



WWF

FOCUS ON
MPAs

2015

MARINE PROTECTED AREAS

SMART INVESTMENTS
IN OCEAN HEALTH



WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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Front cover: Fish caught just outside a marine protected area (MPA) area in Tikina Wai, Fiji. The MPAs are a WWF project that started in 2000. The MPAs have helped fish populations to recover, providing food and livelihoods from selling fish that benefits families and the whole community.

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KEY MESSAGES



- A healthy, biodiverse and productive ocean benefits people by providing food, coastal protection, oxygen, carbon sequestration, and many other ecosystem goods and services as well as supporting livelihoods and jobs.



- Marine protected areas (MPAs) that effectively protect critical habitats, species and ecological functions are an essential tool for recovering, protecting and enhancing biodiversity, productivity and resilience, and for securing these benefits for current and future generations.



- New research commissioned by WWF found that global expansion of MPAs with effective protection of critical habitats would have significant benefits that outweigh the costs:



- Benefits exceed costs across a range of scenarios that targeted different criteria for MPA implementation to protect 10 or 30 per cent of marine and coastal areas.
- The economic rate of return in expanding networks of MPAs is as high as 24 per cent , and greater than the discount rate (3 per cent) in every scenario considered.
- In the most positive scenarios, the benefit-to-cost ratio of expanding MPAs is as high as 20:1, with net benefits over US\$900 billion accruing over the period 2015-2050. Under all scenarios, the benefits are more than triple the costs.



- There is a strong economic case for representative, ecologically coherent and well-managed networks of MPAs. These should be part of a broader framework that manages marine and coastal activities to minimize environmental impacts.



- It is in the interests of communities, governments, business, industry and financial institutions to increase investment in MPAs.

MPAs: INVESTING IN A SUSTAINABLE BLUE ECONOMY

Human lives depend on marine ecosystems that are healthy, resilient and productive. Marine protected areas (MPAs) are an essential tool in the recovery and protection of our ocean and the vital services it provides.

30%
**EXPANDING THE
COVERAGE OF
(MPAs) TO 30%
GLOBALLY IS
EXPECTED TO
GENERATE
SIGNIFICANT
ECONOMIC
BENEFITS THAT
OUTWEIGH
THE COSTS**

MPA networks, that are ecologically coherent and that protect 30 per cent of each habitat in our oceans are expected to contribute significantly to the recovery of marine biodiversity and a productive ocean (Roberts & Hawkins, 2000; Gell & Roberts, 2003; Halpern, 2003). This target has been recommended by the World Parks Congress (WPC 2014).

New research (Brander et al., 2015) shows there is also a strong economic case for protecting ocean assets through expanding MPAs globally. This and other analyses show MPAs can contribute to reducing poverty, building food security, creating employment and protecting coastal communities (Van Beukering et al., 2013; Ferrario et al., 2014; FAO, 2014; Brander et al., 2015).

The research by Brander et al. (2015) shows expanding the coverage of MPAs to 30 per cent globally is expected to generate major economic benefits that significantly outweigh the costs. This holds true under a range of scenarios for no-take MPAs to cover 10-30 per cent of marine and coastal areas with varying degrees of biodiversity and human pressures. The net benefits of increasing protection to 30 per cent range from the most conservative estimate of US\$490 billion and 150,000 full-time jobs in MPA management, to the most optimistic estimate of US\$920 billion and over 180,000 jobs by 2050. It is clear that MPAs provide a useful pathway to investing in sustainable blue economies.

We all have a responsibility to future generations to recover and protect our ocean to secure healthy and productive ecosystems in the long term. On the basis of economic benefits – in addition to ecological and ethical considerations – governments, multilateral agencies, civil society, communities and business need to upscale MPA coverage and support financial, legal and policy mechanisms for effective implementation of MPA networks.



DEFINITIONS

MPAs: Areas designated and effectively managed to protect marine ecosystems, processes, habitats and species, which can contribute to the restoration and replenishment of resources for social, economic and cultural enrichment.

Ecosystem services: The benefits that ecosystems provide to people.

Natural capital: The living and non-living components of ecosystems – other than people and what they manufacture – that contribute to the generation of goods and services of value for people.

