

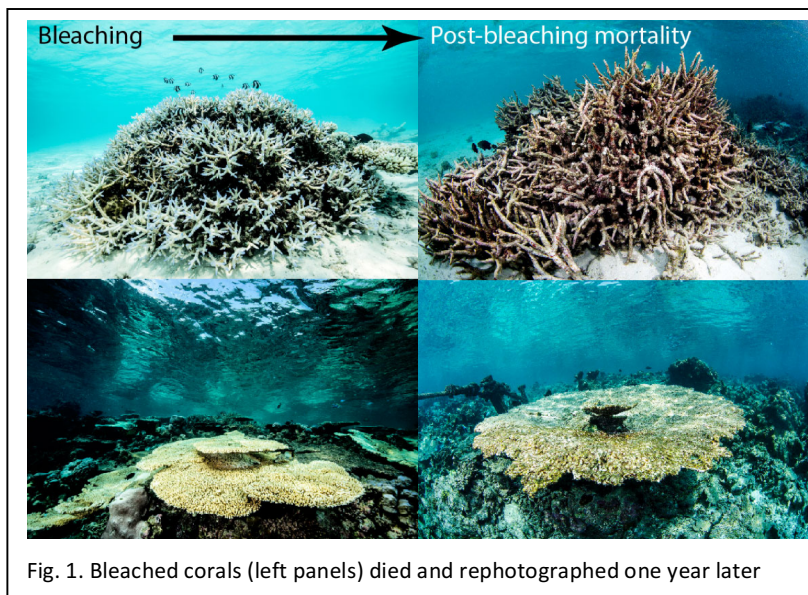
Research Agenda for the Sulu-Sulawesi Marine Ecoregion

A Proposed Project to the GEF 2018/19

Background

The Coral Triangle Initiative on Coral Reefs Fisheries and Food (CTI-CFF) was established a decade ago to coordinate coral reef management among six countries that share adjacent borders and many similar challenges: Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor Leste. Many of these countries share fisheries resources that traverse international borders meaning that their management would benefit from a coordinated transboundary approach. Progress on transboundary resources management has been greatest in the first recognised seascape of the CTI-CFF – the Sulu-Sulawesi Marine Ecoregion (SSME) – that extends from the Indonesian island of Sulawesi in the south, to Borneo (Indonesia and Malaysia), and Palawan, Philippines in the north. To date, transboundary resources management has focused on turtle conservation. Extending transboundary cooperation to other resources – including coral reef fisheries – has been identified as a priority for the CTI-CFF.

People of the Coral Triangle exhibit a high dependence on coral reef fisheries for their food and livelihood (Allison et al. 2009). The productivity of reef fisheries is heavily influenced by fishing pressure and reef habitat quality. While much effort is devoted to reducing overfishing, there is relatively little guidance on how to manage reef habitat quality. Yet, recent studies find that a loss of coral habitat structure can reduce fisheries productivity to between a half or third of that in healthy habitats (Rogers et al. 2014, Ainsworth and Mumby 2015). Climate change, which causes coral bleaching, is the single greatest impact on the quality of reef habitats (Wilkinson 1998). Thus, minimising the effects of climate change on coral reefs is a practical step towards protecting future food security and livelihoods.



Since managers are unable to stop bleaching, their actions must focus on enhancing reef recovery. A recent study identified what we call 'keystone reefs' that play an exceptionally important role in driving ecosystem repair (Hock et al. 2017). These reefs are more likely to survive bleaching and are positioned to replenish many vulnerable reefs with new corals. They do this on account of their upstream location such that coastal currents carry the fertilized eggs of coral to many

other reefs. Steps to protect such reefs can form a part of a strategy to build resilience of reefs to climate change.

