosystem.

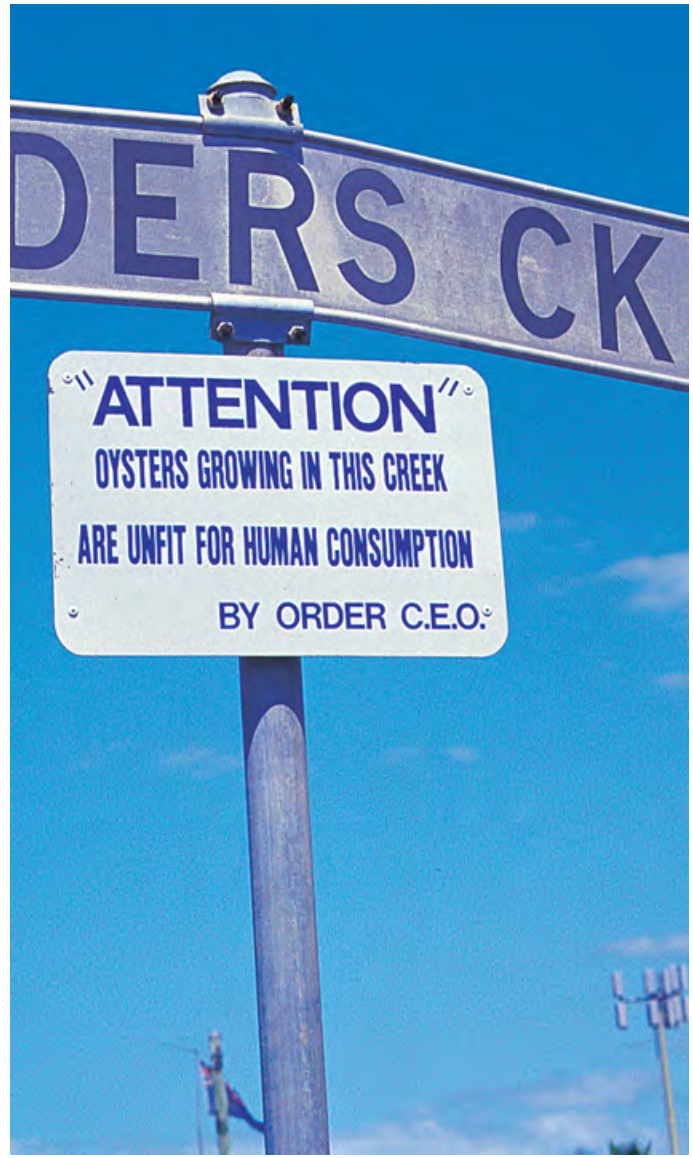
Government agency – Local city council.

Non-government agency – Local enviro-group.



Planting mangroves removed by previous generations is part of the restoration process.

Oysters in the creek can no longer be consumed and water quality in the national park is being degraded.



The project application involved riparian bank restoration and establishment of creek bed filter rubble.

As well as creek bank stabilization and water quality testing by an NGO.

Speed can be **slow** by non- governments organisations if grant applications are few and far between or get rejected time and time again.

Sometimes it takes a few years to get a grant and project up and going.

Planning – role comparisons

Application	Response criteria	Non-government	Government
A local environmental group has decided to apply for funding to restore riparian vegetation of a creek to improve the water quality of a local marine park	Speed	Can be slow as sourcing grant applications take time. Can be quick if polluted stormwater closes recreational swimming beach.	Can be slow if communities do not want change, or stakeholders low perspective of the need for any action at all. Can be quick if locals get sick because of polluted oysters in creek.
	Diplomatic constraints	Local businesses and enviro-groups can cause lack of action.	Downturn in economy can sometimes over rule environmental concerns. Makeup of environmental platform of councillors can influence decisions.
	Political influences	Level of environmental activism can influence decisions close to elections.	Environmental rallies can determine political outcomes. Candidates political platform can determine project decision.
	Enforcement	Very difficult.	Easy / difficult depending on legislation. No point source pollution difficult to plan to get prosecutions. Owners who don't pick up dog droppings can be fined.

