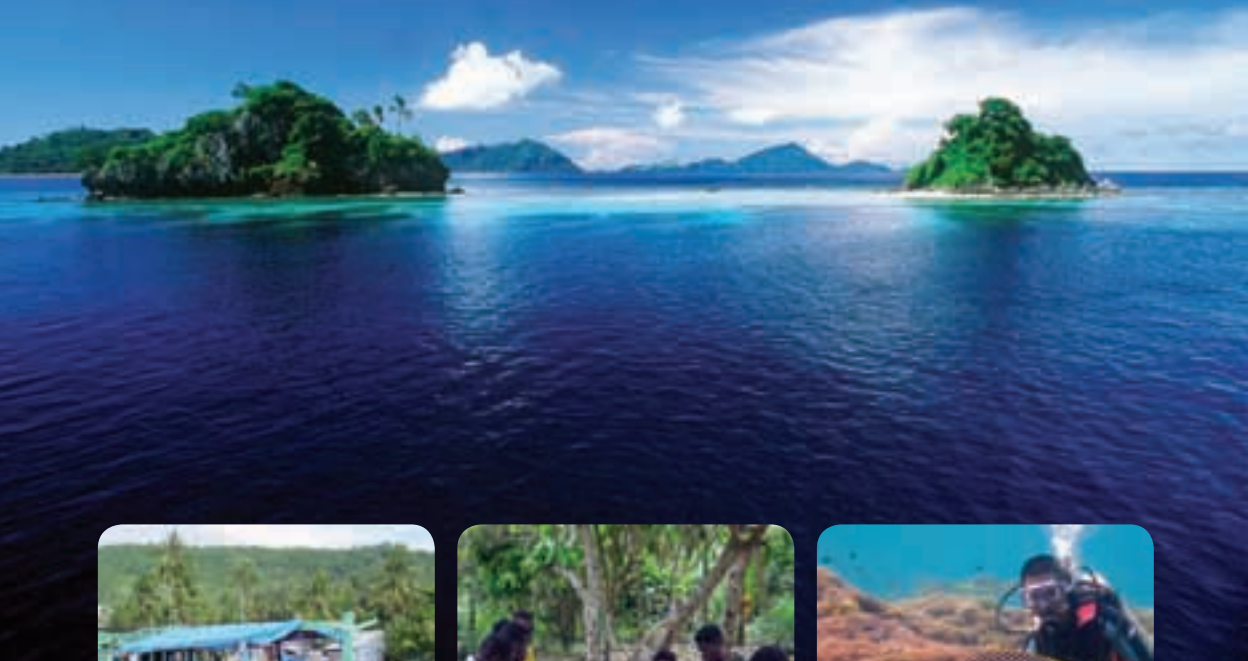


Economic incentives for marine conservation



SCIENCE TO ACTION

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This publication is funded by

Gordon and Betty Moore Foundation

National Fish and Wildlife Foundation

The authors thank Conservation International's Marine Management Area Science Program for funding and guidance, the Gordon and Betty Moore Foundation, and National Fish and Wildlife Foundation for financial support, and the project Advisory Committee for input on the study design. The authors also acknowledge the tremendous conservation efforts of the projects featured in this research. We thank the following groups for providing information and assistance with site visits: Ejido Luis Echeverria, WildCoast, Pronatura, International Community Foundation, Natural Resources Defense Council, The Nature Conservancy, Morro Bay Commercial Fishermen's Organization, Alto Golfo Sustentable, INE, University of California-Santa Barbara, Southwest Fisheries Science Center, Pacific Fishery Management Council, NOAA Coral Reef Conservation Program, US Virgin Islands Department of Planning and Natural Resources, Sea Sense, CI-Ecuador, Nazca, Toledo Institute for Development and Environment, St. Thomas Fishermen's Association, Misool Eco Resort, CI-Indonesia, Seacology, Tetepare Descendants' Association, Western Solomons Conservation Program, Roviana Conservation Foundation, Community Conservation Network, Helen Reef Resource Management Project, Palau Conservation Society, Micronesia Conservation Trust, Conservation Society of Pohnpei, Marine and Environmental Research Institute of Pohnpei, Integrated Marine Management Ltd, Marine and Coastal Resource Conservation Foundation (Bar Reef), WWF, and the communities and governments of all sites. We acknowledge background reports and information provided by the following individuals: Dave Forman, Aaron Bruner, Geoff Shester, Patrick Saki Fong, Shona Paterson, Stuart Sandin, Gabriel Hendel, Sheela Saneidejad, Siri Hakala, and Celet Armedilla-Pontillas.

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Preferred citation:

Niesten, E. and H. Gjertsen. 2010. *Economic Incentives for Marine Conservation*. Science and Knowledge Division, Conservation International, Arlington, Virginia, USA.

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Community releases sea turtle caught by fisherman, Ayau, Raja Ampat, Indonesia.



Milne Bay, Papua New Guinea.

Chapter 1: Introduction

Incentives: motivating sustainable behavior

Inadequate protection and management of marine resources has profound consequences: the oceans house both essential species and critical ecological processes, and provide a vital source of food and livelihoods for large numbers of people, including the world's poorest. Despite this importance, marine species and habitats are increasingly endangered and fisheries are collapsing around the world.

Marine managed areas (MMAs) are a key element of global strategy to reverse these trends, as strategically located and well-designed MMAs protect biodiversity and enhance resource yields.^{1,2,3,4} A comprehensive global MMA system would be economically rational given that it could be supported fully by financial resources saved by eliminating perverse subsidies to industrial

fisheries (estimated at US\$15-30 billion per year). Doing so would create more employment than supported by these subsidies and enhance the sustainability of global fisheries.^{5,6,7,8,9} Nevertheless,

marine protected areas currently cover only 1% of the oceans, and in many cases management leaves considerable room for improvement, often due to inadequate funding.^{5,10} If creation and effective management of a comprehensive global system of MMAs offers such

substantial ecological and economic advantages, the challenge is to explain why this system has yet to materialize.

A large part of the answer relates to distribution of costs and benefits of conservation. Many benefits are non-market values that accrue to people far removed from resource owners and users. For example, people around the world may value the fact that leatherback turtles exist, even if they never see one themselves. In contrast, the costs largely fall on coastal communities, and are immediate and tangible through lost incomes and forgone consumption of marine resources. Although global benefits from conservation may outweigh gains from destructive practices, at the level of resource users the benefits from unsustainable use often exceed those from sustainable management.¹¹ As a consequence of these misaligned incentives, sustainable management in many contexts is either economically unattractive or unaffordable for local decision-makers, particularly in the short-term.

The challenge of making conservation economically attractive is a critical hurdle for creation and effective management of MMAs. This relates to constructing economic alternatives that make foregoing income from unsustainable resource-use a viable and preferred option for decision makers. In other words, resource users need to see tangible rewards from



What are marine managed areas?

MMAs, as defined for this booklet, are multiuse, ocean zoning schemes that typically encompass several types of subareas, such as no-take areas (e.g., no fishing, mining), buffer zones with particular restrictions (e.g., no oil drilling), or areas dedicated to specific uses (e.g., fishing, diving).

MMAs can take many forms, addressing different issues and objectives. Some MMAs involve areas where multiple uses (e.g., fishing, tourism) are allowed under specific circumstances. Others involve areas where no extractive human uses (e.g., fishing, mining, drilling) at all are allowed. Still others restrict certain areas to one specific use (e.g., local fishing) that is judged to be the most beneficial use of that area to the exclusion of others.

The term 'marine managed areas' is often used interchangeably with 'marine protected areas' (MPAs) as an inclusive way of describing different types of MPAs ranging from those with multiple-use to areas of complete protection. For more information on MMAs, see *Marine Managed Areas: What, Why and Where* available at www.science2action.org.

changing behavior if sustainable management and conservation of marine biodiversity is to be achieved.

This research effort is motivated by the proposition that changes in unsustainable behavior will require interventions that enhance the economic appeal of other resource-use options, and examines what kinds of site-based interventions show the greatest promise for doing so. Using a global set of case studies, the analysis that follows examines ways in which different interventions result in incentives to change resource use. Although marine conservation and MMAs face a wide array of challenges beyond those discussed here, if incentives are misaligned at the local level then efforts to address other challenges are far less likely to succeed.

Conservation practitioners increasingly are turning to incentive-based approaches to encourage local resource users to change behaviors that impact biodiversity and natural habitat.^{12,13,14,15,16,17,18} Although past approaches have employed fines and penalties (negative incentives), some current approaches use compensation of various forms (positive incentives) to encourage particular conservation practices. These approaches recognize that conservation can impose a loss in terms of forgone income or access to resources (opportunity cost). Since people face pressing socio-economic needs in many priority areas for conservation, such potential losses can hamper the acceptance and sustainability of conservation interventions, i.e., unless conservation programs address economic needs, local resource users will be compelled to make choices that generate short-term economic returns regardless of destructive impacts.

What is “opportunity cost”?

The opportunity cost of conservation is what is given up by choosing conservation versus other uses of resources. It includes the cost of undertaking the conservation actions (e.g., program administration, wages for patrolling activities), as well as the value of forgone resource use (e.g., income lost by not harvesting turtle eggs). This second component acknowledges that changes in resource-use patterns may come at a cost, and any intervention must consider how and by whom that cost will be addressed.

The opportunity cost of conservation to resource users is defined as the net benefits (benefits minus costs) that would be received under the next best alternative. For example, when establishing a no-take zone in an area, the opportunity cost to consider is the net benefit that could be generated by fishing in that area. Although the net benefit of fishing usually denotes revenues minus harvest costs, benefits can also include other components such as the cultural role of fishing activities. These are more difficult to measure, but should be included. Estimating the benefits that will be forgone by shifting to different resource uses permits explicit examination of offsetting incentives required to elicit this behavioral change.

Purpose of the study

The aim of this study is to provide guidance for conservation practitioners and policy makers with respect to selecting and deploying incentive-based tools. The role of incentives in conservation efforts is receiving increased recognition, but there are many different ways that projects can incorporate incentives. In particular, incentives can be differentiated by their level of directness. Directness refers to the link between project benefits as an incentive and the desired change in behavior, i.e., how benefits depend on conservation performance. Paying someone to relinquish fishing rights is a very direct incentive. An

example of an indirect incentive is training someone to be a dive guide, i.e., with the expectation that they then will be less inclined to overharvest. This analysis examines incentives using case studies that represent features of the following approaches.



Buyouts

Conservation investors purchase resource rights or equipment with the intention of retiring them, thereby reducing

the overall level of effort applied to harvesting. Compensation to resource owners or users is typically in the form of an up-front, one-time cash payment, followed by government enforcement to prevent illegal activities.



Conservation agreements

Conservation investors negotiate contracts by which resource-users forego unsustainable activities in exchange for

benefits that are conditional on conservation performance. Benefits may be in the form of

cash, services, or goods, and are provided periodically upon verifying that conservation performance targets are met.



Alternative livelihoods

Conservation investors establish livelihood activities to replace unsustainable activities by resource users. Income or

harvest for their own consumption may be derived from entirely new economic activities or revised forms of previous activities. When income is sought through enterprises, benefits depend on market profitability. Whether or not these enterprises are resource-based, benefits typically are not contingent on conservation performance per se.