Many keystone reefs will be distributed across national borders. Moreover, because the SSME region is monsoonal with wind direction reversing seasonally, many reef fish populations are strongly connected across national borders. The management of such biodiversity and fisheries

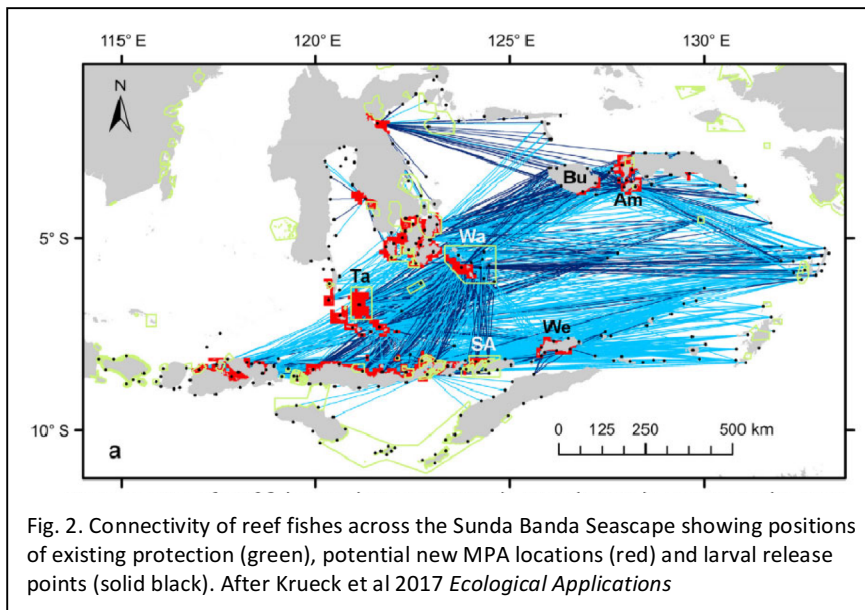


Fig. 2. Connectivity of reef fishes across the Sunda Banda Seascape showing positions of existing protection (green), potential new MPA locations (red) and larval release points (solid black). After Krueck et al 2017 *Ecological Applications*

resources would benefit strongly from a coordinated approach throughout the SSME. In practice this means identifying and then protecting networks of keystone reefs across national boundaries. In other words, the acceleration of coral bleaching events in recent years has renewed the urgency of adopting a transboundary approach to the management of coral reef habitats and

their associated fisheries.

The identification of keystone reefs that are either or both (i) climate resilient, and (ii) important sources of reef fish larvae is a practical step to sustaining tourism and rebuilding overexploited fisheries. Marine Protected Areas (MPAs) are the major form of fisheries and tourism management in the region. MPAs work by exporting adult and larval fishes that can help rebuild overexploited areas (Gill et al. 2017, Krueck et al. 2017b). Importantly, new developments in algorithms and connectivity data are helping managers design reserves specifically to benefit fishers in the region (Krueck et al. 2017a).

Ultimately, the benefits of identifying keystone reefs of the CT are to help protect biodiversity and support reef fisheries. However, like corals, fisheries resources are shared across many jurisdictions of the CT (Treml and Halpin 2012, Beger et al. 2015). It would be valuable to refine the selection of keystone reefs – that help rejuvenate seascape habitat quality – so that the support they provide to fisheries was maximised at both national and regional scales. Such actions are core to the very concept of the CTI, embracing **MPAs, seascapes, and climate adaptation** and these approaches present a feasible and practical means of achieving meaningful transboundary resources management.

In light of these considerations, the Australian Government funded a workshop to draw together scientists, managers, and conservation practitioners to discuss the needs and feasibility of developing a transboundary management strategy for coral reefs and their fisheries within the Sulu-Sulawesi Marine Ecoregion (SSME). Specifically, the intent was to develop a collaborative proposal, shared by all, that can be used to support a new activity under the CTI-CFF. The workshop was organised principally by the University of Queensland, CTI-CFF Secretariat, James Cook University, and Hasanuddin University. It was held at the CTI Regional Secretariat in Manado on the 7-9th of May 2018. 37 delegates attended drawn from all three countries, and representing government practitioners at local, regional, and national levels, CTI National Country Coordinators, conservation NGOs, local academic institutions, DfAT, and the CTI secretariat.

Achieving transboundary resource management is always challenging. However, participants of the workshop identified four strategic reasons why its prospects are unusually high in the SSME.