Humpback whale (*Megaptera novaeangliae*); Queensland, Australia

MARINE BIODIVERSITY IS VITAL FOR LIFE SUPPORT

HUMAN LIFE
AND WELL-BEING
DEPEND ON
MARINE BIODIVERSITY,
WHICH IS NECESSARY
FOR FUNCTIONING
MARINE ECOSYSTEMS
AND THE GOODS
AND SERVICES
THEY PROVIDE



Marine biodiversity is the variety of life in the marine environment.

Human life and well-being depend on marine biodiversity. The health of marine biodiversity determines how well ecosystems function and in turn are able to provide goods and services. Coastal and open, high seas ecosystem goods and services include production of oxygen, production of fish and shellfish for harvesting, production of key components for the development of (new) medicine, nutrient recycling, decomposition of waste, coastal protection, carbon sequestration to mitigate climate

change, recreational opportunities and spiritual appreciation of the magnificence and diversity of the ocean (Beaumont et al., 2007; Böhnke-Henrichs et al., 2013).

Ecosystem resilience is dependent on adequate protection and rebuilding of biodiversity in the face of pressures such as overfishing. The ability of an ecosystem to withstand and bounce back from stress is particularly important for dealing with the impacts of climate change. The marine environment needs to adapt to changing conditions, both natural and induced by humans. A positive relationship between the health of biodiversity and the productivity and resilience of ecosystems is increasingly being recognized (Worm et al., 2006; Stachowicz et al., 2007; Cardinale et al., 2012).

Besides sustaining goods and services that benefit mankind, marine biodiversity has intrinsic value of its own; countless marine species and habitats have been part of this planet for millions of years.

MPA POLICY TARGETS

The **Convention on Biological Diversity (CBD) Aichi Target 11**, adopted in 2010 at the 10th Conference of the Parties in Nagoya, Japan, requires that: *“By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.”*

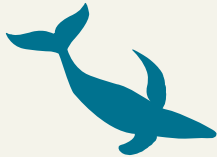
The **IUCN World Parks Congress 2014 Promise of Sydney**, supported by over 6,000 participants from 170 countries, recommended to: *“urgently increase the ocean area that is effectively and equitably managed in ecologically representative and well-connected systems of MPAs or other effective conservation measures by 2030; these should include strictly protected areas that amount to at least 30% of each marine habitat and address both biodiversity and ecosystem services.”*



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The proposed Tun Mustapha Park in Sabah, Malaysia would enhance the sustainable management of marine resources that could potentially benefit over 80,000 people.

41%
NO AREA IS
UNAFFECTED BY
HUMAN INFLUENCE
AND A LARGE
FRACTION
(ESTIMATED IN
ONE STUDY AS
41%) IS STRONGLY
AFFECTED
BY MULTIPLE
PRESSURES



OUR NATURAL CAPITAL UNDER THREAT

Studies show that our ocean and coasts face serious threats from overexploitation, pollution, sedimentation, ocean acidification and habitat destruction (Brander, 2007; Noone et al., 2014; Hoegh-Guldberg et al., 2015). As a result, the health of the marine environment is deteriorating and marine biodiversity loss increasingly impairs the ocean's capacity to provide ecosystem services and its ability to recover from perturbations (Worm et al., 2006). No area is unaffected by human influence and a large fraction (41 per cent) is strongly affected by multiple drivers (Halpern et al., 2008).

The Ecosystem Approach

The 'ecosystem approach' is central in WWF's vision for a healthy ocean. It is described as a comprehensive, integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity. This implies that human activities in ecosystems need to be managed in such a way that they do not compromise ecosystem components that contribute to the structural and functional integrity of the ecosystem. Marine protected areas are one essential element – among others – for the delivery of an ecosystem approach and providing the framework to implement those measures, necessary to conserve the most critical ecosystems.

MPAs PROTECT BIODIVERSITY AND YIELD VITAL BENEFITS

When designed and managed properly and when combined with complementary measures through an ecosystem approach, networks of MPAs form safe havens for marine flora and fauna. They protect and restore habitats and species, as well as restoring important ecological functions (such as spawning and nursery areas) and sustaining ecosystem goods and services.

MPA benefits are numerous and include the following:

Coastal protection: MPAs protect habitats that provide a buffer against the impacts of climate change and a level of insurance against natural disasters. Mangroves can mitigate the impacts of tropical

MPAs

CAN PROTECT
CRITICAL HABITATS,
INCLUDING
MIGRATION
CORRIDORS,
REFUGES AGAINST
PREDATORS,
SPAWNING
GROUNDS AND
NURSERY AREAS



storms, and coral reefs can prevent coastal erosion. Well-placed MPAs defend coastal property and infrastructure from impacts of natural disasters.