Buyout example: trawl permit and vessel buyout, Morro Bay, USA

Trawling, the primary method for groundfish capture on the west coast of the United States, involves dragging large, weighted nets along the sea bottom, damaging habitat and causing high bycatch. In 2003, The Nature Conservancy (TNC) and Environmental Defense engaged the Morro Bay bottom trawling industry along the central California coast to protect marine habitat. With their support, in June 2005, the Pacific Fishery Management Council approved a network of no-trawl zones of ~1.5 million hectares of ocean. The regulations were enacted in May 2006, and TNC subsequently purchased six federal limited-entry trawling permits and four trawling vessels from commercial fishers. Now, the project seeks to sustain fisheries by leasing permits back to fishers who commit to switching to sustainable gear and practices.

Conservation agreement example: community development fund, Laguna San Ignacio, Mexico

In 2005, the 43 members of the Luis Echeverria community agreed to protect ~48,500 hectares of grey whale habitat, in exchange for annual payments of US\$25,000 that support small-scale development projects. The area is monitored by a third party to verify compliance with contract terms, and payments are released upon confirmation of compliance with contract terms. Payments have been used to provide business training and launch new income-generating activities. Every year, any community member can present a project proposal for review by the leadership, and all the members vote on the proposals in a general assembly. The agreement is financed through a dedicated trust fund that covers annual payments, monitoring, and legal expenses. The contract was signed by the community and NGOs (Pronatura, International Community Foundation, Maijanu), and is designed to last in perpetuity.

Alternative livelihood example: dive tag fees, Kubulau, Fiji

The communities of Kubulau district in southwestern Vanua Levu, Fiji's second largest island, have created a network of 13 MMAs, anchored by the Namena Marine Reserve. The site is one of the best diving areas in Fiji, but it is threatened by poachers from nearby villages as well as more distant urban centers. Together with Moody's Namena Resort, the Kubulau communities enforce no-take areas against poaching to protect important dive sites, using a surveillance system involving community fish wardens. The system is financed through dive-tag fees paid by dive-tourism operators to the Kubulau Resource Management Committee (KRMC), and the funds are used for community development, tertiary scholarships, operational costs such as patrolling and mooring maintenance, and other management expenses. Strong community ownership of the project is made possible by recognition of customary fishing rights under Fijian law and is strengthened through extensive technical support from NGO partners such as Wildlife Conservation Society and Coral Reef Alliance.

Project characteristics in the case studies vary widely and many projects share features of multiple approaches. Nevertheless, basic project design does allow for differentiation. One important design difference lies in financing strategy: typical buyouts involve a one-time, up-front cost, whereas conservation agreements explicitly require long-term external financing and alternative livelihoods are intended to become self-financing.

Another important distinction arises in how benefits are structured to create incentives. In a buyout, benefits compensate for reduced harvest capacity, and behavior change is maintained by enforcement (direct incentive). Under a conservation agreement, benefits are provided over time only if behavior change is sustained (direct incentive). An alternative livelihood project results in benefits when the livelihood becomes economically viable (indirect incentive).

Research method

This research involved gathering information on case studies representing the three approaches listed above. The interventions in the majority of cases are implemented in conjunction with MMAs. However, we did not restrict the cases specifically to MMAs, as this would exclude some informative marine conservation sites from the sample, particularly those involving species rather than habitat protection. The paucity of available data required primary data collection. Indeed, the research confirmed that most projects do not consistently collect the types of data and information required for rigorous quantitative analysis of individual project effectiveness, let alone cross-comparisons among projects. Therefore the study relies on qualitative analysis.

Key informants helped compile a large set of suggested candidate projects for inclusion in the study. Constrained to a sample size of 27 cases, random selection from all possible sites

would not yield an adequately representative sample. Therefore, to ensure broad geographical representation we constructed a purposive sample that includes examples of each approach in a wide variety of settings. The purposive sample also sought to include effective representation of best practices of each approach (Table 1).

A template was designed to facilitate equivalent data collection for each site. The information collected includes a detailed characterization of the project: location, stakeholders, conservation objective, principal threats, intervention model, budget, duration, etc. Project implementers and other key informants including community representatives were interviewed to document each project; project implementers were invited to comment on the draft case studies. The case studies were then analyzed as a collection of project experiences.



Twenty-seven cases were selected to examine the role of economic incentives in changing behavior.

Table 1. List of the 27 case study sites included in the research sample.

	Buyout	Conservation Agreement	Alternative Livelihood
Belize		Maya Mountain Marine Corridor scholarships	Port Honduras Marine Reserve Alternative Livelihood Training
Ecuador		Galera-San Francisco Marine Reserve fisheries management	
Federated States of Micronesia			Pohnpei sponge and coral farming
Fiji		Navini Island Resort lease	Kubulau dive tag fees; Waitabu marine reserve ecotourism
Indonesia		Misool Eco Resort lease; Jamursba Medi scholarships	Ayau piggery
Kiribati	Phoenix Islands Protected Area fisheries license revenue offset		
Mexico	Northern Gulf of California gill net permit buyout	Laguna San Ignacio community development fund	Punta Abreojos cooperative and Marine Stewardship Council certification
Palau		Helen Reef community fund	
Philippines			Cagayancillo tourism entry fee; Gilutongan Marine Sanctuary tourism revenue sharing
Solomon Islands		Tetepare and Rendova incentive payments and scholarships; Olive health clinic	Baraulu sewing
Sri Lanka			Bar Reef Sustainable Livelihoods Enhancement and Diversification
Tanzania	Mafia Island Marine Park gear replacement	Mafia Island incentive payments	
USA	Morro Bay, CA trawl permit and vessel buyout; Palmyra island purchase; St. Croix gill net and trammel net buyout		St. Croix East End Marine Park interpretive ranger and commercial captain training

Guidebook overview

Chapter 2 presents the three economic incentive approaches used to characterize the case studies. Observations gleaned from the case study analysis are presented in the form of project design advice in Chapter 3.

The case studies are incorporated into this document as brief summaries. For more information, see *Economic Incentives for Marine Conservation: Case Studies* available at www.science2action.org.



Lankayan Island, Malaysia.

Chapter 2: Three approaches to shaping incentives

Economic incentives differ in the way that they affect resource use. The previous chapter introduced three approaches to providing economic incentives to conserve natural resources: buyouts, conservation agreements, and alternative livelihoods. This chapter discusses how these tools are used by conservation investors (e.g., non-government organizations, government, private sector) to engage resource users (e.g., local residents, fishers, developers).



Buyouts

Buyouts are the most direct approach with respect to incentives, involving a complete transfer of property or user rights. In a typical buyout, the conservation implementer acquires resource rights or equipment for the purpose of retiring them from use. Doing so reduces the level of harvesting effort, and thereby reduces pressure on the resource base. A buyout can take several forms:

- Purchase and retirement of fishing permits, quotas, or licenses to reduce effort.
- Purchase of vessels or gear to reduce effort or change harvesting methods.
- Purchase of an area and the accompanying resource rights.

Buyouts will only reduce harvest effort if the reduction is not readily replaced by either existing resource users or new entrants, which means that **total effort or harvest level must be effectively regulated**.^{19,20} In a pure buyout, compensation to resource owners or users typically is in the form of an up-front, one-time cash payment. Following the transaction, prevention of violations depends primarily on government enforcement.

Most examples of buyouts are motivated by objectives related to industry profitability or commercial stock management, rather than bycatch reduction or biodiversity conservation. However, **buyouts increasingly are being implemented for other goals such as protecting ecosystems and endangered species, reducing bycatch, and conserving biodiversity in general**.²¹ The buyout cases analyzed in this study are described in Table A.1 in the Appendix.

Although the buyout approach in principle is based on a one-time payment, half of the case studies include ongoing incentives beyond the initial transaction. For instance, in the Phoenix Islands Protected Area, the buyout

approach is adapted to conform to the national system of annual access agreements for fishing fleets, such that a trust fund will yield annual payments in return for enforcement of no-take zones. Thus, **one component of the appeal of buyouts—the apparent simplicity of a one-time transaction as opposed to long-term engagement—is less common in practice** when the approach is applied to conservation objectives. Nevertheless, the basic proposition of acquiring rights or equipment to reduce extraction pressure offers a powerful direct incentive for resource users.

In Mexico's Northern Gulf of California, ongoing investment in alternative livelihood efforts—in tourism and alternative fishing methods—is needed to sustain a permit buyout designed to protect the vaquita, an endemic porpoise species. Developing vaquita-safe fishing gear will take considerable time, but the threat to the vaquita population is extremely urgent. Therefore the strategy chosen, in addition to the buyout, was to offer temporary compensation for not fishing in certain areas (which does not require relinquishing a permit), while collaborating to develop new fishing equipment that reduces the risk of vaquita bycatch. Thus, **a buyout can be used as a stopgap measure while developing alternative fishing gear**.

Palmyra Island, USA: purchase

Located 1,693 km south of Hawaii, the Palmyra atoll consists of 275 hectares of land and 6,277 hectares of pristine coral reefs. In 1947, the Fullard-Leo family prevailed in a protracted US Supreme Court battle with the US Navy for ownership of Palmyra. In 2000, after more than two years of negotiations, the Fullard-Leo family agreed to sell the atoll to The Nature Conservancy (TNC) for ~US\$30 million. The US Fish and Wildlife Service (USFWS) contributed US\$9 million to the purchase of above-water forest lands and most of the submerged lands and open water, including the reefs; these areas are a National Wildlife Refuge, while TNC manages the remainder of the atoll, about a third of the total, as a preserve.

Phoenix Islands, Kiribati: protected area fisheries license revenue offset

The Phoenix Islands lie in Kiribati, in the central Pacific Ocean. Their reefs are among the most pristine in the tropical Pacific, but are threatened by foreign commercial fishers. The Phoenix Islands Protected Area (PIPA) was created in 2006, and the boundaries were finalized in 2008 to encompass 408,250 km². Using a buyout model, the size of the PIPA no-take zone will depend on financing to offset forgone fishing-license revenue. To guarantee revenue replacement over time, the New England Aquarium and Conservation International are working with the government to create an endowed trust fund from which payments to replace fishing-license revenues will continue as long as conservation objectives of PIPA are met. An initial target of US\$25 million is estimated to justify closing 25% of PIPA to commercial fishing.

Northern Gulf of California, Mexico: gill net permit buyout

The vaquita (*Phocoena sinus*), a small porpoise endemic to Mexico's Northern Gulf of California, is killed as bycatch in gill nets used to harvest fish and shrimp. To avoid imminent extinction, the Mexican government launched an initial buyout of permits in 2007, offering fishers start-up funds for tourism enterprises. Another option was for fishers to receive funds to purchase new gear. A second round in 2008 included a third option, namely compensation for not fishing with gill nets inside a designated vaquita reserve. Realistic options for alternative livelihoods are limited, and few fishers will support any plan that prevents them from fishing entirely. Therefore, the long-term strategy includes better enforcement against illegal fishing, maintenance of no-fishing zones, and development of gear that avoids vaquita bycatch.