1) There now exists **an appropriate governance mechanism** for transboundary decision-making among the three countries involved. Historically, a bilateral MoU between the Philippines and Malaysia was created to manage the Turtle Islands National Park. This was then extended into a trilateral MoU (with Indonesia) ratified in 2006 and extending to 2016. This agreement was not renewed on its expiry because it was recognised that the 2009 CTI Collaborative Agreement and Regional Plan of Action (ROPA) had superseded former agreements. The CTI is therefore the mechanism by which countries can collaborate in a transboundary capacity.

2) Each of the three countries (Philippines, Malaysia, Indonesia) have **national requirements to extend their marine protection** in order to meet UN Aichi Target 11 and/or national targets. It therefore makes sense that MPA expansion is guided by the needs for climate change adaptation and transboundary resource management. Specifically, the Philippines is engaged in zoning their network of protected areas in Palawan so has the potential to modify zoning to accommodate transboundary issues (11 municipalities require zoning). It was also pointed out that some of the source areas upstream of the SSME (e.g., islands of the South China Sea) do not yet have adequate protection and there are on-going discussions to address this. Malaysia has marine parks in Sabah but only 6% protection nationally so falls short of the UN Aichi Target, which should be achieved by 2020. The search for new MPAs will include Sabah (part of the SSME). Moreover, while Sabah has some well-established marine parks, Malaysia would like to identify subregions for special protection or management such that climate resilience and fisheries benefits are considered explicitly. Indonesia has completed 3 provincial marine spatial plans for the southern reaches of the SSME (North Kalimantan, North Sulawesi, and Central Sulawesi), while the other 2 provinces (Gorontalo and East Kalimantan) are in the development process. Indonesia is also formulating a marine spatial plan for Sulawesi Sea, covering the internal waters, territorial sea, contiguous zone, Exclusive Economic Zone, and continental shelf. However, additional zoning for additional MPAs is on-going particularly in areas north of Manado where the Wildlife Conservation Society are active. Moreover, while Indonesia is at an advanced stage of declaring their 20 Mha of coastal protection by 2020, they plan to extend this to 30 Mha by 2030. A new project in the SSME would help shape this extension of coastal protection. The head of regional management for Sulawesi also pointed out the importance of ensuring that core zones are located in the most appropriate areas so that management is efficient. He also reinforced the need to provide guidance on evaluation of the fisheries benefits of MPAs.

3) A new seascape MPA project in the SSME **aligns well with existing CTI-CFF programmes** including Seascapes, MPAs, climate change adaptation (CCA), and the University Partnerships Programme (UPP). At the 2013 Senior Officials Meeting of the CTI-CFF, a decision to pursue transboundary resources management was endorsed by the parties. The CCA programme is actively examining vulnerability assessments of coastal areas, building on the advances made in the Philippines for coastal protection. Vulnerability analyses could be extended to consider the wider impacts on marine resources including climate change as well as the relative importance of reefs from a fisheries and ecosystem resilience perspective. The MPA programme is currently working with the seascapes programme to develop a regional network of MPAs for turtles in the SSME. This could help support a regional network for reef fisheries and coral reef resilience, though would likely need additional protection. Otherwise there has been little progress in achieving transboundary management of fisheries resources or coral reefs. An approach to evaluate the fisheries benefits of MPAs, including those providing potential networks across boundaries, would be highly desirable. An SSME project would operationalise the UPP network.

4) The existence of the UPP means that a **technical network exists** to provide the science and data in support of a transboundary resource management initiative.