Approval – role comparisons

Approval	Response criteria	Non-government	Government
Local and State governments consider the funding application application for the commencement of works approval	Speed	Can be slow as grant applications take time. Can be quick if private sponsorship can be found.	Can be slow as many approvals from many stakeholder groups are usually involved. Time to obtain quotations can slow things down and then it may all fall over if too expensive.
	Diplomatic constraints	Ability to form a lobby group or engage a professional lobbist. Inexperience in in lobbying or implementing the wrong diplomatic policy can rub decision makers up the wrong way. Failure to weave through the approval processes – workplace H&S, certification processes.	Competing priorities for other taxpayer funds. For example sporting groups, capital works and the thousands of other projects local government undertakes. The ability to work within other government agencies and comply with their approvals. Eg Some vegetation may have to cleared to make way for improved rubble drains – is this the habitat for a rare creek frog, so the need to work with State and Federal agencies to resolve an approval process. Then the re is the need to resolve cultural issues. Approvals usually will not be granted if cultural sites are to be disturbed.
	Political influences	Stakeholders will have a big say. Indigenous communities, commercial fishers, developers.	Proximity to local elections becomes relevant when approval declarations by councillors is made public. Elected representatives are then held accountable for their pre-election promises. Eg Candidate says - "If elected I will clean up the creek". Political advertising then comes into play.
	Enforcement	Very little influence.	Governments have constitutions, rules and minutes which are enforced by higher authorities. Eg: State governments can sack councils.

The there are the implementation and evaluation stages.

Government and NGO reps at creek restoration opening

Case study D:
AMCS – an NGO.

AMCS is Australia's only national charity dedicated solely to protecting our precious ocean wildlife.

Reference

Australian Marine Conservation Society

https://www.marineconservation.org.au

Australian Marine Conservation Society

AMCS advocate for real, evidence based solutions based on the best available science.

AMCS work closely with research centres worldwide and employ conservation experts to safeguard the future of Australia's oceans.

Anna Franke, Operations Coordinator, Australian Marine Conservation Society has kindly responded to the table syllabus objective in the next few slides.

Case study	Response criteria	Non-government	Government
	Speed		
	Diplomatic constraints		
	Political influences		
	Enforcement		

Speed [1]

"We can respond very quickly to arising issues, breaking news or changes in policy as we aren't bound by the same bureaucratic systems and processes as government agencies (for example on approvals processes for public positions).

We do work within our overall Strategic Plan and conservation priorities, but can respond quickly and flexibly within those bounds."[1]

[1] Anna Franke
Operations Coordinator
Australian Marine Conservation Society

Political influence/ diplomatic constraints [1]

"There are clear limits to how we work in relation to political influence (as stipulated by the Charities Act and policy of the Australian Charities and Not-for-profits and Commission) – so we cannot be political in the sense of supporting or promoting a political party or candidate. Whilst we are proudly independent and non-partisan, we can and do comment on the government policies and positions as those relate to conservation of the marine environment.

We work through scientific research, policy reform, community engagement and education to advance our mission of protecting Australia's oceans for the sake of current and future generations."

[1] Anna Franke
Operations Coordinator
Australian Marine Conservation Society

Political influence

Political influence, **enforceability** [1]

"Government sets legislation, makes policy and binding/enforceable environmental decisions, which is something that charities/***NGOs don't do, but do seek to influence***.

We seek to shape and influence government policy, investment and decisions."

[1] Anna Franke
Operations Coordinator
Australian Marine Conservation Society

Ask the Parties to Act

Send Email — Fisheries

9,655 emails of 10,000

Stop Killing Endangered Species in the Great Barrier Reef

Demand Action

Targeted Email — Fight For Our Reef

9,143 emails of 10,000

Tell your candidates: Stop Adani & Support Renewables!

Send My Email!

Petition — Plastic Pollution

Ban single-use plastics in Australia!