A buyout may require substantial upfront funds for a one-time payment. Declining economic profitability as in the Morro Bay trawl fishery can lower opportunity cost and make a buyout more financially feasible. However, the conditions needed for a buyout to succeed (i.e., a limited-entry fishery with reliable enforcement) typically are most likely to hold in more developed areas that also tend to exhibit higher costs, and therefore buyouts are unlikely to be cheap investments. The advantage of implementing buyouts in more developed areas is that institutions for fisheries management and enforcement tend to be stronger. In contrast, buyouts in developing countries may be less costly, but management and enforcement provisions may not be robust enough to guarantee that conservation investors get what they pay for.

The buyout approach offers a direct response to the problem of excess harvesting pressure. However, implementation of a buyout can involve a number of challenges, ranging from high financing requirements as in the Phoenix Islands Protected Area and Palmyra examples, difficult social and political conditions as in the Northern Gulf of California example, or complex legal and bureaucratic requirements as in Morro Bay. A recurring theme is that in many contexts simply removing fishing capacity through a one-time transaction will not be enough; local stakeholders demand assistance in pursuing alternatives, whether that be in new economic activities or continuation of fishing activity but with different gear or practices. This means that **buyout initiatives often will share significant overlap with conservation agreements and alternative livelihoods approaches.**

Further guidance on design of buyout projects

Countries such as the United States, Canada, Australia, and New Zealand have long experience with vessel and license buyouts as a fisheries management tool. These measures have been used to address excess fishing capacity, overexploitation of fish stocks, and distributional issues. In *Fisheries Buybacks*, Curtis and Squires review global experience with vessel and license buyouts, and note that these programs can be expected increasingly to include a fourth major objective, namely conservation of ecosystems and biodiversity.²¹

The single-most important condition for effective buyouts is limited entry, which requires effective registration of licenses and vessels to form a well-defined group of participants, and well-defined boundaries of the fishery. The program must be accompanied by a mechanism to prevent new entry, re-entry, or other investments that reintroduce harvest pressures. Buyouts can be counterproductive if participants use funds to purchase upgraded equipment, or if new participants can enter the fishery as profitability increases. Therefore buyout programs may include restrictions on reinvestment of funds received by participants and on reuse of the purchased vessel, gear, or license; indeed, many buyouts require that purchased vessels be scrapped to ensure permanent retirement of excess harvest capacity.

Design of buyout initiatives must pay particular attention to clearly defining the scope of the program. For instance, should the program purchase licenses or vessels and gear, or some combination? How will the buyout price be determined? Will the program consist of a single round or multiple rounds of transactions? When moving beyond fish stock management to pursue conservation objectives, programs may purchase vessels and licenses or pay fishers to change fishing practices (e.g., restricting location or time of harvest, or defining permissible gear). The program also must decide whether it will focus on full-time or part-time (latent) vessels. Purchasing inactive vessels or permits may be cheaper, but have less impact on overall fishing effort. Indeed, a poorly designed buyout may result in exit by only the least efficient, less profitable vessels, or fishers that were already planning to retire, again undermining the objective of reducing harvest pressure.

Financing buyouts typically involves some combination of industry, government, and NGO support, depending on the extent of benefits to industry and to the public. However, **although vessel and permit owners are likely to benefit from a buyout, crew members often do not.** The potential decrease in employment may require investment in retraining or business grants to facilitate a transition to new economic activities.

For further discussion of specific design considerations and review of practical experiences in buyout programs, see: Curtis, R. and D. Squires. 2007. *Fisheries Buybacks*. Blackwell Publishing, Oxford.²¹



Conservation agreements

Conservation agreements offer direct economic benefits to resource users in exchange for changes in resource-use practices. A distinction between this approach and buyouts or alternative livelihoods is that it explicitly provides ongoing delivery of benefits from external sources. A key feature of conservation agreements is that benefits are conditional on conservation performance, thus requiring effective monitoring. The following are components of a conservation agreement:

- **Parties and their rights and responsibilities**

An agreement typically involves two principal parties—the resource users who agree to collaborate in conservation and forego destructive practices, and the investor who agrees to provide compensatory benefits. An agreement may incorporate other parties, such as by defining the role of government agencies or other partners in monitoring activities.

- **Conservation commitments**
An agreement stipulates prohibited and required activities that will be the responsibility of the resource users, designed to advance conservation objectives, e.g., observing no-take zones, ending certain practices such as dynamite fishing, or conducting patrols to deter poachers.
- **Benefits**
In return for conservation actions from resource users, the conservation investor agrees to supply a defined benefit package. The value of benefits should be commensurate with opportunity costs—the value of forgone resource use (e.g., reduced fish yields from not using destructive gear) and the cost of conservation actions (e.g., wages for patrolling activities). Benefit packages can include cash payments, but they usually consist of investments in social goods such as scholarships or community development funds.
- **Sanctions for non-compliance**
Benefits are provided in return for adherence to conservation commitments. If commitments are not met, benefits must be adjusted; a thorough agreement will define how benefits are affected by particular types of infractions. Typically, reductions in benefits will be temporary to allow an opportunity to improve compliance and restore full benefits.
- **Performance monitoring protocol**
Given that benefits are contingent on performance, compliance with conservation commitments must be monitored to justify continued benefit delivery. This means that commitments must be defined in a way that is amenable to monitoring, and the parties to the agreement must agree to compliance standards and means of measuring performance with respect to those standards.

Table A.2 in the Appendix lists the conservation agreement cases in the study. Though rooted in the basic concept of a direct exchange of benefits in return for conservation commitments, each agreement is tailored to a specific context in which cultural, economic, biological, legal, and institutional factors all shape benefit packages, conservation commitments, and implementation details. Some cases, though designed as such to provide direct incentives as per the conservation agreement approach, do not

feature all the components of a comprehensive agreement. For instance, several lack formal performance monitoring or sanctions for non-compliance. Provisions for monitoring and the types of conservation actions/non-actions required of resource users vary widely. In most agreements, resource owners commit to establishing and respecting an MMA in some form. In some cases, the MMA is legally designated while in others it is an agreement to observe management rules within a defined area without formal protected status.

Long-term financing is a common challenge for conservation agreement projects. The Laguna San Ignacio easement is supported by an endowed fund. In the Misool Eco Resort case, sustainability is ensured by the presence of a private enterprise with a long-term stake in the success of the agreement. However, the other cases remain dependent on short-term grant cycles, affecting both the reliability of the benefit stream and the ability of implementers to execute project management and monitoring roles.

The conservation agreement approach has met with some resistance from skeptical conservationists, often due to incomplete understanding of how agreements can be adapted to different contexts. For example, there are concerns about an influx of cash into a small, remote community, but **benefit packages can comprise in-kind benefits or funds for community development**, as in the Tetepare and Rendova examples. Another misunderstanding is the impression that local stakeholders lose their resource rights. However, under most conservation agreements stakeholders retain their rights and simply agree to exercise these rights in particular ways; should the agreement become unacceptable to resource owners, they usually can withdraw from the arrangement and dispose of their resources as they see fit (a notable exception is Laguna San Ignacio, where the community has signed an agreement in perpetuity). The conservation agreement case studies suggest that the basic proposition of providing benefits in return for conservation commitments resonates with resource users in many settings around the world.

Misool Eco Resort, Indonesia: lease

Raja Ampat is a large archipelago in eastern Indonesia's Papua province. In 2005, the Misool Eco Resort (MER) entered into a 25-year lease agreement with the customary owners of uninhabited Batbitim island to establish a 425 km² no-take zone around Batbitim and many neighboring islands. The lease grants MER exclusive rights to the islands, including hills, forests, coconut trees, water, animals and the surrounding lagoon. The no-take zone protects animals, coral reefs, turtles, sharks, rays and fish. The agreement was made under both customary law and Indonesian law. In addition to paying lease fees, the resort also employs villagers and provides them with health insurance, job training, and English lessons. Under the agreement, the resort regularly patrols the area for illegal fishing and shark-finning and manages the area for conservation, including observance of the no-take area.

Tetepare and Rendova, Solomon Islands: incentive payments and scholarships

Tetepare Island is located in Western Province of the Solomon Islands and is ~11,880 hectares in size. The island retains roughly 97% of its original forest growth. The majority of the landowners—collectively, the Tetepare Descendants' Association (TDA)—live in 15 zones around the Province, but primarily inhabit four villages on Rendova, the closest island west of Tetepare. In return for agreeing to protect the island habitat, villagers receive three types of benefits, including a scholarship program operated through the TDA, training and employment opportunities linked to conservation activities and ecotourism, and a payment scheme in Rendova for turtle nest protection. The turtle project provides cash payments to individuals and to a village development fund for nests found and protected.

Further guidance on design of conservation agreement projects

The Nature Conservancy (TNC) and Conservation International (CI) have developed a *Practitioner's Field Guide* for conservation agreements in marine contexts, drawing on the collective field experience of many different organizations. The manual describes a step-by-step process in four phases, from initial scoping of potential for the approach in a given site to on-the-ground implementation. The *Guide* itself is complemented by additional resources available online at www.mcatoolkit.org. The process described in the *Guide* is applicable to a wide variety of agreement types, ranging from formal leases and contracts that rely on legal frameworks to informal arrangements that rely on non-legally binding covenants between implementers and resource owners. Similarly, the process is **applicable whether the conservation agreement targets specific areas, harvesting methods, resource access, or any other proposed behavior change with respect to resource use.**

The four phases consist of feasibility analysis, engagement, agreement design, and implementation. **Of the several elements to be considered in the feasibility analysis, among the most important is the presence of a clear agreement counterpart** (individuals, community, management entity, etc.) who is in a position to make concrete commitments and undertake actions that advance conservation objectives in return for specified benefits. The purpose of the engagement phase is to reach a shared understanding between the implementer and the resource users with respect to the conservation agreement approach. This encompasses understanding of the motivations for conservation, the actions required, the implications of changes in resource use, and, critically, the fact that benefits are contingent on verified compliance with agreement terms. Once all stakeholders fully comprehend and consent to the conservation agreement model, the agreement design phase can proceed. **To design the agreement, the implementer and resource users work toward mutually agreeable terms on specific actions, compensatory benefits and performance metrics, as well as consequences of non-compliance.**

The implementation phase can begin after the conservation agreement terms have been finalized. Implementation will include many different elements, but **one of the most critical activities for the conservation agreement approach is monitoring to verify that the**

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Further guidance on design of conservation agreement projects (continued)

parties to the agreement are fulfilling their commitments. This compliance monitoring typically will be accompanied by other monitoring efforts that measure both biological and socio-economic impacts of the agreement.