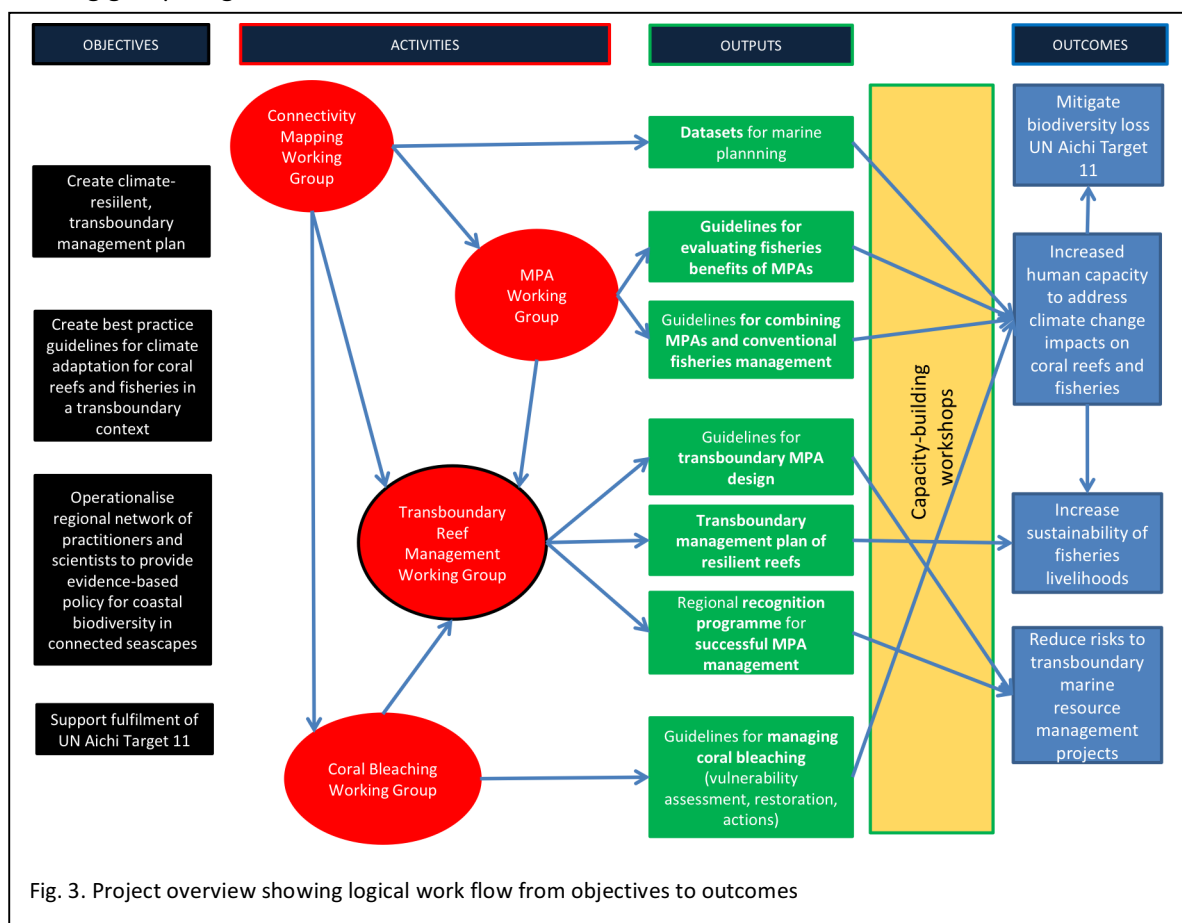
Here we describe the research plan to develop a network of keystone reefs and associated management guidelines.

Objectives

1. Create a climate-resilient, transboundary management plan for coral reefs and associated small-scale fisheries. This will complement and utilise existing management and supplement where needed
2. Create and adopt regional guidelines of best practice for climate adaptation for coral reefs and fisheries in a transboundary context. Share with other transboundary seascape projects
3. Operationalise a regional network of practitioners and scientists to provide evidence-based policy for coastal biodiversity in connected seascapes
4. Support the fulfilment of the UN Aichi Target 11 for the tri-national network

Approach

Implementation of the project requires five principal activities, which are divided into four technical working groups and project coordination. This project structure is modelled, in part, on the CTI-CFF organisation and will link with technical working groups. A project plan provides the logical flow from objectives to activities to outputs and outcomes (Fig. 3). The potential composition of technical working groups is given in Table 1.



Technical Working Groups

1) Connectivity Working Group (CWG)

The fundamental rationale for a transboundary approach to resource management in the SSME is the existence of coral and fisheries connectivity across national jurisdictions (Trembl and Halpin 2012). Connections are complicated because of the region's monsoonal weather, which periodically reverses the flow of surface currents. Therefore, connections can exist in a variety of directions depending on the time of year that an animal spawns.