Act Now

The Australian Sustainable Seafood Guide is produced by AMCS is an example if influence.

Youtube video
by AustMarineConsSoc, available:

https://youtu.be/d30FE6aqZwk

Others could include

For example the restoration of a reef from crown of thorns outbreak, improvement of water quality on a reef by improved catchment practices (urban and rural)

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AIMS copyright reproduced with permission.

Perhaps the most challenging longer term - global reduction in greenhouse emissions to combat sea temperature rise and ocean acidification.

By Frank J. (Frank John) Aleksandrowicz, 1921-, Photographer (NARA record: 8452210) - U.S. National Archives and Records Administration, Public Domain, https://commons.wikimedia.org/w/index.php?curid=17100801

Additional reading

The following set of slides takes the topic further, but beware of time constraints as subject matter is very large.

The National Reserve System is Australia's network of protected areas, conserving examples of our natural landscapes and native plants and animals for future generations. Based on the CAR framework, it is the nation's natural safety net against our biggest environmental challenges.

Reference: https://www.environment.gov.au/land/nrs/getting-involved/government-agencies

Government roles

State and territory governments have primary responsibility for land management in Australia's federal system; building protected areas by declaring national parks in some of the country's most stunning landscapes.

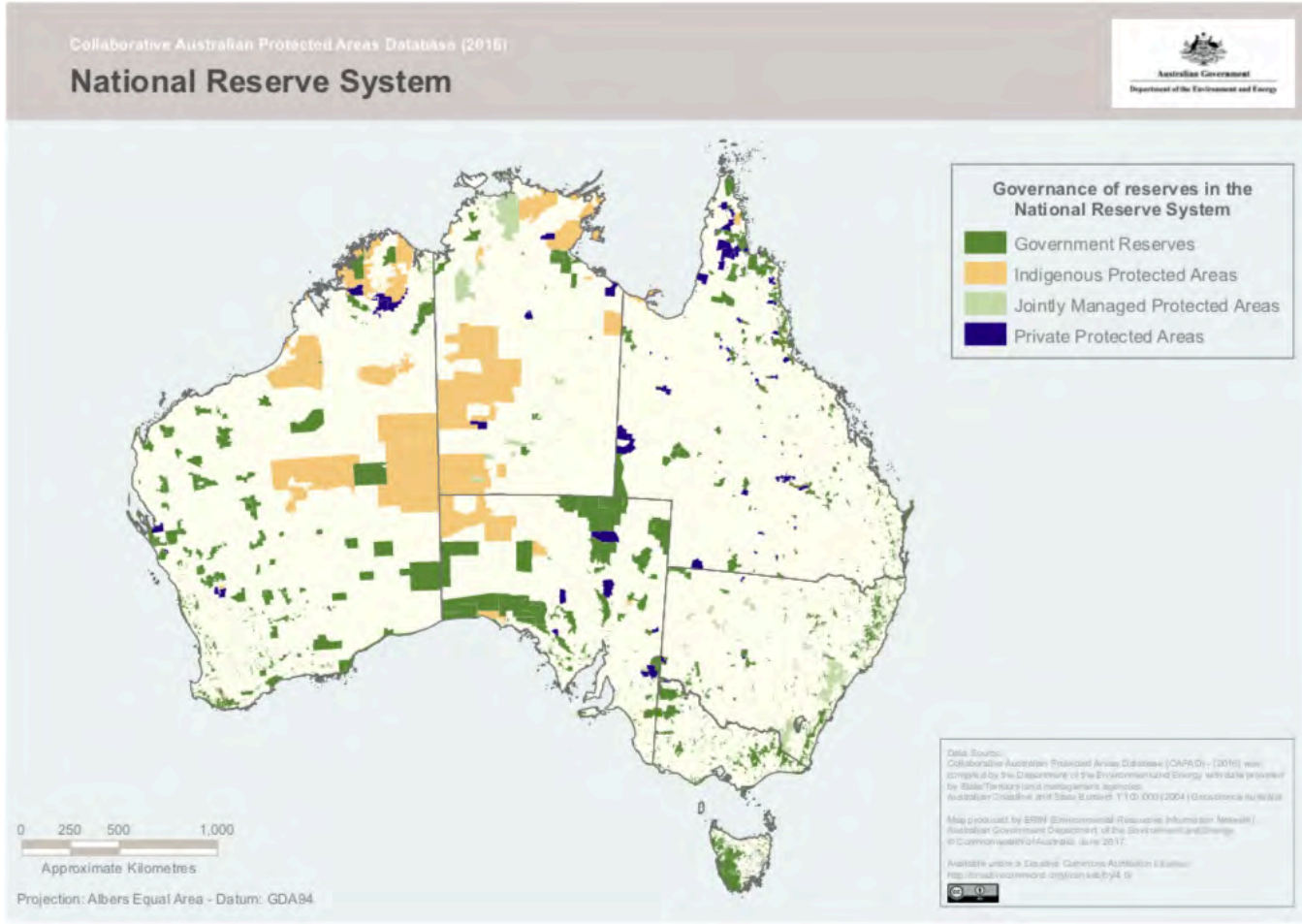
Local council governments manage a network of reserves and open spaces, which make up the National Reserve System (NRS)