For detailed guidance on designing and implementing conservation agreements, see: The Nature Conservancy and Conservation International. 2009. *Practitioner's Field Guide for Marine Conservation Agreements*. Final V1. Washington DC. 74 pp.²²



Alternative livelihoods

The alternative livelihoods approach provides incentives to resource users by developing new income options. Alternative livelihood support typically is not linked directly to conservation performance. Rather, new options are designed to result in conservation as people pursue activities that are more profitable than unsustainable resource use. Alternative livelihood interventions can take three forms:

- **Transform existing resource extraction to sustainable use.** Many projects in this category involve working with fishers to adopt management practices such as rationalizing harvest levels or establishing no-take zones to enhance resilience of the resource base. Thus, improved prospects for continued extraction serve as the incentive for resource users.
- **Encourage new commercial activities that do not involve harvesting but rely on ecosystem quality.** For example, ecotourism requires intact ecosystems and abundance of species. The incentive for conservation derives from the fact that ecosystem health sustains the provision of environmental goods or services essential to the non-consumptive income-generating activity.
- **Pursue new activities that are not or only peripherally related to the ecosystem.** The intention is to reduce dependence on marine resources, as in a project that encourages fishers to become farmers or livestock keepers. Income from non-marine activities serves as the incentive to cease exploiting the resource of conservation interest.

Making reduced resource pressure a viable option for local users by providing alternative income options has great intuitive appeal. Consequently, it is no surprise that this basic logic underlies many conservation

interventions. Indeed, several cases examined in this study suggest that acceptance of buyouts often requires adding alternative livelihoods to overall project design, as seen in the Northern Gulf of California case. However, under the alternative livelihoods approach, support for new activities is not positioned explicitly as compensation for displacing unsustainable behavior. This support is not necessarily conditional; the income or production from the new activity is what offsets the forgone resource use. The alternative livelihood cases examined in this study are described in Table A.3 in the Appendix.

The opportunity cost of conservation tends to be low in the alternative livelihood cases, which might be expected given that high opportunity cost could make it hard to find competitive alternatives. **Although the benefit level needed to overcome opportunity cost may be low, alternative livelihood programs also incur costs of providing continued technical assistance to overcome capacity gaps; thus, the approach can entail an expensive long-term commitment.** In the cases studied, one-time investments in Baraulu and St. Croix did little to impact livelihoods or reduce pressure on resources. The projects in the Philippines opted for longer-term investments, but reduced the need for external funding by using tourism revenue and by issuing loans rather than grants.

Social expectations with respect to distribution of benefits can pose a challenge for alternative livelihood projects. Successful projects typically include prominent roles for individuals with particular aptitudes and skills, so there is a tendency for benefits to accrue to those who are already advantaged.^{23,24,25} These people may then face strong social pressures that can undermine a project. Such dynamics were seen in the

Baraulu sewing project, where disputes and jealousies led to lack of cooperation, poaching, and project disintegration. In Pohnpei, project implementers have avoided these problems

by working directly with individuals who wish to set up their own sponge or coral farm, and extending this opportunity to all community members.

Cagayancillo, Philippines: tourism entry fee

The municipality of Cagayancillo covers Tubbataha Reefs Natural Park (TRNP), which in 1988 became the first national park in the Philippines. The TRNP is under a no-take policy that bars all activities except tourism, research, and management, but it is threatened by illegal fishers from other coastal communities in the Philippines and as far away as Taiwan and China. One TRNP management strategy is an alternative livelihood program to replace income lost by Cagayancillo residents due to reduced fishing access. The municipality receives 10% of park entrance fees. Half is allocated to road construction, and the rest to a microcredit facility. Two types of loan are offered—livelihood loans to support enterprise development and salary loans against future income. To date, 80% of recipients used their loans to finance livelihoods, principally seaweed farming. Low repayment rates in 2006/2007 led to a new system of weekly (rather than monthly) collection and group (rather than individual) loans.

Pohnpei, Federated States of Micronesia: sponge and coral farming

In 2001, the Conservation Society of Pohnpei (CSP) began working with communities to re-establish state sanctioned marine protected areas (MPAs) within Pohnpei lagoon. To provide additional income-generating opportunities, CSP partnered with the Marine Environmental Research Institute of Pohnpei to establish sponge farming with communities near MPAs. In 2005, income-generating activities were expanded to hard coral, soft coral, and other marine invertebrate farming. Sponges are sold locally and for export as beauty products, while corals are exported for the aquarium trade. The farming project is resulting in increased income for the 32 participating community members, but it is not being used as an incentive for conservation per se, since participation in the program or profitability of the farming does not depend on conservation behavior. However, it does offer an environmentally benign income source in an area where these are few and far between.

Further guidance on design of alternative livelihood projects

A successful alternative livelihood project requires taking the time to conduct an extensive, participatory process with community members to identify aspirations and capacities. Such a process is described in detail in *Sustainable Livelihood Enhancement and Diversification—SLED: A Manual for Practitioners*.²³ This step-by-step guide also emphasizes that **rigorous market analysis is essential to ensure that alternative livelihood investments are tailored to realistic market conditions and opportunities.** Self-evident as these two considerations may seem, they all too often are insufficiently incorporated into livelihood initiatives.

The SLED process encompasses three major phases—discovery, direction, and doing—each of which entails several specific steps. The discovery phase generates the information needed by the implementer to facilitate community livelihood development visioning. These visions must be grounded in the skills, capacities, and aspirations of the community, and must reflect consensus on the need to change existing livelihood strategies and resource use. During the direction phase, the implementer supports community efforts to identify and evaluate ways to achieve their livelihood development visions. This is when specific alternatives are explored. Finally, in the doing phase **the implementer must build community capacity and facilitate market access by helping the community cultivate links to government, civil society actors, and the private sector.**

(continued on following page)

Further guidance on design of alternative livelihood projects (continued)

IMM 2008(a) describes this process as one that empowers communities to adapt to change—including changes in management regimes over marine resources.²³ Therefore, **successful SLED engagement results in benefits beyond the immediate rewards of new livelihoods to encompass social resilience.** Although specific vocational skills related to a new livelihood are important, additional value results from enhancing skills related to identifying strengths and opportunities, and building networks that facilitate community responses to those opportunities.

For further discussion of the SLED livelihood development process and review of practical experiences in alternative livelihood projects, see IMM 2008(a). *Sustainable Livelihood Enhancement and Diversification—SLED: A Manual for Practitioners*. IUCN.²³

To choose sustainable management and conservation of marine biodiversity and natural habitat, resource users and decision makers need to see tangible rewards for changing resource use behaviors. The incentive-based conservation approaches discussed in this

chapter all recognize that potential loss of income and access to resources must be offset. The next chapter discusses various ways in which project design must consider links between incentives and behavior to draw on strengths of each approach.



Ahus Island, Papua New Guinea.

Chapter 3: Reflections on project design and tool selection

The preceding chapter presented three incentive-based approaches to marine conservation, summarized in Table 2 below. Ideally, one would like to answer the question of which approach is best, or assuming there is no unique intervention that works best in all settings, how should one design a project given the conditions of a site? Answering these questions on the basis of the case studies is complicated by the fact that: 1) the case study approach constrained the research to a small sample size, and 2) most projects do not collect adequate measures of biological and socioeconomic outcomes. Nevertheless, the various experiences surveyed do illustrate how these cases have responded to the challenge of designing incentives for conservation, and how they have performed in different settings. Indeed, despite the inability to support statistical analyses, the case studies offer a number of insights into how to choose the appropriate approach and how to successfully combine different features of the approaches to fit a particular context.

Table 2. Summary of three incentive-based approaches.

	Buyout	Conservation Agreement	Alternative Livelihood
Definition			
reward	Purchase of resource rights or equipment.	Direct compensation for behavior change.	Income or subsistence from new livelihoods.
behavior change	Reduce harvest levels.	Halt ecosystem-damaging activity.	Halt reliance on unsustainable resource use.
Mechanism	Reward compensates for reduced harvest capacity. Enforcement maintains the change.	Reward provided only if behavior changes.	Reward follows when alternative livelihood becomes economically viable.
Reward type	Usually cash.	Social benefits (e.g., health, education, transportation) Cash.	Income or consumption of goods from new livelihoods.
Maintaining change	Government agencies must continue to provide monitoring and enforcement.	Conservation investors must ensure continued monitoring for compliance and delivery of benefits.	Resource users must continue to engage in new activities and avoid unsustainable resource use.
Cost structure	Large, initial cost. Ongoing enforcement cost.	Ongoing cost of benefits and monitoring.	Cost of training, technical assistance, and initial funding for new livelihoods. New activities designed to become self-sustaining.
Essential for success	Well-defined access rights over the resource. Effective enforcement.	Long-term commitment from conservation investor.	Becomes and remains more profitable than unsustainable resource use.
Example project	Purchase and retire fishing licenses to reduce total harvest in an area.	Cover annual teacher salaries as long as no-take zone is observed.	Provide skills-training and start-up funds for ecotourism venture.

Opportunity cost

Advice: *Incentives are needed to address the opportunity cost of conservation. Incentives should be targeted towards legitimate stakeholders whose behavior or resource-use decisions the project seeks to influence, as they face an opportunity cost of conservation. However, in many cases wider distribution of benefits will be more practical and equitable.*

With respect to project design, case studies of all three approaches demonstrate the importance of addressing the opportunity cost of conservation—offsetting potential loss of income and access to resources to ensure that local stakeholders are not forced to bear an undue economic burden—but strategies to do so can vary widely. Buyouts are predicated on the notion that fair compensation can be transferred in an upfront transaction. Conservation agreements seek to provide a stream of benefits over time that offset opportunity costs. Alternative livelihood projects strive to develop new economic options that replace reliance on unsustainable resource use.

When opportunity cost is high, alternative livelihoods will struggle to generate sufficient income to replace forgone resource use. This was seen in the Port Honduras case where local fishers expressed the need to continue fishing despite the availability of alternative jobs linked to tourism and conservation. High opportunity cost also presents a challenge to more direct incentive strategies, as buyouts and conservation agreements will involve a substantial fundraising burden. If the opportunity cost is extremely high—for instance, if offshore oil resources are present—then incentive-based approaches may become unaffordable, necessitating other strategies centered on regulatory reform and policy advocacy.

Alternative livelihood approaches will be more feasible in low opportunity cost settings, but so will the other approaches. Low opportunity costs are favorable for buyouts and conservation agreements since opportunity cost forms the basis for determining compensation levels. Many conservation agreements are implemented in remote places where there are few alternatives and costs are generally low, as in the Melanesia cases. On the other hand, areas with high opportunity costs may be those in which a buyout or agreement is most needed to induce resource owners to embrace conservation, as in the case of Laguna San Ignacio.

In general, opportunity cost and resource dependence are correlated, though high dependence can accompany low opportunity cost, as in situations characterized by poverty and dependence on small-scale fishing. In these cases, offsetting forgone resource-use through a buyout or conservation agreement will be relatively affordable, even if there is a high dependence on the activity. Nearly all of the cases examined featured low-medium opportunity cost and low-medium dependence.

Another design consideration is the distribution of opportunity cost, which indicates who should receive benefits from a conservation intervention. For example, in the Phoenix Islands, benefits are provided to the government to compensate for lost revenues from license fees. In some cases, further incentives may be needed to secure buy-in from additional stakeholders, and often also cover at least a portion of enforcement costs (technically also a component of the opportunity cost of conservation). Buyouts are generally quite targeted in terms of beneficiaries, as compensation goes to those fishers or boat owners who agree to give up their licenses or vessels. The alternative livelihoods approach often is promoted with the expectation that the community will benefit as a whole. Many conservation agreements include a fund for community-wide benefits. For example, at Navini Island, the landowner clan receives lease payments, and the villages also receive funds to support schools and community development projects. Often it is easier and more equitable to provide benefits to the entire community rather than a subset, and this does not necessarily involve substantially higher costs.