The CWG will utilise models of oceanography and particle tracking to map connections of key coral and fisheries species around the SSME. This will result in datasets that support the identification of keystone reefs and planning for transboundary benefits of MPAs. Working with other WGs they will identify keystone reefs that have the potential to replenish corals damaged from coral bleaching.

2) MPA Working Group (MPAWG)

The MPAWG will contain a mix of practitioners and scientists and its mandate is to develop guidelines on how to maximise and evaluate the fisheries benefits of MPAs in the region. This is strategically important in identifying MPA locations that offer the greatest national and transboundary benefits to fishers. That way, steps to reach the UN Aichi Target 11 (10% coastal protection) will be designed to maximise food security benefits. Moreover, a sound means of evaluation the fisheries benefits of MPAs will strengthen their legitimacy and help governments monitor MPA function and take corrective action where functions are lacking. Working with the CWG, the MPA-WG will identify reefs with the greatest ability to support fisheries replenishment.

3) Coral Bleaching Working Group (BWG)

Coral bleaching presents a number of challenges for reef managers ranging from obtaining early warnings, choosing appropriate action during bleaching, and how to direct resources to help reefs recover after bleaching. An important set of guidelines were prepared 12 years ago (Marshall and Schuttenberg 2006) but these need updating to cover strategies for stimulating reef recovery including the keystone reefs concept and greater emphasis being placed on restoration. The BWG will develop a new set of guidelines and evaluate appropriate options for managing tourism activities during bleaching events. For example, is it best to close reefs that are experiencing bleaching when this might intensify pressure on healthier reefs? Should 'sacrificial areas' be identified to absorb tourism pressure? Which restoration techniques are desirable in a bleaching context?

4) Transboundary Reef Management Working Group (TWG)

The Transboundary Reef Management WG will receive inputs from the three technical WGs described above. The TWG is charged with making transboundary recommendations on networks of MPAs that achieve climate resilient fisheries and tourism benefits in the SSME. Recommendations are not confined to the expansion of MPAs because other management measures are likely to be recommended at strategic locations, such as increased enforcement, bleaching response plans, and responsible reef restoration.

The TWG comprises practitioners from all three countries and at both provincial and national scales of authority. With support from the technical WGs, members of the TWG will evaluate opportunities to improve biodiversity and fisheries outcomes within their jurisdictions by taking a coordinated transboundary approach. Examples will include identifying strategic new MPA locations that complement existing MPAs and build greater climate resilience to the system and improved fisheries productivity.

In practice, practitioners of the TWG will undertake an iterative process by which they explore a variety of transboundary options and then return to their local jurisdictions to discuss these with local government bodies that have planning authority over inshore coral reefs. For example, the Palawan Council for Sustainable Development (PCSD) has a regional perspective in the Philippines and can discuss strategic options for MPA designation with appropriate Municipal governments

throughout Palawan that have jurisdiction over shallow reefs within 15 km of the coast. Feedback is then reported back to the TWG as part of a national governmental delegation. In this way, the project will make informed recommendations to the NCCs of each country regarding a national set of priority reefs and actions that achieve better national outcomes for biodiversity and food security having taken a transboundary analysis.

Table 1. Project activities and likely participants. Government agencies listed first then remaining participants (alphabetical) (draft only)