Species survival and reproduction: MPAs can protect critical habitats, including migration routes, places of refuge against predators, spawning grounds and nursery areas. In other words, they support the reproduction and survival of species, including many valuable fish stocks.

Fisheries benefits: Globally, MPAs have been shown to increase fish size, density, biomass as well as species richness (Lester et al. 2009). These increases are also seen beyond the boundaries of the protected area, through the so-called spillover effect. This spillover effect applies to larvae, juvenile and adult fish moving beyond MPA boundaries (Halpern, 2003; Lester et al., 2009; Harrison et al., 2012). The community composition outside the protected area becomes like that inside, essentially exporting recovery beyond the protected zone (Russ & Alcala, 2010). As such, MPAs are an important tool in stock replenishment, long-term food security and fishing-related livelihoods.

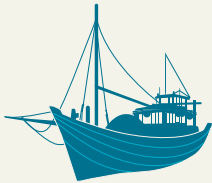
Carbon storage: Increasingly, coastal ecosystems are recognized for their important role in fighting climate change through carbon sequestration – and, conversely, their potential to become sources of carbon emissions when degraded (Crooks et al., 2011). Coastal vegetation – such as seagrass beds, mangroves and salt marshes – stores and sequesters carbon very effectively (Murray et al., 2011). The protection and restoration of coastal vegetation could provide coastal and island communities with important economic opportunities on the carbon offset market (Hastings et al., 2014).

Jobs and commerce: MPAs can support livelihoods for families and communities. They can also create jobs for managers and researchers (Balmford et al., 2004). MPAs are known to attract and sustain coastal tourism and recreation, supporting growth of employment and commerce associated with these sectors at the local, regional and national level.

Cultural value: Last, but by no means least, the ocean provides important cultural services – aesthetic, artistic, educational, recreational, scientific and spiritual values.

EXPANDING MPAs MAKES ECONOMIC SENSE

WE KNOW MPAs
PROTECT VITAL
ECOSYSTEM
FUNCTIONS, GOODS
AND SERVICES
THAT BENEFIT
PEOPLE AND
CREATE IMPORTANT
ECONOMIC
OPPORTUNITIES



Protecting ocean health is like opening a bank account. The account preserves the capital invested and generates interest that both society and individuals can benefit from.

The benefits of MPAs are wide ranging, as discussed above. Opportunities for private investment and new markets are emerging in areas such as trading in environmental goods and services, payment schemes for ecosystem services, sustainability-certified products and innovative insurance programmes.

We know MPAs can protect vital ecosystem functions, goods and services that benefit people and create important economic opportunities. But do MPAs make economic sense from a benefit/cost perspective?

WWF commissioned a study, led by experts in valuations of marine and coastal environments at the regional and global scales, to assess the net benefits of protecting marine habitats. The researchers developed scenarios for expanding MPAs globally and modelled the results. They concluded that the economic rate of return in expanding networks of MPAs is as high as 24 per cent. Benefits of expanding no-take MPAs significantly outweigh their costs, indicating that MPA expansion is economically advisable. This holds true for six exploratory scenarios in which the strictest form of MPAs (no-take zones) are expanded to cover 10 per cent of the ocean in areas of low biodiversity and low human impact; in areas of high biodiversity and low human impact; and in areas of high biodiversity and high human impact. These three scenarios are also examined for 30 per cent coverage, creating a total of six scenarios. In the most positive scenarios, the benefit-cost ratio of expanding MPAs is as high as 20 to 1, with net benefits over US\$900 billion accruing over the period 2015-2050. Under all scenarios, the benefits are more than triple the costs.

MAIN FINDINGS THE ECONOMIC CASE FOR EXPANDING MPAs

EXPANDING
MPAs - PRODUCES
ECONOMIC BENEFITS
THAT EXCEED
THE COSTS.
THE BENEFIT-COST
RATIOS RANGE
BETWEEN 3:1
AND 20:1.

The main findings of the report by Brander et al. (2015) are:

- The total ecosystem service benefits of achieving 10 per cent coverage of MPAs are estimated to be US\$622-923 billion¹ over the period from 2015 to 2050. For 30 per cent coverage, the benefits range from US\$719 billion to US\$1,145 billion¹ over the same period.
- The economic rates of return range between 9 per cent and 24 per cent. These high rates

of return indicate a strong economic case for investment in expanding global coverage of MPAs, in terms of net benefits from increased provision of important ecosystem goods and services.