Port Honduras Marine Reserve, Belize: Alternative Livelihood Training (ALT)

The Toledo Institute for Development and Environment (TIDE) co-manages Belize's Port Honduras Marine Reserve (PHMR) with the Department of Fisheries. Many local fishers complain of illegal fishers from neighboring Honduras and Guatemala. Although most arrest cases involve foreigners, some are locals involved in the TIDE training programs. TIDE operates an Alternative Livelihood Training (ALT) program to link sustainable natural resource management with livelihoods for local communities. The ALT program provides training in ecotourism fields such as kayaking, birding, fly-fishing, diving, hospitality, and small business management. Since tourism has not met growth expectations, trainees increasingly are looking for other opportunities to use their new skills. Despite the ALT, people say their income is insufficient for daily household needs, and community representatives argue for relaxed restrictions on fishing and harvesting of marine resources.

Navini Island Resort, Fiji: lease

Navini is one of 32 small islands in Fiji's Mamanuca group. The Navini island MMA exists by agreement between the Navini Island Resort and the chiefly clan of the Tui Lawa, the paramount chief of the Malolo region. The MMA protects the reefs surrounding the island with a complete ban on extraction of any resources. Surveillance and monitoring of illegal activities falls under the daily duties of resort staff, who inform the Tui Lawa of infractions which he addresses using traditional authority mechanisms. The agreement, including an annual payment of FJD5000, has been renewed every year since 1988. Additional benefits include library books and other materials for the local primary school, and support for community development projects with resources, cash, or labor. Local communities are also seeing ecosystem benefits as stock recovery around Navini is having positive spillover effects for fishing grounds throughout the Malolo region.

Positive and negative incentives: benefits and enforcement

Advice: *Both positive incentives from any of the three approaches and negative incentives in the form of enforcing laws and regulations are necessary for conservation success—the sources of threats to the resource base determines the balance of incentives and enforcement in successful project design.*

Most sites include a formal protected area of some kind, as well as formal laws that support conservation beyond protected areas. For example, the turtle projects in Tanzania, the Solomon Islands, and Indonesia are in remote sites that are rarely visited by enforcement officers. Thus, weak enforcement gives rise to the need for additional incentives. Nearly all the case studies involve providing a benefit to local resource users whose activities threaten biodiversity or resource sustainability. Some cases also face external pressure, such as fishers from other regions or countries who are active in the Phoenix Islands, Helen Reef, Cagayancillo, and Galera. In the most remote case study sites, illegal foreign fishing operations pose the main threat. The capacity of local communities to deal with this large-scale threat is limited, so any approach must not only provide incentives for local resource users to change practices, but also assist them with enforcement. Several projects support community efforts to enforce conservation measures against outside threats,

enhancing security of property rights while also providing employment opportunities. In general, more significant external threats imply a need for greater emphasis on enforcement, while local threats may be more responsive to incentives.

In buyout cases, government enforcement generally remains necessary, while compensation serves to achieve equitable reductions in capacity and thereby improve acceptance of conservation measures and strengthened regulation. The Northern Gulf of California case illustrates how initial reliance on regulation and enforcement failed to thwart the risk of extinction, and then the buyout was hoped to ease the enforcement burden; ultimately, a combined investment in the buyout and enforcement proved necessary. A fishery with limited access is necessary so that there is a bundle of legal interests that can be purchased, traded, or leased. These property rights must be enforced, otherwise conservation investors cannot be assured

that by acquiring these legal interests they will quantitatively reduce harvest pressure. To maintain the impacts of a buyout, enforcement is necessary to ensure that fishers cannot re-enter the fishery and that new entrants are prevented. The case studies suggest that in the absence of reliable enforcement, buyout project design must become more elaborate to incorporate ongoing incentives.

Conservation agreements require the ability to monitor conservation performance (see below) and to apply and enforce sanctions in the event of non-compliance. In some contracts, sanctions may simply take the form of withholding funds or reducing benefits by some prescribed amount. Losing eligibility for scholarship funds if caught poaching, as might occur in Jamursba Medi or the Maya Mountain Marine Corridor, is an example. In these cases, government or third party enforcement is not essential. However, in cases such as Laguna San Ignacio, legal action may be required to prevent development that is contrary to the terms of the contract. In most of the conservation agreement cases, the contract

sought to fill the enforcement void left by an absence of laws or inadequate application of existing laws.

In alternative livelihoods, enforcement may not be emphasized if the new activity fully replaces unsustainable behavior. However, most often livelihoods need to be part of larger set of interventions, including investment in enforcement. In the absence of enforcement, there may be little to prevent people from continuing with the unsustainable behavior that the new livelihood is meant to displace. Project design often appears to assume that time or income needs of resource users are constrained such that the alternative income opportunity will make the original resource use either impossible or superfluous; however, this is rarely the case. Building an enforcement component into the project is one possibility. Another is to include alternative livelihoods in an agreement to provide funds for livelihood development in return for verified compliance with conservation requirements. The latter approach adopts the logic of conservation agreements.

Galera-San Francisco Marine Reserve, Ecuador: fisheries management

The 546 km² Galera-San Francisco Marine Reserve was established in October 2008 in Ecuador's Esmeraldas Province. Ecuador's Ministry of the Environment and the Ecuadorian NGO Nazca will use a conservation agreement to offset short-term losses to fishers caused by improved management that will generate greater returns in the future. Preparatory actions for conservation agreements were signed in February 2010 with the communities' Marine Reserve association and the Galera fishers. The actions will include designing and implementing a communication program, building capacity for the Marine Reserve association to operate as an organized group, creating a seed fund to improve livelihoods, mapping fishing areas for marine reserve zonation, designing and implementing fisheries rules and a monitoring system, and strengthening the fisheries cooperative. These steps will feed into the development of a management plan and a conservation agreement.

Maya Mountain Marine Corridor, Belize: scholarships

The Toledo Institute for Development and Environment (TIDE) co-manages Belize's Port Honduras Marine Reserve (PHMR) with the Department of Fisheries. One type of incentive provided by TIDE to communities is a scholarship program. This program encourages fishers to give up unsustainable management practices in return for scholarships, thus providing an alternative way for parents to finance their children's education. Over 50 students have received scholarships. The program targets children whose parents agree to stop using unsustainable fishing and farming methods. The recipients of the scholarship program are expected to contribute to conservation efforts and work alongside TIDE on community outreach activities. Although scholarships are provided in exchange for commitments to foregoing unsustainable fishing practices, eligibility is not directly contingent on performance, and there is no explicit trade or formalized sanction system.

Performance monitoring

Advice: *Ongoing performance monitoring is critical for the success of conservation agreements, but less so for alternative livelihoods and buyouts. However, all projects will benefit from greater monitoring to assess intervention impacts and inform future tool selection and project design based on quantitative analysis.*

Monitoring is inadequate in most projects, including monitoring of conservation outcomes, socioeconomic impacts, and performance of resource users with respect to conservation requirements. Given the necessity of monitoring in the conservation agreement approach to ensure that benefits are contingent on performance, one might expect this group of case studies to exhibit better monitoring provisions. However, even among these cases monitoring leaves room for improvement, resulting in weaker incentives if the link between benefits and compliance is not sufficiently strong. The importance of performance monitoring for the conservation agreement model means that this tool should be selected only if the desired behavior change is amenable to such monitoring and the project implementers have the capacity to ensure that monitoring takes place. Again, the Laguna San Ignacio easement is a model agreement in which a third party monitors and reports on compliance on an annual basis, and funds are released based on this reporting.

The conservation agreements that involve direct payments for sea turtle nest protection

are among the best monitored. These projects devised compensation formulas of varying complexity linked to numbers of nests, eggs, and hatchlings, as in Mafia Island and Rendova. The Mafia Island case involves per-hatchling payments, which means that each hatchling from each nest is counted. This provides valuable information regarding conservation performance of villagers as well as hatching success rate, which may be low for various reasons. For instance, the Jamursba Medi project did not monitor hatching success, and only recently found that rates are low due to high sand temperatures and nest inundation. The project now relocates many nests, a need that would have been revealed earlier by better monitoring. These projects demonstrate how specific conservation actions and the explicit link between conservation performance and benefits have significant implications for monitoring requirements. The more sophisticated the arrangement, the more imperative it is that performance and conservation outcomes are closely monitored. Such monitoring has the added benefit that the project can better demonstrate actual conservation impact.

Mafia Island, Tanzania: incentive payments

Before 2001, all turtle nests discovered by residents on Tanzania's Mafia Island were poached. In 2001, the Mafia Island Turtle Conservation Program was initiated through a collaboration between Mafia Island Marine Park and Mafia District Council, with financial support from WWF. The program led to the establishment of a local NGO, Sea Sense, which trained and paid elected community monitors to patrol nesting beaches, relocate nests when necessary, and assist with data collection. Staff perceived that the monitors were not sufficient, since 50% of nests were still poached. In 2002, Sea Sense began paying individuals for finding and reporting nests, with the amount depending on the nest's hatching success. Under the combined program of nest monitoring, nest protection payments, and education programs to raise awareness and concern about sea turtle conservation, the poaching rate decreased to 3% in 2002, 2% in 2003, and less than 1% in 2004. Between 2005 and 2008, the incidence of poaching remained low averaging 3.4%.

The alternative livelihood approach does not depend in the same way on the ability to monitor performance, as the investment is not predicated on an explicit, negotiated exchange. However, like the other two approaches, alternative livelihood interventions do benefit from monitoring to demonstrate biological as well as socioeconomic impacts

of the investment. Although some cases do include monitoring of certain aspects of the marine environment, with the exception of Punta Abrejos the alternative livelihood cases do not monitor conservation performance. For instance, in Ayau there is no monitoring or enforcement protocol for the MPAs or the turtle commitments. Although this does not

necessarily preclude success, impacts of these programs are difficult to assess due to the lack of monitoring data. Monitoring of resource trends is also important for

sustainable resource management, as extraction rates must be calibrated with respect to stock dynamics.

Benefit packages

Advice: *Benefits should be linked to conservation performance, sufficient to offset opportunity costs, and tailored to local needs and aspirations. While cash payments are rare, commonly seen elements in benefit packages include scholarships or other forms of support for education, direct employment in monitoring and enforcement activities, and support for new and improved livelihoods.*

The case studies exhibit a wide variety of benefits that can serve as incentives for conservation. Individual cash payments are not very common in the cases in our study. This is the form of benefit that probably most people associate with direct incentive programs due to the literature on conservation payments and payments for environmental services. However, in some contexts, cash is not fungible, or project proponents are concerned with how the cash will be used. Buyouts have traditionally involved direct payments to vessel or permit owners, but the buyout examples in this study also involve loans or alternative livelihood support. The cases in which individual cash payments are provided usually also include some other form of benefit such as employment or community development funds. A system that pools individual payments to fund public goods can achieve much greater positive impact than small individual cash payments. The ejido members of Laguna San Ignacio recognized this and chose to pool payments to fund community projects rather than divide them among households. Pooled payments can be particularly attractive when communities face institutional or social challenges to providing public goods in the absence of outside support.