655 hectares of rainforest bordering the Great Sandy national Park is part of the NRS

Image: Peter Taylor, © Commonwealth of Australia, CCBY

Reference: https://www.environment.gov.au/land/nrs/getting-involved/government-agencies

The reserve system includes more than 10,500 protected areas covering 19.63 per cent of the country - over 150 million hectares. It is made up of Commonwealth, state and territory reserves, Indigenous lands and protected areas run by non-profit conservation organisations.



Nearly 45 % of the protected area estate on mainland Australia is publicly owned and managed by the Australian government or state and territory governments.

Image: Map produced by ERIN (Environmental Resources Information Network), Australian Government Department of the Environment and Energy.

The National reserve system includes marine protected areas.

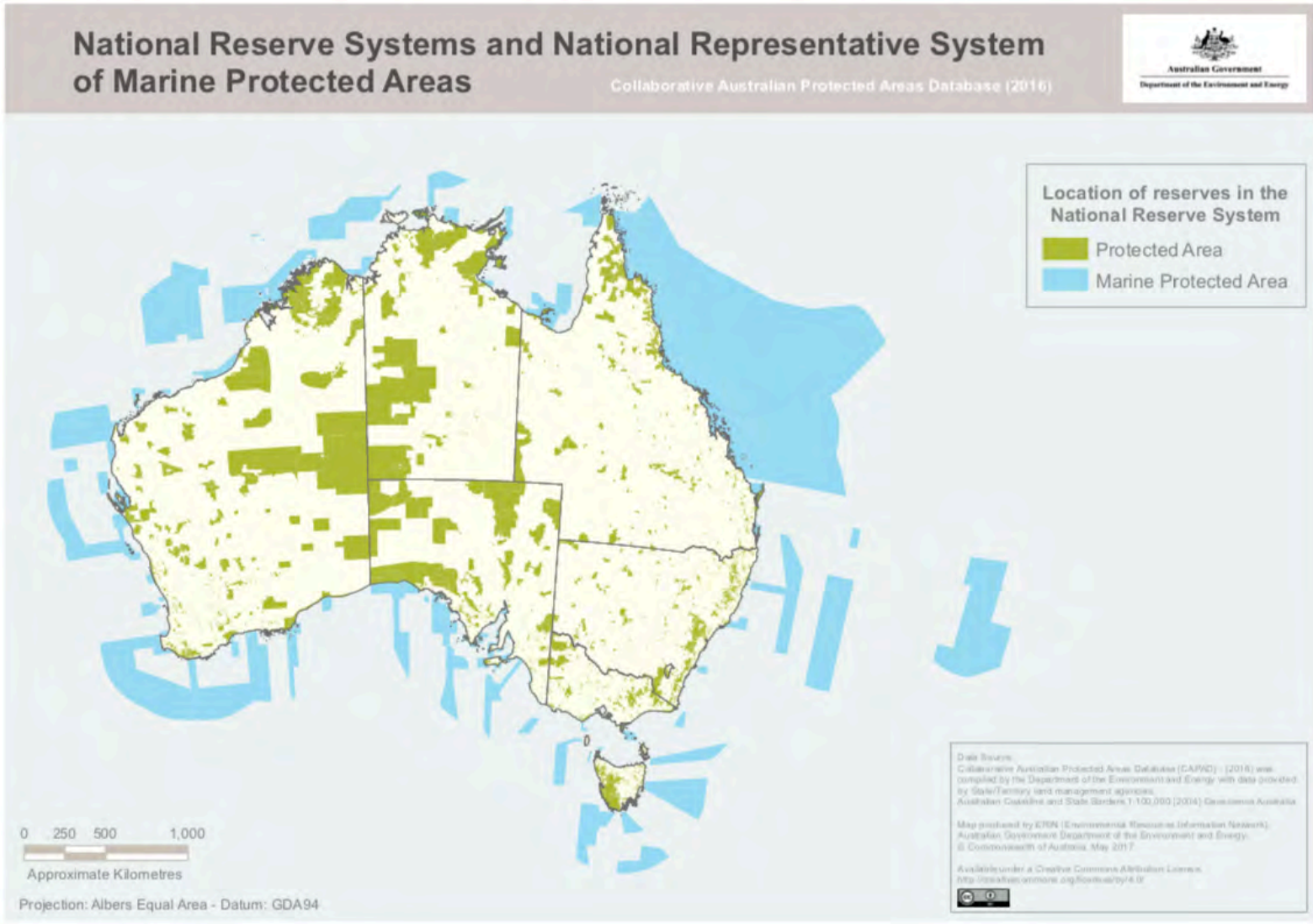


Image: Map produced by ERIN (Environmental Resources Information Network), Australian Government Department of the Environment and Energy.

Non-government

Non-government organisations are part of the National Reserve System, purchasing land, managing land, conducting research and running on-ground conservation programs. These organisations include Australian Wildlife Conservancy, Bush Heritage Australia, and Nature Conservancy.

Bush Heritage Australia manage Reedy Creek Reserve, near Agnes Water.

YouTube video by Bush Heritage Australia, available: https://youtu.be/R4T0O5NzY48

Here are some eNGOs involved with the Great Barrier Reef:

Australian Coral Reef Society Inc
Australian Marine Conservation Society
Australian Youth Climate Coalition
Australians for Animals
Citizens of the Great Barrier Reef Foundation
Friends of Beware Reef
Great Barrier Reef Foundation
Ocean Ark Alliance
Ocean N Environment Ltd
Reef Catchments (Mackay Whitsunday Isaac) Ltd
Reef Check Foundation Ltd
Reef Life Survey Foundation Inc
The Lizard Island Reef Research Foundation
Great Barrier Reef Research Expedition Inc
The Virginia Chadwick Memorial Foundation

Visit:
https://www.aegn.org.au/environmental-organisations/engos/
To learn more about these eNGOs

The Great Barrier Reef Foundation

The Great Barrier Reef Foundation is the lead charity dedicated to protecting the Great Barrier Reef through funding solutions grounded in science, technology, engineering and on-ground action to ensure its long-term conservation.

The GBRF lead the collaboration of business, science, government and philanthropy – groups who would not otherwise come together – for the benefit of the Reef.