Activity	Anticipated Contributors / Members
Connectivity Working Group (CWG)	Mabel Matsumoto, UMS Ejria Saleh, UMS Eric Trembl, Deakin University Cesar Villanoy, UPMSI Aletta Yñiguez, UPMSI
MPA Working Group (MPAWG)	Bureau of Fisheries & Aquatic Resources MMAF KKP / CTI-CFF MPA Working Group Sabah Parks CTI-CFF Ecosystem-Approach to Fisheries Technical Working Group Chair Estra Divari, WWF-ID Naomi Gardiner, JCU Grevo Gurung, University Sam Ratulangi Jamaluddin Jompa, UnHas Peter Mumby, University of Queensland Shinta Pardede, WCS Rukisah Saleh, University of Borneo Imam Syuhada, CTC
Transboundary Reef Management Working Group (TWG)	Chairs of CWG, MPA-WG, BWG and other members as needed DENR Biodiversity Management Bureau Marine Parks Malaysia MMAF BPSPL, Makassar MMAF Marine Planning Directorate, CTI-CFF Seascapes Chair MMAF North Sulawesi Palawan Council for Sustainable Development Sabah Parks Evangeline Miclat, CI-Philippines
Coral Bleaching Working Group (BWG)	MMAF Coastal Disaster Mitigation Muhammad Lukman, UnHas Peter Mumby, UQ Miledel Quibilan, UPMSI Ejria Saleh, UMS Monique Sumampouw, WWF-Malaysia Andreas Roeroe, Un Sam Ratuangi
Project Board	NCC Indonesia NCC Malaysia NCC Philippines DENR Representative MMAF Representative Sabah Parks Representative Deputy Executive Director, CTI-CFF Project Chief Scientist Implementing Agency Representative (CI) Executing Agency Representative (UQ) Independent Chair

Project Management

A project management unit (PMU) will be established at the Executing Agency (EA) headquarters. The PMU's responsibilities include coordination among technical WGs, budgetary oversight, reporting to the Implementing Agency (IA), sub-contracting and procurement, and communications.

The PMU will also sub-contract a national coordinating body to support on-the-ground activities in each jurisdiction.

Oversight of the project's progress and direction will be carried out by a Board with an independent chair and high-level representation of CTI-CFF Regional Secretariat, National Country Coordinators of the CTI-CFF, IA and EAs, the Chief Scientist, and each country's national government body with responsibility for implementing the UN Aichi Target 11.

Contributions of project to national and international policies

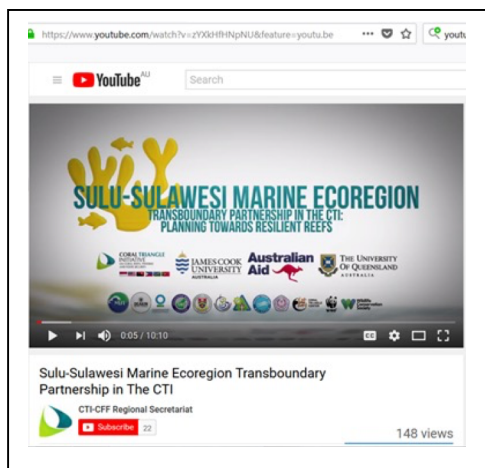
Country	Policy	Contribution of Project
Indonesia	UN Aichi Target 11	Guide the expansion of protected areas to include climate resilience and fisheries productivity across the wider – transboundary - ecosystem
		Marine spatial planning at province levels including zoning
Malaysia	UN Aichi Target 11	Guide the expansion of protected areas to include climate resilience and fisheries productivity across the wider – transboundary - ecosystem
Philippines	UN Aichi Target 11	Guide the expansion of protected areas to include climate resilience and fisheries productivity across the wider – transboundary - ecosystem

Next steps and timeline

In short, we intend to submit a request for a Project Preparation Grant (PPG) from the GEF at their Council meeting in the first half of 2019. The PPG will likely request \$150k over 8-12 months to develop the full proposal. Funds expended in this phase are removed from the total request. It is expected that a PPG would be needed to identify specific sites for activities, identify and cement the roles for all partners, and acquire full sets of endorsements, although GEF focal point and NCC endorsements would be required before we even progress to the PPG.

Activity	Date
Circulate draft research plan to meeting participants for comment	Sep-18
Request CTI-CFF RS disseminate to NCCs, and Seascope and MPA Technical Working Groups for endorsement and comments	Oct-18
Request NCCs forward draft to GEF Focal Points	Oct-18
Request CTI-CFF RS add project to preSOM agenda	Oct-18
Incorporate feedback from CTI-CFF Technical WGs and NCCs	Nov-18
Possibly discuss proposal with Malaysian and Sabah governments	Nov 18
Discuss project with NCCs at preSOM, request estimates of co-financing	Dec-18
Generate Project Identification Form (PIF) and discuss with CI GEF office	Jan-19

Submit PIF to GEF for comment	Jan-19
Submit PIF to CI for submission to next GEF Board Meeting	Feb-19
Decision from GEF Board (estimated)	Jun-19
Start of Project Preparation Grant (PPG), \$150k for 8 months	Aug-19
Submit full project proposal to GEF (estimated)	Jul-20
Project start	Dec-20
Project end	Dec-25



Communications plan

Firstly it is important that people reviewing this proposal understand the inclusive process by which the project was created. In so doing it is useful to direct them to the workshop video.