Buyouts generally involve upfront cash payments as the primary benefit. Alternative livelihoods involve providing support to

catalyze new livelihood options that will provide benefits in the form of income or subsistence. Conservation agreements can incorporate a range of options for benefits. From individual cash payments to funds for community development projects to scholarships, there is a wide range of possible benefits that can create individual or community incentives. Importantly, benefit packages must respond to resource users' needs and priorities, typically identified through a participatory consultation process. For instance, if unsustainable resource use is driven by the need for cash to pay school fees, a benefit package that includes scholarships may be appropriate. Another difficulty faced by people at many sites is constrained access to credit. A benefit package can address this need by directing funds to a micro-loan facility accessible to community members, as done using tourist fees in the case of Gilutongan.

Several projects in the case studies provide scholarships. In remote areas, school fees represent a major expenditure for households, and lack of cash is the primary obstacle that prevents parents from sending their children to school. For conservationists, paying for school fees can be relatively inexpensive (for instance, ~US\$10,000 per year would cover the expenses for all schoolchildren in Jamursba Medi), and is a benefit that is likely to reach nearly every household.

Gilutongan Marine Sanctuary, Philippines: tourism revenue sharing

Gilutongan Marine Sanctuary (GMS) is located in the Philippines' Cebu province. GMS is one of the country's few 'urban' MPAs, located 20 km from Cebu City, the second largest urban area in the Philippines. The ordinance that established the GMS includes a tourism revenue-sharing scheme between the municipality of Cordova (70%) and the village of Gilutongan (30%). Alternative livelihoods—including seaweed farming and tourism-based activities (catering, lifeguarding, boating service, souvenir selling)—are promoted to reduce dependence on reef resources. Loans are available to finance new livelihoods, but only 10% of loans have been repaid. Another issue is revenue disputes; municipal officials claim they have given the allocated share to village officials each year, but village officials deny this.

Jamursba Medi, Indonesia: scholarships

Jamursba Medi, in Indonesia's Papua province, hosts the largest remaining leatherback nesting population in the Pacific. World Wildlife Fund (WWF)-Indonesia has worked with the villages of Saubeba and Warmandi to protect this site since 1993. Past attempts to create incentives for turtle conservation included alternative livelihood projects, but these all failed due to lack of transportation and marketing infrastructure. Thus, benefits only accrued to 24 village patrollers receiving salaries, causing tension in the villages. In 2005, WWF collaborated with SEACOLOGY (www.seacology.org) to provide 13 three-year scholarships for village students in exchange for protecting a 113-hectare nesting beach and 65-hectare fringing forest reserve. If a family is found poaching eggs, they no longer will be eligible for participation in the scholarship program. In August 2007, the villages agreed to protect an additional 822 hectares, including 25 km of turtle nesting beach.

Although the conservation agreement approach offers great flexibility in designing benefit packages to meet locally specific needs and aspirations, there is considerable convergence in the form that these benefit packages take. As noted, scholarship programs are fairly common, and benefits also often include direct employment in patrolling and monitoring activities. In addition, despite the fact that the logic underlying the conservation agreement model is distinctly

different from the alternative livelihoods approach, at least a portion of benefits often takes the form of investments in improved livelihoods and enterprise development. Among our case studies, in addition to the alternative livelihoods projects themselves, nearly half of the other projects from the buyout and conservation agreement examples provide alternative livelihood support as a component of the benefit package.

Choosing approaches—property rights

Advice: *Conservation agreements and buyouts should be implemented in areas with clear property rights (either full ownership or enforceable exclusive rights of access and use). This factor is less important for alternative livelihoods, unless the emphasis is on improving managed use of the resource.*

An analysis of the legal context and property rights is essential to inform the selection of conservation approach in a given situation. In many places, outright purchase of an area (as in the Palmyra example) or a formal easement (as in the Laguna San Ignacio) will not be possible due to the lack of essential enabling legislation that allows parties to enter into such a transaction—whether because certain types of property cannot be bought and sold, or because there is no legal recourse in the event of transgressions. Similarly, a conservation investor must be confident that, by entering into a transaction with resource owners, pressure on the resource actually will be reduced rather than simply create an opportunity for third parties to replace the previous resource users. Thus, buyouts and formal legal mechanisms will only be feasible in places that are subject to relatively sophisticated legislative and regulatory frameworks.

Conservation agreements are more flexible, as they simply require that conservation

investors and resource users come to mutually agreeable terms, but they do require that property rights—whether formal, informal, or customary—are reasonably well defined. This need not denote formal, legal rights, as several cases involve customary and traditional tenure arrangements and rights of access. The important consideration is whether the resource users entering into the agreement have a defensible claim to the resources or habitat area, such that they can make commitments that will not be undermined by the behavior of others. In some cases, strong leadership can sustain an agreement despite disputes or ambiguities concerning property rights. For example, in Laguna San Ignacio an easement was negotiated with the ejido members, although an additional 400 non-members also reside in the area. Although many of those 400 residents dispute the ejido landownership claim, the ejido members are sufficiently well organized to prevent the other residents from disrupting the conservation easement.

Alternative livelihoods projects can be attempted almost irrespective of the legal and property rights context, but their conservation impact does depend on who has resource access, particularly in the case of sustainable resource management schemes. Sustainable management is more likely to succeed with well-defined property rights. For instance, the purpose of the Punta Abreojos cooperative was to sustain fisheries production for its members. As the area is fairly remote and

there are few income generating options, residents decided against new activities and instead attempt to maintain the viability of fishing, their traditional livelihood. The incentive for a long-term management perspective derives from exclusive access offered to the cooperative in the form of a concession. These dedicated access privileges have allowed the Punta Abreojos cooperative to exclude others from the area and reap the rewards of sustainable management.

Punta Abreojos, Mexico: cooperative and Marine Stewardship Council certification

In 1994, the Mitsubishi Corporation and the Mexican government proposed to construct the world's largest salt plant in Laguna San Ignacio, a wetland on Mexico's Pacific coast. The anticipated impacts of this facility on whales and the lagoon generated great concern, and the local fishing village of Punta Abreojos worked with a consortium of Mexican and American NGOs to defeat the proposal. The fishers chose to continue fishing rather than pursue potential jobs at the proposed plant. Punta Abreojos holds an exclusive concession to its fishing territory for lobster, abalone, and other benthic species, renewable every 20 years. The area is co-managed by the cooperative, which provides internal and external enforcement, and the Mexican government, which conducts stock assessments and implements management measures such as area closures, gear restrictions, legal minimum sizes, and protection of gravid females. In 2004, the Mexican red spiny lobster fishery operated by Punta Abreojos and 8 neighboring cooperatives obtained Marine Stewardship Council (MSC) certification, the first small-scale community fishery to be MSC-certified.

Choosing approaches—essential capacities

Advice: *Buyouts only should be pursued if reliable enforcement capacity exists to ensure a permanent reduction in resource pressure.*

Buyouts require the least local capacity, as resource users essentially relinquish ownership or rights in exchange for compensation, and therefore are no longer involved in management or enforcement activities. However, the approach typically relies on government capacity to enforce the terms of the buyout. Even in cases where a nonprofit organization purchases and retires permits or equipment, a buyout will have no impact if the purchased vessels or gear are replaced by

other fishing capacity, or if retired licenses or permits are reissued. Therefore, a successful buyout requires government enforcement and monitoring to verify that total capacity and harvest effort are indeed reduced. In some cases, a buyout accompanies a gear ban, such as the gill net bans in St. Croix and the Northern Gulf of California. In addition to purchasing the gear and declaring a ban, the government must monitor fishers to verify that illegal gear is not being deployed.

St. Croix, USVI: gill net and trammel net buyout

St. Croix is the largest of the US Virgin Islands, located in the Caribbean. An estimated 400 species of fish live in and around the East End Marine Park of St. Croix, and the area is also important to several sea turtle and sea bird species. Overfishing, especially using gill and trammel nets, is a key concern. In 2002, the St. Croix Fisheries Advisory Committee recommended a ban on trammel and gill nets, with a strategy to simultaneously buy out destructive gear. Regulations to ban these nets were approved in 2006, and the one-time buyout program took place in 2008, funded by NOAA. However, the ban remains controversial and unpopular among fishers, as the buyout budget was very low relative to the value of the fishery, and many are unconvinced that an equipment ban addresses the main ecological threats.

Advice: *Conservation agreements only should be pursued if the resource owners have the capacity to collectively negotiate, enter into binding agreements, and perform the required conservation actions.*

The resource owners must be in a position to understand the agreement and to negotiate and enter the agreement as a unified party. This can be an obstacle in establishing a conservation agreement, requiring extensive consultation and often an investment in creating community decision-making mechanisms. For instance, in Tetepare, resource owners belong to the Tetepare Descendants' Association, which acts on behalf of thousands of individuals scattered throughout several islands. In some cases, an investment in institutional capacity building at the community level can generate wider benefits by serving a broader community coordination role. At the same time, project implementers entering into the agreement as conservation investors need considerable

capacity, particularly with respect to benefit delivery. Dependence on short-term funding poses a challenge to ensuring that this capacity endures.

The resource owners also must be able to perform the agreed-upon conservation actions, which in many cases include specific management activities as well as reductions in harvesting. In several of the case studies project implementers provided equipment and training for community monitoring and enforcement to strengthen management capacity, particularly in remote areas such as Helen Reef. Thus, although ability to perform conservation actions is an essential capacity, when lacking, this gap typically can be addressed through targeted investments.

Helen Reef, Palau: community fund

Hocharihie (or Helen Reef) is located over 500 km south of the main islands of Palau and 65 km east of Hatohobei Island (or Tobi). The remoteness of its reefs leaves it vulnerable to foreign illegal fishing, as well as locally driven unsustainable harvesting. Management challenges include conservation planning, monitoring and enforcement for an extremely isolated site, and reconciling conservation with economic needs of the Tobian community. The Hatohobei State Government and Hatohobei traditional leadership are working with Conservation International and Natural Equity to protect Helen Reef as a marine reserve using a conservation agreement. The conservation agreement plan for Helen Reef includes an endowment to support both management activities and a community fund for social development investments that compensates the Tobians for forgone resource use. Support for monitoring and enforcement will include means to address the challenges of remoteness, using technologies such as radar and strategies to coordinate with national law enforcement.

Advice: *Alternative livelihood projects for income-generation only should be pursued if the capacity to operate in market context exists or can be created.*

The cases in this study represent varying degrees of local capacity for management, enforcement, and business. Alternative livelihoods are the most demanding approach in terms of the required skill set for local communities. Therefore one might expect to see this approach implemented mostly in areas with high local capacity, but this is not the case in the sites in this study. For areas with limited local capacity, training and skills building may be a worthwhile investment if other conditions are amenable to the livelihoods approach, but in many cases an approach with less demanding local capacity requirements may be more suitable.