YouTube video by Great Barrier Reef Foundation
Available: https://youtu.be/VP4YUotrbVI

Learn more about The Great Barrier Reef Foundation here:
https://www.barrierreef.org

Activity - The roles of an NGO

As part of her Masters thesis, Crosman categorised specific activities of eNGOs involved with marine conservation into **five** roles:

Role	Description	Sample activities
Advocate	Drawing attention to or cultivating concern about marine issues; rallying support for a marine conservation agenda	Lobbying government and industry Participating in cross-sector collaborations as the voice of the environment Lawsuits Direct action Some education and outreach
Expert	Providing scientific input into marine conservation and management; increasing organisational knowledge	Original scientific research Development of scientific conservation tools Providing solicited process or science expertise
Manager	Directly implementing marine or coastal conservation; engaging in hands-on conservation activities	Land or easement purchases Management or co-management of protected areas Service provision Habitat restoration
Watchdog	Enforcing marine conservation agreements; preventing or stopping illegal activities, or activities seen as incompatible with a conservation agenda	Monitoring compliance and publicising infractions Direct action, including direct interference with targeted activities Lawsuits
Enabler	Empowering others to manage or provide input into management of their own marine and coastal resources	Capacity building Funding provision Providing opportunities for stakeholder involvement in conservation activities Process facilitation Network creation

Crosman, K. (2013). *The Role of Non-Governmental Organizations in Marine Conservation* (Master of Science). University of Michigan.
Accessed: http://hdl.handle.net/2027.42/99557

Class activity– research an NGO from previous slide- and categorise their main role:

Role	Description	Sample activities
Advocate	Drawing attention to or cultivating concern about marine issues; rallying support for a marine conservation agenda	Lobbying government and industry Participating in cross-sector collaborations as the voice of the environment Lawsuits Direct action Some education and outreach
Expert	Providing scientific input into marine conservation and management; increasing organisational knowledge	Original scientific research Development of scientific conservation tools Providing solicited process or science expertise
Manager	Directly implementing marine or coastal conservation; engaging in hands-on conservation activities	Land or easement purchases Management or co-management of protected areas Service provision Habitat restoration
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Crosman, K. (2013). *The Role of Non-Governmental Organizations in Marine Conservation* (Master of Science). University of Michigan. Accessed: http://hdl.handle.net/2027.42/99557

Questions

Q1. What is the role of each of the following in the management and restoration of ecosystems?

a. Government organisations
b. Non-government organisations

Q2. Give two similarities and two differences in these roles.

Make sure you mention speed, diplomatic constraints, political influence, enforceability

Example answer – local creek restoration

Q1. Roles

a. the role of government is to budget for, fund, process and approve applications. If the work is done by external contractors, to make sure the works are certified and evaluated.
b. the role of a non-government is to lobby for the works, bring public attention to the need for water quality improvement, help supply research evidence, network labour forces, partipitate in the project and help with evaluation.

Syllabus requirements

Speed and diplomatic constraints

An NGO can work faster than government as they have no diplomatic constrains.

- The Government has to implement and pass legislation which takes more time.
- The shared need can take time until it becomes a real community issue eg the creek turns blue from paint pollution, oysters can no longer be eaten.
- Approval processes by government take time due to officers workloads.

Political influence

An NGO can seek to lobby for change through media and professional lobbyists.
Government creates policies and procedures which once enacted, remain in force until further governments change them.
The proximity to local elections can also influence local community politics.

Enforceability

NGO's have limited ability whereas government can fine polluters of the local creek.
NGO's can bring pollution to attention but have no enforcement capability.

Q2. Similarities and differences

a. Two similarities would be
The shared need for the restoration of the local ecosystem and the whole of community approach to the subsequent management process.

b. Two differences would be the NGO would be to (a) fund the works and (b) to get government environmental approvals.

Two differences the GO would be (a) make political statement in the press to raise community awareness and (b) to pay sub-contractors to provide earth moving equipment.

Q3. If an oil spill occurred on the Great Barrier Reef, government organisations (GOs) and non-government organisations (NGOs) would have different roles in supporting the reef's recovery.

- Identify two differences between the roles of GOs and NGOs in this scenario and the significance of each difference.

Suggested answer

The speed would be faster from an NGO compared to a GO. The faster response, the greater the likelihood of the recovery of the reef.

The final capacity for funding the reef rehabilitation would be limited by an NGO. The GO would have more funds to repair the reef.

Worksheet

Success v's Failure

by

Gail Riches

www.marineeducation.com.au