- The estimated net benefit (once known costs are taken into account) from increased ecosystem goods and services ranges from US\$490 billion to US\$920 billion, across all scenarios.

Not all costs and benefits were included in the analysis due to data and knowledge limitations inherent to such analyses at global scales:

- The study likely vastly underestimated the true benefits of expanding MPAs, considering the expected positive impacts of MPAs on some less-studied ecosystems, including seamounts, seagrass and kelp forests, and ecosystem services such as ocean bioprospecting (the discovery and commercialization of new products based on living marine resources). Many marine biodiversity values were not included in the study due to a lack of data. Estimates of the 'existence value' (individuals may simply enjoy knowing that an ecosystem exists) of marine biodiversity in other studies are generally high (Börger et al., 2014; Jobstvogt et al., 2014). Similarly on the cost side, useful information was not available on the opportunity cost of other marine-related activities such as extractives.
- Due to data limitations, this study sums the effects of single no-take zones, rather than the effects of ecologically coherent, well-managed networks of MPAs (which may include no-take zones, as well as multiple-use zones, depending on conservation objectives and cultural and socio-economic considerations). An MPA network approach is likely to yield higher benefits than the sum of its parts (Grorud-Colvert et al., 2014).

1. The present value of costs and benefits were calculated over the period 2015-2050, using 2013 prices and a 3 per cent discount rate; a rate in line with similar global assessments (Hussain et al., 2011).

MARINE PROTECTED

SMART INVESTMENTS IN OCEAN HEALTH

THE STUDY

A NEW STUDY EXPLORES THE BENEFITS OF MARINE PROTECTED AREA (MPA) EXPANSION BASED ON 6 EXPLORATORY SCENARIOS AND EXAMINES WHETHER AN ECONOMIC CASE CAN BE MADE GLOBALLY FOR EXPANSION OF MPAs.

6 EXPLORATORY SCENARIOS

EXPANDING MPAs TO COVER :

10% & 30%

INTO AREAS OF:

- LOW BIODIVERSITY & LOW HUMAN IMPACT
- HIGH BIODIVERSITY & LOW HUMAN IMPACT
- HIGH BIODIVERSITY & HIGH HUMAN IMPACT

HABITATS

THE HABITATS INCLUDED IN THIS STUDY ARE LIMITED TO:



MANGROVES



CORAL REEFS



SEAGRASS



COASTAL WETLANDS

BENEFITS

THE BENEFITS OF ECOSYSTEMS ARE LIMITED TO INCLUDE:



COASTAL PROTECTION



FISHERIES



TOURISM



RECREATION

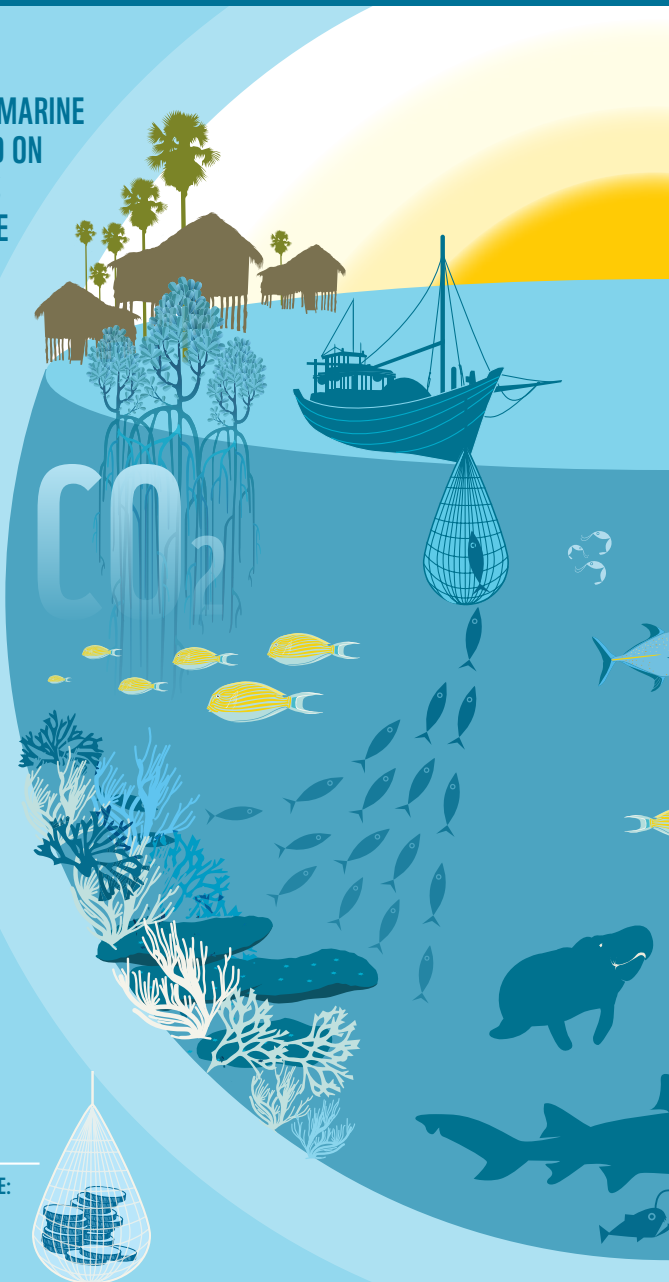


CARBON STORAGE

COSTS

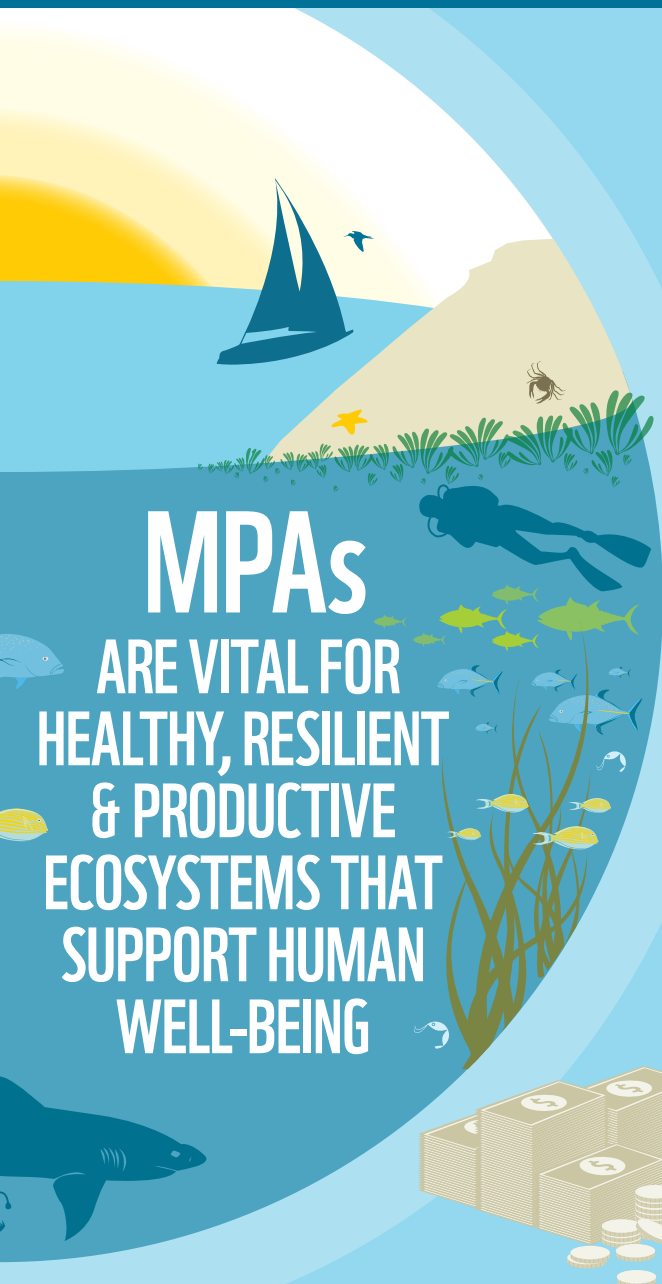
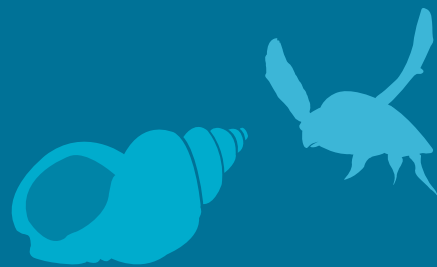
THE COSTS OF EXPANDING MPAs THAT WERE INCLUDED IN THE STUDY ARE:

SET UP COSTS + OPERATING COSTS + OPPORTUNITY COSTS TO FISHERIES



AREAS

MPAs ARE AN ESSENTIAL TOOL FOR THE RECOVERY AND PROTECTION OF OUR OCEAN AND THE VITAL SERVICES IT PROVIDES, BUT DO THEY MAKE ECONOMIC SENSE?