The extent to which markets drive unsustainable resource use varies tremendously among the cases. Along the coast of central California, fishers are responding directly to local, national, and indeed global consumer demand for fish. Similarly, the sale of fishing licenses to foreign fleets in Kiribati is driven by global demand for desirable species. In contrast, consumption of sea turtle meat and eggs in Ayau and Jamursba Medi is the result of local demand, as is overharvesting of various species in the Solomon Islands cases. Interestingly, in the remote sites where resource behavior is primarily shaped by local subsistence demand, conservation actors often have gravitated to the alternative livelihood approach—in

precisely the contexts where cultivating new enterprises faces the greatest challenges due to remoteness and absence of business skills and entrepreneurial capacity. One of the most important considerations in tool selection

must be whether the enabling conditions for alternative livelihoods are in place, and, if not, to what degree conservation investment can strengthen these conditions.

Ayau islands, Indonesia: piggery

The Ayau islands are part of the Raja Ampat archipelago in Indonesia's West Papua province. Turtles and turtle eggs have long been a staple food in Ayau. In the past, villagers would harvest up to 100 adult turtles for large communal gatherings such as the annual Christmas feast. In 2005, Conservation International engaged the Ayau villages to reduce turtle consumption. The headman of Yenkawir village indicated that his community might forgo turtle meat if a substitute were made available. Yenkawir committed to cease turtle hunting at the end of 2007, and CI agreed to supply six large pigs for their Christmas feast. CI also supplied each extended family with two piglets to raise for later feasts and provided intensive technical assistance to design a closed system piggery to collect waste for processing into cooking biogas and compost manure. The compost aids fruit and vegetable production which currently is limited by poor soil quality. The pigs initially were offered as a one-time benefit, but CI has continued to provide pigs for Christmas feasts.

Alternative income projects also require individuals within the community with an entrepreneurial disposition, managerial skills, and basic financial and business capacity—pre-requisites for operating a successful business. While an NGO may be able to provide training and start-up capital for new enterprises, the basic requirement of cost competitiveness often will be difficult to meet due to high communication and transportation costs imposed by remoteness. One solution proposed in Ayau is to train the community to produce goods that are consumed locally, to avoid the need for transportation and

marketing. Thus, alternative livelihood initiatives that focus on local subsistence rather than production destined for market often may be more viable. Value chain analyses and market studies for new products are an essential but often missed step in evaluating the potential for alternative livelihoods, including assessment of capacity to deliver a product or service at consistent quality and quantity. If products will not be competitive and supplies are unreliable, a more direct incentive approach will offer a greater probability of success.

Baraulu, Solomon Islands: sewing

Baraulu and Bulelavata villages are on the Roviana Lagoon, in the western Solomon Islands. In 1999, these communities decided to periodically close mangrove areas to shellfish gathering to reduce overexploitation. A small-scale sewing project was implemented to offset income lost by women who would normally sell shells. Positive experience with temporary closures led to the establishment of a 103-hectare permanent closed area in 2002, but the sewing project failed due to disputes about distribution of benefits and challenges relating to consistent product markets, transportation to those markets, reliable people to handle finances, and entrepreneurial skills—requirements that are difficult to meet in this remote location. Difficulties facing alternative livelihoods prompted a shift in project focus to infrastructure projects that are more likely to benefit the whole community and are less demanding in terms of capacity.

Many alternative livelihoods projects provide assistance with one particular aspect of livelihood development. For example, the Baraulu project provided the initial capital investment, in the form of sewing machines. However, assistance likely is needed in several areas for an alternative livelihood to succeed.

In St. Croix, fishers were assisted in obtaining captain's licenses, but not in obtaining employment. Support may be required not only for initial equipment purchases, but also for such activities as business development, technical assistance, credit, transportation, and marketing. These observations are

consistent with the findings of a global review of livelihood approaches by IMM 2008(b), which lists 29 elements for consideration when designing alternative livelihoods projects²⁶.

Most alternative livelihood projects currently implemented address one or two of these elements, but not a complete program.

St. Croix East End Marine Park, USVI: interpretive ranger and commercial captain training

In 2001, the St. Croix East End Marine Park (STXEEMP) was created, the largest marine protected area of the US Virgin Islands. The Nature Conservancy (TNC) received a grant from NOAA and private funding to strengthen the STXEEMP, including alternative livelihood initiatives. The Nature Conservancy has implemented two alternative livelihood programs for fishers in St. Croix. One commercial fisher was trained as an interpretive ranger for the STXEEMP. In 2006, TNC began a commercial captain's license training. Fishermen displaced by the STXEEMP received first priority for the twelve available training spots. Following low response, the program opened to the wider community, but only eight fishers enrolled. Some displaced fishers were unable to participate because of literacy and language barriers. Also, the alternative livelihoods may not have been lucrative enough to compete with fishing, opportunities for those receiving captain's licenses were limited, and TNC could not assist fishers in finding new employment.

Choosing approaches—urgency of threat and funding potential

Advice: *The greater the urgency of conservation action, the more direct the incentive will need to be to elicit behavior change within the necessary time-frame. However, the feasibility of more direct incentive approaches depends on the degree of fundraising potential.*

The urgency of conservation action greatly impacts the suitability of a given tool. If sufficient funding is available and legal mechanisms are clear, a buyout may be the quickest way to reduce pressure. In the Northern Gulf of California initiative in Mexico, imminent extinction of the vaquita prompted a buyout. In the case of Morro Bay, a lawsuit against the National Marine Fisheries Service and the declining profitability of the fishery motivated the parties to come to the table and find a workable solution using a buyout despite the costs. The simplicity of the approach notwithstanding, opposition to a buyout can delay implementation. For example, in the Northern Gulf of California, strained relations between fishers and government made it difficult for parties to come to the table. In St. Croix, the funding available for the buyout was so limited that many fishers felt insulted. Some of these issues can be prevented by early and ongoing communication between stakeholders to involve them throughout the design and implementation process for the buyout.

The conservation agreement approach can be deployed relatively quickly, as seen in cases where an initial short-term agreement is concluded as a stepping-stone toward a more comprehensive long-term arrangement,

as in the Galera example. Alternative livelihood projects are less likely to result in near-term benefits, as new enterprises usually require an incubation period, and the results of improved resource management systems typically will not be seen for some time. However, the skills and capacity fostered by an alternative livelihoods program may improve general prospects for long-term development, as is expected from the program in Bar Reef.

Each approach faces fundraising challenges, and tool selection may be constrained by availability of financing. Consequently, project design must be informed by a careful evaluation of fundraising potential. A typical buyout will require a large upfront payment, which can be difficult to raise. Urgency of threat to a charismatic species such as the vaquita can strengthen fundraising potential, which made the Northern Gulf of California buyout possible. Alternative livelihoods initiatives can benefit from synergies with development donors, as was the case in Bar Reef. Conservation agreements necessarily depend on long-term funding to sustain incentives through provision of benefits.

Conservation agreements spread the opportunity cost offset over time, such that

Bar Reef, Sri Lanka: Sustainable Livelihoods Enhancement and Diversification

In 1992, Sri Lanka's Bar Reef became a 306.7-km² marine sanctuary, housing over 200 fish species and 120 coral species. Destructive fishing methods and overfishing threaten many of these species. The villagers of Kudawa rely on fishing around Bar Reef. Starting in 2007, the Coastal Resource Management Project and Community Help Foundation employed IMM's Sustainable Livelihoods Enhancement and Diversification (SLED) approach to create new income-generating options. Extensive community consultation led to investments in seaweed farming, fish farming, home gardens, and PADI diving license training. Seaweed farming at the village level has not reached viable scale, but several PADI licensees have found new employment, aquaculture is taking hold, and home gardens are reducing cash needs that drive destructive fishing. However, the project currently is unable to verify whether success in jumpstarting new livelihoods is achieving conservation outcomes, and it is not clear when the livelihoods will become economically self-sustaining. The SLED process is concerned not only with creating successful alternative livelihoods, but also on empowering community members to continue the process.

reliance on short-term grants may be viable for a period, but ultimately the objective is to secure a long-term financing mechanism. Most of the conservation agreements studied in this research effort have yet to secure a long-term funding source. Exceptions are Laguna San Ignacio, which is supported by an endowed trust fund to cover costs of benefits, monitoring, and enforcement in perpetuity, and the Misool Eco Resort, which will use tourism revenues to sustain its financial commitments to the local community. While most conservation agreements seek to use short-term grants to sustain benefits for a window of time during which long-term financing is secured, actually capitalizing trust funds for the long term is a non-trivial task.

The alternative livelihood approach reflects a model in which an initial set of investments is intended to result in self-sustaining enterprises or changes in resource management, thereby dispensing with the need for long-term financing. Although alternative livelihood projects aim to become self-financing, there are very few examples of projects that succeed in this aim and thus most continue to rely on series of short-term grants. A study by the Biodiversity Conservation Network found that very few enterprises generated any profit after several years.²⁷ In some places, ecotourism projects can offer a dependable stream of benefits, such as in Fiji which already enjoys a well-developed tourism market and related infrastructure. Of course, tourism is not appropriate in all locations and comes with its own set of challenges.²⁸

Waitabu, Fiji: marine reserve ecotourism

The Waitabu MMA, located on Fiji's Taveuni island, covers an area of about 27 hectares. This MMA is part of the Fiji Locally Managed Marine Area Network, as well as the Bouma National Heritage Park, and is managed by local community members with support from Marine Ecology Consulting and the Coral Reef Alliance. A small-scale marine reserve ecotourism project was developed in 2000 to provide cash income for community members. A snorkeling access fee system provides funds for community development and to support the operation of the MMA. In addition, community members can earn income through home stays and sale of souvenirs. There is no formal surveillance program, and the area has attracted occasional poaching by people from neighboring villages due to perceived increases in fish abundance.

Drawing on strengths from each approach

Advice: *Combining features of the three approaches can remove harvest capacity to reduce pressure on resources, provide ongoing incentives to ensure long-term compliance, and create alternative economic options to generate income.*

Most projects in our study attempt to provide ongoing incentives for conservation. Only a few provide purely one-time benefits, and those that do, such as the Mafia Island gear exchange, also include an alternative livelihood component. The principal difference among the approaches is how benefit provision is structured to create incentives. In a typical buyout, the benefit offered is a one-time incentive to cease an activity. However, in the buyout cases surveyed, benefits are being structured to also provide ongoing incentives for compliance instead of relying solely on a one-off payment followed by enforcement. In addition to initial payments to individuals for

giving up permits, vessels, or gear, project design can include a public incentive in the form of periodic payments to the community that depend on measurable performance (e.g., number of nets in the water, amount of bycatch). For example, in the Northern Gulf of California case some fishers received one-time funds to relinquish their permits (a clear buyout transaction), while others received compensation for temporary cessation of fishing in a particular area (more like a conservation agreement), and a portion of this compensation consisted of support for alternative livelihood development.