<https://youtu.be/zYXkHfHNpNU>

In the interim, communication among project participants will take place by email. There are, however, several opportunities for more detailed conversations. Indonesia hosts its 'Our Ocean' conference on the 29/30 October and several of us will be attending (MMAF KKP has organised a side event on MPAs). The preSOM and SOM will take place

in Manila from the 9-15th of December. It is important that the project is added to the preSOM agenda so that it can be discussed (and hopefully endorsed) by the technical working groups.

Indicative budget

It is estimated that an appropriate budget is US\$7m. The request would be made to the International Waters portfolio of GEF. The budget would be spent in all three countries.

References

- Ainsworth, C. H., and P. J. Mumby. 2015. Coral–algal phase shifts alter fish communities and reduce fisheries production. *Global Change Biology* **21**:165-172.
- Allison, E. H., A. L. Perry, M.-C. Badjeck, W. N. Adger, K. Brown, D. Conway, A. S. Halls, G. M. Pilling, J. D. Reynolds, N. L. Andrew, and N. K. Dulvy. 2009. Vulnerability of national economies to the impacts of climate change on fisheries. *Fish and Fisheries* **10**:173-196.
- Beger, M., J. McGowan, E. A. Treml, A. L. Green, A. T. White, N. H. Wolff, C. J. Klein, P. J. Mumby, and H. P. Possingham. 2015. Integrating regional conservation priorities for multiple objectives into national policy. *Nature Communications* **6**.
- Gill, D. A., M. B. Mascia, G. N. Ahmadi, L. Glew, S. E. Lester, M. Barnes, I. Craigie, E. S. Darling, C. M. Free, J. Geldmann, S. Holst, O. P. Jensen, A. T. White, X. Basurto, L. Coad, R. D. Gates, G. Guannel, P. J. Mumby, H. Thomas, S. Whitmee, S. Woodley, and H. E. Fox. 2017. Capacity shortfalls hinder the performance of marine protected areas globally. *Nature* **543**:665-669.
- Hock, K., N. H. Wolff, J. C. Ortiz, S. A. Condie, K. R. N. Anthony, P. G. Blackwell, and P. J. Mumby. 2017. Connectivity and systemic resilience of the Great Barrier Reef. *PLoS Biology* **15**:e2003355.
- Krueck, N., G. N. Ahmadi, A. Green, G. P. Jones, H. P. Possingham, C. Riginos, E. A. Treml, and P. J. Mumby. 2017a. Incorporating larval dispersal into MPA design for both conservation and fisheries. *Ecological Applications* **27**:925-941.

- Krueck, N. C., G. N. Ahmadi, H. P. Possingham, C. Riginos, E. A. Treml, and P. J. Mumby. 2017b. Marine Reserve Targets to Sustain and Rebuild Unregulated Fisheries. *PLoS Biol* **15**:e2000537.
- Marshall, P., and H. Schuttenberg. 2006. A reef manager's guide to coral bleaching. Great Barrier Reef Marine Park Authority, Townsville.
- Rogers, A., J. L. Blanchard, and P. J. Mumby. 2014. Vulnerability of coral reef fisheries to a loss of structural complexity. *Current Biology* **24**:1000-1005.
- Treml, E. A., and P. N. Halpin. 2012. Marine population connectivity identifies ecological neighbors for conservation planning in the Coral Triangle. *Conservation Letters* **5**:441-449.
- Wilkinson, C. R. 1998. Status of coral reefs of the world 1998. Global Coral Reef Monitoring Network and Australian Institute of Marine Science, Townsville.