

Destructive Fishing Practices

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Statement of Issue

DESTRUCTIVE fishing practices (DFPs) are those that result in direct damage to either the fished habitat or the primary habitat-structuring organisms in that habitat (for example, scleractinian corals), and include such well-known problems as blast and cyanide fishing and muro-ami drive nets. DFPS have been recognized as important threats to coral reefs on a regional basis for at least two decades, and are becoming more widespread and globally significant. In fact, in a number of developing countries, particularly those in the center of reef diversity in SE Asia, DFPS represent the most immediate and significant threat to the continued existence of coral reefs.

State of Knowledge

Widespread Use of Destructive Fishing Practices

DFPS are reported from every tropical sea and encompass a wide range of techniques. The two undisputed “heavy-weights” are blast or dynamite fishing, and cyanide fishing for both the live reef fish aquarium trade and the Asian live reef food fish trade. These two techniques are used widely throughout the Indo-West Pacific with an epicenter in SE Asia. Blasting is also common in the Red Sea and Western Indian Ocean. Estimates suggest that up to 80 percent of Indonesian and Philippine reefs have been damaged by blast and cyanide fishing. Other common DFPS in the Indo-West Pacific include muro-ami drive nets, inshore trawling, and trap fishing. An interesting phenomenon prevalent in the Hawaiian Islands is damage from derelict fishing gear, which causes entanglement of marine life, direct damage to the reef, and introduction of alien species. In the Caribbean, DFPS are not as prevalent, although steel trap fishing and lobster traps can result in the crushing of substrate and the use of poisons like bleach are reported.

Impacts on Coral Reefs

Unlike many other anthropogenic impacts on coral reefs, DFPS directly destroy the reef framework, making



Photo: Lida Pet-Soede

Dynamite blast-fishing

recovery a long and difficult process even after the acute threat is removed. Studies indicate that the rubble fields created from blasting are a “rough neighborhood” for juvenile hard corals; the constantly shifting rubble buries new coral growth, while the aggressive soft coral mats that often invade these rubble fields are also capable of out-competing and even killing juvenile hard corals. Additionally, DFPS are often species-indiscriminate and have been shown to directly reduce fish diversity. As with most gears with high catchability, DFPS typically lead to smaller average sizes of target species. Just as importantly, DFPS are not limited to reefs near large population centers; rather, a paradox exists whereby the most remote reefs are often the most damaged by DFPS due to a complete lack of enforcement in these regions.

Socioeconomic Causes

The socioeconomic causes of DFPS are complex and vary from place to place. In many coastal communities, poverty and declining catches from conventional fishing techniques encourages fishers to use DFPS. In other areas, however, some recent studies have suggested that it is “greed rather than need” that drives the introduction and spread of DFPS like many criminal activities; it is simply a way to make more money faster than can be obtained from legal occupations. In the case of the live reef fish

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trade, traders and exporters, frequently in collusion with corrupt local officials, have often systematically introduced cyanide fishing. In Indonesia, for example, fishers engaged in blasting and cyanide fishing can easily earn more than government officials or university professors. In one case study, the “outlaw image” was a major incentive for young fishers to take up DFPs.

Management Solutions to Destructive Practices

Regarding solutions to the DFP problem, numerous case studies documented both successes and failures. There is very strong evidence that marine protected areas (MPA) are one of the most effective means of preventing DFPs, especially when a combination of patrols and active marine tourism discourages the use of DFPs.

Unfortunately, enforcement activities both inside and outside MPAs are often hampered by persistent corruption, especially in the lucrative live reef fish trade, and by a lack of funding. At times there seems to be an unwritten policy of both conservation non-governmental organizations (NGO) and development agencies that enforcement is a repressive activity that should not be funded in developing countries, even when local communities and DFP practitioners alike agree that strict enforcement is a necessity. Of course, the solution to DFPs clearly must be a balanced and integrated one and beefed-up enforcement capacities and activities must play an important role.

The use of alternative income generation schemes to lure fishers from DFPs has proven difficult and failures seem to outnumber successes. One problem is the lucrative nature of most DFPs; it is often difficult to devise alternative income generation schemes that earn nearly as much as DFPs. Seaweed farming, or mariculture, is one scheme that has shown considerable earnings potential, although in one case the relatively large amount of free time afforded seaweed farmers resulted in “recreational cyanide fishing.” Mariculture of target species for both the live reef fish aquarium trade and food fish trades also shows promise. Unfortunately, larger companies often undertake these activities with little benefit to the local fishers otherwise involved in DFPs.

Mixed results have also been achieved in the case of training fishers in non-destructive techniques to replace DFPs. In the live reef fish trade, there have been some successes in converting cyanide fishers to the use of nets for aquarium fish and hook-and-line for live reef food fish, particularly in the Philippines. But few such efforts have yet been implemented in other Southeast Asian

countries where cyanide fishing is a problem, such as Indonesia and Vietnam. While training in non-destructive techniques prevents damage to the reef itself, it does not in itself prevent overfishing. For example, hook-and-line fishers have wiped out grouper spawning aggregations in Palau nearly as efficiently as would be the case with cyanide. Likewise, training and regulations in the Philippines to switch fishers from muro-ami—where rocks are pounded along the reef to drive fish into a trap net—to pa-aling—where the fish are chased with hundreds of bubbling air hoses instead—may prevent damage to the reef. But pa-aling still removes up to 50 percent of the standing fish biomass on a reef in one net operation. In short, approaches to reducing destructive fishing need to be coupled with more comprehensive measures to prevent overfishing.