MPAs
ARE VITAL FOR
HEALTHY, RESILIENT
& PRODUCTIVE
ECOSYSTEMS THAT
SUPPORT HUMAN
WELL-BEING



THE RESULTS

THIS STUDY OF THE ECONOMIC IMPACT OF EXTENDING MPAs GLOBALLY SUGGESTS ECONOMIC BENEFITS OUTWEIGH THE COSTS

BENEFIT: COST RATIO

ACROSS ALL SIX SCENARIOS, BENEFITS OUTWEIGH THE COSTS RANGING BETWEEN

3:1 & 20:1

ECONOMIC BENEFITS

THE NET ECONOMIC BENEFIT OF EACH SCENARIO IS ESTIMATED TO BE IN THE RANGE OF USD 490-920 BILLION OVER THE PERIOD 2015-2050

THIS ADDS AN IMPORTANT REASON FOR GOVERNMENTS, BUSINESS, COMMUNITIES AND FINANCIAL INSTITUTIONS TO INCREASE INVESTMENT IN MPA IMPLEMENTATION

TOTAL NET BENEFITS

BENEFITS:

THE SCENARIO OF EXPANDING NO-TAKE MPAs BY

10%

US\$622-923
BILLION

THE SCENARIO OF EXPANDING NO-TAKE MPAs BY

30%

US\$791-1,145
BILLION

MINUS COSTS:

US\$45-47
BILLION

US\$223-228
BILLION

EQUALS TOTAL NET BENEFITS FROM 2015 TO 2050

US\$490-920 BILLION

NET IMPROVEMENT ACROSS THE SCENARIOS AS MEASURED BY THE BENEFITS MINUS THE COSTS

CASE STUDIES

GALAPAGOS ISLANDS: BALANCING GROWTH

The tourism industry is the most important sector of the Galapagos economy, and is growing rapidly. Tourists come to Galapagos to experience the extraordinary marine and terrestrial wildlife supported through protected areas. Visitors also place pressure on the same ecosystems that provide those unique attractions. Good management to keep tourism within the limits of the ecosystems has been shown to provide greater benefits overall than allowing unlimited growth of tourism.

PROTECTING THE ARCTIC PROVIDES LOCAL TO GLOBAL BENEFITS

With rapidly increasing shipping and extractive industries in the Arctic, critical benefits of MPAs will be felt locally, where nature is the basis of the very identity and culture of indigenous peoples and the livelihoods of Arctic residents. Protecting Arctic marine ecosystems through well-designed networks of MPAs will contribute to human well-being, food security and economic options far beyond the local, by safeguarding globally important Arctic fisheries, and increasing the resilience of key ecosystems and species in a warming climate.

VALUES OF BONAIRE MARINE PARK SECURE INVESTMENT IN CONSERVATION

Dutch citizens value nature in the Caribbean Netherlands even if they never visit and experience it directly. This existence value is part of a total economic value for nature in the Caribbean Netherlands. The understanding of this important economic contribution by nature has helped secure a US\$7.5 million investment by the Dutch Ministry of Economic Affairs in nature conservation.

THE SARGASSO SEA: PROTECTION OF HIGH SEAS BENEFITS PEOPLE

The Sargasso Sea lies in an area beyond national jurisdiction. Like many of the “high seas”, the Sargasso Sea yields important benefits for people that live far beyond its boundaries – such as habitat for whales and turtles that visit areas closer to shore where they support tourism, and spawning areas for eel later harvested in North America and Europe. Because the high seas are largely ungoverned, the benefits they provide are at severe risk.

THE HISTORY OF THE MEDITERRANEAN IS ONE OF PEOPLE AND THE SEA

The future of this remarkable region will be enhanced with increasing investment to support MPA expansion to reap the extensive dividends that its people and economies will gain in decades to come.