One relatively new solution to reduce DFPs, and cyanide fishing in particular, involves the use of “eco-labelling” or certification to ensure that fish and corals exported for the aquarium trade are harvested at sustainable levels without the use of destructive methods. This approach is being widely advocated by private sector and non-government groups in the United States, the world’s largest importing country for the aquarium trade. If combined with tighter regulations to prevent the export of “undesirable aquarium species”—those that do not survive in aquaria due to dietary or habitat requirements or behavioral incompatibilities—certification has the potential to greatly reduce both cyanide fishing and unnecessary mortality of exported fish and invertebrates. It depends, however, on the growth of consumer demand for “environmentally-friendly” fish and other reef species, and willingness on the part of governments of consumer countries to regulate—and possibly restrict—the import of non-certified reef species. Unfortunately, in the case of blast fishing, the majority of the catch is destined for low-value local markets where certification is not an applicable strategy.

Relevant Actions Taken to Address the Issue

Governments, researchers, national and international conservation NGOs and development aid agencies are now realizing the full extent of the DFP problem and are mobilizing to combat DFPs. Research is focusing on both the effects of DFPs, the extent of reef damage caused by DFPs, and methods to enhance recovery from this damage. International NGOs and aid agencies are helping many MPAs beef up enforcement activities and involve the private, marine tourism sector in prevention of DFPs. Government agencies are becoming more actively involved



Photo: Jeffrey Jeffords, divergallery.com

Fish collector employs cyanide in reef fish collection, Capone Islands, Philippines

as well. The U.S. National Marine Fisheries Service is increasing efforts to remove derelict fishing gear in the Hawaiian Islands. The International Marinelife Alliance's Destructive Fishing Reform Initiative, carried out in partnership with a wide variety of other NGOs and government agencies throughout the Asia-Pacific, is using a combination of education for both fishers and government agencies, enforcement, and monitoring of the live reef fish trade to combat cyanide fishing (and prevent its introduction into new source countries), overfishing and other abuses in the live reef fish trade. The Marine Aquarium Council in the United States is leading an effort to establish a certification system for aquarium organisms in international trade.

Management and Policy Implications

DFPs present an immediate and expanding threat to coral reefs throughout the world, with SE Asian reefs in the epicenter of global marine biodiversity at highest risk. Management solutions are urgently needed to address this problem, which threatens to severely degrade a large percentage of the world's most diverse reefs *within this decade*. Priority recommendations for action are included below.

Specific Recommendations for Action

- **Focus immediate policy and funding initiatives on stronger enforcement against DFPs.** Most

countries have laws against DFPs, but glaring legal loopholes must be closed and persistent problems with corruption in the legal system addressed. Specific regulations banning possession and use of key components of DFPs such as blasting caps and cyanide would greatly facilitate enforcement. Hookah compressors should be banned for the capture of live reef food fish (which can be captured with hook-and-line), but may be necessary for aquarium fish collectors even when using best practices. The wholesale ban of compressors is therefore problematic. Banning their use would be unfair to aquarium fishers trying to do the right thing, while allowing compressors creates a loophole for those fishers still using cyanide to catch fish. Policymakers must keep in mind how the nuances between the food fish and aquarium trades have the potential to create incompatibilities in policy. Perhaps even more importantly, enforcement institutions must be educated on the tremendous damage caused by DFPs, while patrol time both inside and outside of MPAs must be greatly increased. Firsthand experience from conservation agencies and suggestions from destructive fishers themselves show that stronger enforcement is an essential prerequisite for curbing DFPs.

- **Expand and strengthen the world's MPA network.** MPAs are one of the most effective tools against destructive fishing, though properly focused funding assistance is still needed in many tropical developing country MPAs to move beyond "paper park" status.
- **Fund applied research on restoration of DFP-damaged reefs.** Current reef restoration efforts are largely focused on extremely high-cost rehabilitation of damage from ship groundings. There is an urgent need for inexpensive, low-technology restoration techniques for the vast areas of blast and cyanide damaged reefs prevalent in areas of the Indo-West Pacific. Local community involvement in restoration efforts can both build local support and provide a potential source of livelihood.
- **Develop and support "ecolabelling" certification systems to provide market incentives against DFPs.** Significant progress has been made by the Marine Aquarium Council and its partners towards developing a certification system sustainable for collection of reef organisms for the aquarium trade, but the system has yet to function in the real world, and it is unclear if and when it will become a major driver of the aquarium fish market. Similar systems might conceivably be applied to live reef food fish and

lobsters, but more study is needed to determine if it is possible to mobilize consumers in Asian markets against DFP-caught products or not. A more promising route for Asian markets may be to pressure and work with industry players themselves to develop an industry code of conduct that could be independently monitored.

Useful References and Resources

This paper is based upon presentations at the 9th International Coral Reef Symposium, Mini-Symposium E6, *Destructive Fishing Practices*. Authors and titles of presentations can be found at: <http://www.nova.edu/ocean/9icrs/>.

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