The references for these case studies can be found in Brander et al. (2015)





THE
MEDITERRANEAN
SEA



COASTAL
EAST AFRICA AND
MADAGASCAR



THE
CORAL
TRIANGLE



GREAT BARRIER
REEF



FIJI

COASTAL EAST AFRICA AND MADAGASCAR, WHERE MPAs ARE RESTORING FISH STOCKS

Local spawning grounds are increasingly protected in places like Mozambique where they are rebuilding fish populations that provide essential food and livelihoods to local people. Similarly, Madagascar is increasing MPAs in its waters.

PROTECTING THE CORAL TRIANGLE TO SECURE FOOD AND LIVELIHOODS

The Coral Triangle's natural wealth in fisheries and varied coastal and marine ecosystem services is estimated to be in the billions of dollars. It directly sustains more than 130 million people living along the coasts of this 6 million km² ocean expanse in the Asia-Pacific region. In 2007, the governments of the six countries in the Coral Triangle came together to

form a multilateral partnership to implement networks of MPAs (among other measures). These generate significant income, livelihoods and food security benefits for coastal communities, and help conserve the region's rich biological diversity.

EMPLOYMENT IN THE GREAT BARRIER REEF

Estimates of the added economic value of the Great Barrier Reef are as high as \$5.7 billion – primarily from tourism and supports 48,000 jobs through direct employment and another 21,000 jobs through employment indirectly generated. The large majority of these jobs are in tourism related activities.

LOCALLY MANAGED MARINE AREA NETWORK IN FIJI YIELDS COMMUNITY BENEFITS

Locally managed marine areas (areas of marine protection that are established and managed by local communities to provide benefits for local owners) have helped reduce poverty through improved fish catch, new jobs, stronger local governance, and benefits to health and women. A Fijian community leader observed that “the MPA is like a bank to the people: by conserving marine resources, people reap higher returns in the future.”

RECOMMENDATIONS

The body of evidence supporting the positive economic contribution of MPAs is growing. Ecologically

coherent, representative networks of well-managed marine protected areas positively contribute to ocean ecosystem health and resilience. MPAs can:

3.4%

TO DATE, JUST
3.4 PER CENT OF
THE WORLD'S
OCEAN IS
PROTECTED ON
PAPER



- Contribute critically to the recovery, protection and increased productivity of marine ecosystems and the resultant goods and services that are crucial for sustaining life on earth;
- Create economic opportunities and the essential foundation for a sustainable blue economy;
- Provide an ecological and economic insurance policy and safety net for the survival and well-being of future generations.

To date, just 3.4 per cent of the ocean is protected on paper (Thomas et al., 2014). However, many MPAs are not effectively implemented or managed. WWF recommends that government leaders, communities, leaders of business and industry, investors and development banks urgently support:

- Implementation of ecologically coherent representative networks of MPAs, that are effectively managed and that help ensure the strongest outcomes for biodiversity, food security and livelihoods.
- Delivery of the internationally agreed target for at least 10 per cent of coastal and marine areas to be conserved and effectively managed by 2020.
- Measurable commitment to implementation of networks of MPAs in coastal waters and in the high seas, to amount to 30 per cent coverage by 2030.
- The Sustainable Development Goals, with strong targets and indicators for the ocean, and commit to coherent policy, financing, trade and technology frameworks to restore and protect ocean ecosystems as part of the United Nations Post-2015 Agenda process. These actions will generate the resources, policy settings and leadership necessary for meaningful action, including to greatly expand networks of MPAs.

- Development of a strong and legally binding United Nations High Seas Implementing Agreement that will provide the much-needed legal framework and mechanism to properly manage human activity in the open ocean and effectively protect our high seas.
- Creation of financial mechanisms to facilitate and increase investment in protection and effective management of MPAs critical to food security, livelihoods and sustainable development.
- An integrated approach to ocean management including the recommended expansion of ecologically coherent networks of MPAs as an essential component together with action on climate change, overfishing and other priorities as described in WWF's Reviving the Ocean Economy report: ocean.panda.org

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Our ocean in numbers

100%
RECYCLED



<4%

To date approximately only 3.4% of the ocean is protected on paper in MPAs but many are not effectively managed

3:1

Benefits of expanding marine protected areas to cover 30% of the ocean outweigh the costs at least 3 to 1



US\$920 BILLION

The net improvement in economic benefits over the period 2015–2050 from expansion of MPAs to 30%

30%

WWF recommends to increase investment and implementation in MPAs in coastal waters and the high seas to amount to 30% coverage by 2030



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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SUSTAIN OUR SEAS 