Mafia Island Marine Park, Tanzania: gear replacement

Covering 822 km² on the southeast of Mafia Island, and involving over 20,000 people in 14 villages, Mafia Island Marine Park (MIMP) is one of the largest marine protected areas in the Indian Ocean. Its resources are threatened by destructive fishing methods as well as over-exploitation. In line with strategies set out in the MIMP management plan, a credit-based gear replacement scheme was initiated in 2002 that offered fishers the chance to obtain materials for any sustainable livelihood, including fishing, in exchange for destructive fishing gears, principally illegal small-mesh seine nets. Fishermen could access interest-free loans by which to buy replacement materials. The incentive to participate was that MIMP set a deadline after which illegal gears would be confiscated and the opportunity to get loan assistance would pass. According to participants, the gear replacement program has played an important role in sustaining livelihoods while regulations against destructive techniques are enforced. The scheme was supported by World Wildlife Fund up to 2005; thereafter, support has come from a World Bank program. About 75% of illegal seine nets have been removed, but evidence suggests some fishers simply go outside of protected zones or fish with illegal gears at night, at times when they are confident of avoiding MIMP patrol boats.

Alternative livelihood projects are based on the premise that incentives in the form of income or subsistence from new livelihoods will be ongoing as the new activities take hold and offer an attractive alternative to unsustainable resource use. Thus, whether the incentive truly is ongoing depends on whether the enterprise is successful, and whether people forgo unsustainable activities as a result. Importantly, most contexts are dynamic and an incentive that is adequate today may become irrelevant tomorrow. Conservation agreements can adapt to such changes by periodically adjusting or renegotiating benefit packages to account for economic or other changes, as they deliberately structure benefits as ongoing incentives that depend on verified reductions

in threats to resources and biodiversity. The evolution of interventions in Baraulu and Olive reflects adjustment to the alternative livelihood approach to incorporate an intervention that more closely reflects a conservation agreement model. However, these projects do not include sanctions for non-compliance.

Olive, Solomon Islands: health clinic

Olive is a village located in the Roviana Lagoon, in the Western Solomon Islands. In 2003, Olive permanently closed 157 hectares as a marine protected area (MPA) to protect coral reefs and reef fish. The MPA is part of a system developed in collaboration with the Western Solomons Conservation Program (WSCP). WSCP assists communities that establish MPAs with social development benefits (e.g., clinics, health posts, schools, school renovations, community halls, women's halls). WSCP only funds benefits that will accrue to the entire community or some large portion of it (e.g., women or children). In Olive, the selected benefit was a health clinic completed in 2008. There are no specific requirements for a village to receive benefits, other than establishing a MPA and providing the timber and labor for construction.

Thus, many of the projects combine features of the three approaches. For example, both buyouts and alternative livelihoods can be integrated into a conservation agreement project structure. The Laguna San Ignacio easement involves funds to be used for community development and alternative livelihoods training. The difference between the Laguna San Ignacio livelihood investments and a typical alternative livelihoods project is that the funds are provided contingent on conservation performance, and the implementing conservation organization is not responsible for creating or maintaining the livelihood projects. Buyouts can effectively

reduce effort and address overfishing, but in many contexts fishers do not want to just be compensated for withdrawing effort but also desire support for developing sustainable fisheries or other livelihoods. Therefore, in many cases a buyout will only be accepted as one component of a broader plan, again yielding a hybrid of approaches. For example, in the Morro Bay trawl fishery, TNC is exploring the possibility of leasing the permits they bought back to the fishers. These permits would include legally binding gear or time-area restrictions, mimicking the easement approach that is used in terrestrial settings.



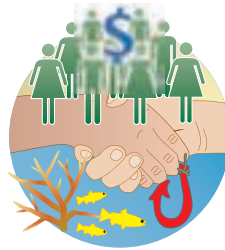
Gulf of California, Mexico.

Chapter 4: Concluding remarks

The various considerations discussed in the preceding chapter intersect in numerous ways, such that a simple decision-tool for selection of approach is impossible to construct. Greater need for enforcement will usually accompany high opportunity cost. Weaker market integration often implies greater resource dependence. Although one wishes that greater urgency and degree of threat would be positively correlated with availability of funding, this is not necessarily the case. Taking together these factors and the dynamics among them, the conservation implementer faces a project design task that requires careful, informed judgment.

In summary, although the complexity of successful marine conservation interventions precludes a definitive characterization of ideal approach or project design, the case studies collectively do suggest that the design of incentives is a key consideration. Economic incentives drive behavior with respect to resource use, and therefore project impacts on incentives are crucial to eliciting change in that behavior. Direct incentives that reward conservation and sustainable practices offer unambiguous choices to resource users if conservation performance is measured and used to calibrate benefit packages. Thus, direct incentives present resource users with distinct decisions regarding how to extract value from their resources, and force implementers to consider important factors of monitoring, enforcement, and coordination mechanisms for resource-use decisions.

One might be tempted to conclude that the more direct the incentive, the more likely that the intervention will succeed. If that were the case, it would suggest that tool selection first should consider whether a buyout is possible, and if not then consider the potential for an incentive agreement, and finally, if neither of these approaches are feasible, settle for an alternative livelihood strategy. However, the case studies reviewed in the preceding chapters do not support such a clear-cut conclusion.



Instead, successful interventions combine elements of all three approaches. The direct incentive offered by buyouts can produce a quick, measurable reduction in harvesting pressure, thereby addressing the principal

threat to biodiversity and ecosystem values. The conservation incentive agreement model is built on a stream of benefits over time, such that the incentive for resource users to support conservation is sustained. Given that most projects—regardless of approach—involve the termination or reduction of certain activities by resource users, other economic opportunities are needed to drive socioeconomic development, indicating that an alternative livelihoods component often must be part of overall strategy. Further piloting of combined approaches, such as leasing fishing rights to reduce bycatch or performance-based agreements that provide funds for education or alternative livelihood development, promise great potential for effective design of successful marine conservation interventions.



Gladden Spit, Belize.

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Appendix

Table A.1. Summary of buyout case studies.

Site	Year	Purpose
Mafia Island Marine Park gear replacement	2002	Curb the use of destructive gear to diminish ecosystem degradation.
Morro Bay trawl permit and vessel buyout		Reduce trawling intensity off the California coast to reduce negative impacts on habitat.
Northern Gulf of California gill net permit buyout	2007, 2008	Reduce number of gill nets in the water, thus reducing vaquita bycatch.
Palmyra island purchase		Establish conservation area to preclude destructive development.
Phoenix Islands Protected Area fisheries license revenue offset	pending	Eliminate pressure from commercial fishing by foreign fleets.
St. Croix gill net and trammel net buyout		Remove gill and trammel net gear to reduce impacts on benthic habitat, in particular corals.

Table A.2. Summary of conservation agreement case studies.

Site	Year	Purpose
Galera-San Francisco Marine Reserve	pending	Protect marine resources through MPA creation.
Helen Reef	pending	Establish MPA with sustainable management and enforcement provisions.
Jamursba Medi scholarships	2005	Protect a turtle nesting beach and fringing forest.
Laguna San Ignacio community development fund	2005	Protect grey whale habitat by prohibiting coastal development.
Mafia Island incentive payments	2002	Protect green and hawksbill turtle nests.
Maya Mountain Marine Corridor scholarships	2003	Reduce unsustainable fishing practices in and around the Port Honduras Marine Reserve.
Misool Eco Resort lease	2005	Protect reef habitat and species through a no-take zone.
Navini Island Resort lease	1988	Protect coral reefs from fishing through a no-take zone.
Olive health clinic	2003	Protect marine resources.
Rendova incentive payments	2002	Reduce poaching of leatherbacks or their eggs.
Tetepare scholarships	2005	Protect forest and reef habitat through a no-take zone and other regulations.

Incentive	Number of permits vessels, or gear purchased	Total amount of compensation
Fishermen are compensated for turning in destructive small-mesh seine nets and issued interest-free loans to purchase new sustainable gear or pursue alternative livelihoods.	~80% of small-mesh seine nets	US\$4,413-13,239 per loan
Trawling permits were purchased from fishers to compensate for declaring no-trawl zones. This intervention is moving towards an easement design as the licenses will be re-issued with restrictions rather than retired.	6 trawling permits, 4 trawling vessels	US\$3,800,000
Gillnet permits were purchased or leased from fishers to compensate for giving up fishing rights.	804 fishers	US\$16,600,000
Outright purchase of private property by non-government organization, with financial support from foundations, private donors, and US government.	1	US\$30,000,000
Government is compensated for lost revenue from eliminating fishing from the area.	Not yet determined	Not yet determined
The most profitable gill and trammel net fishers received funds to partially offset losses from the ban on the gear.	9 fishers	US\$55,000

Incentive	Benefits		
	Cash payments	In-kind	
	Individual	Individual	Group
Support for costs of MPA establishment and management, and institutional capacity building within community.			
Endowed fund to cover management costs and support a community development fund.			
Scholarships provide incentives to villagers to declare and respect the no-take zone.		X	
Under a conservation easement, ejido members receive funds for community projects each year that they meet all the conditions under the agreement.	X		X
Individuals receive cash payments for finding and reporting nests and allowing hatchlings to hatch from eggs.	X		
Provide fishing households with economic support for children's education to encourage fishers to forego the use of gill nets and other unsustainable management practices.		X	
Agreement to provide incentives to the villagers in the form of employment and lease payments contingent on declaration and observance of the no take zone.	X	X	
Agreement to provide lease payments to the landowner clan and community development benefits to the village in exchange for respecting the no-take zone.			X
Clinic built to compensate community for implementing no-take areas. No other ongoing economic benefits that are contingent on adherence to the MPA rules.			X
Individual finders and the community development fund receive cash payments for allowing hatchlings to hatch from eggs.	X		X
Scholarships to provide incentives for Tetepare descendents.		X	

Appendix

Table A.3. Summary of alternative livelihood case studies.

Site	Year	Purpose
Ayau piggery	2007	Reduce the consumption of sea turtles.
Bar Reef sustainable livelihoods enhancement and diversification	2007	Reduce pressure on marine resources.
Baraulu sewing	1999	Reduce the harvest of shellfish.
Cagayancillo tourism entry fee	2003	Preserve the globally significant biological diversity and ecological processes of Tubbataha and manage it and the surrounding areas on a sustainable basis.
Gilutongan Marine Sanctuary tourism revenue sharing	1999	Conserve, protect and maintain the integrity of coastal and marine resources.
Kubulau dive tag fees	2005	Protect the reef system from extractive use.
Pohnpei sponge and coral farming	2001	Sustainably improve the living condition of the most impoverished coastal communities in Micronesia through sustainable small-scale mariculture ventures, decrease the stress on traditional resources.
Port Honduras Marine Reserve Alternative Livelihood Training (ALT)	2003	Reduce fishing effort in the area.
Punta Abreojos cooperative and Marine Stewardship Council (MSC) certification	2004	Sustain fisheries production.
St. Croix East End Marine Park interpretive ranger and commercial captain training	2006	Eliminate fishing in the STX East End Marine Park.
Waitabu Marine Park	2000	Preserve coral reefs to sustain village-based ecotourism.

Incentive

Provide local villagers with an alternative protein source for feasts. Rather than attempting to provide an income generating activity (subsidizing production), this project subsidizes consumption of a local food. It thus does not require production, marketing, transportation, etc.

Divert labor from destructive activities to more benign ones (seaweed culture, sea bass farming, home garden improvement, PADI licensing, tilapia farming).

Compensate women for the closures through income from a sewing project.

Address the issue of lost fishing access to Tubbataha by implementing community-based livelihood projects (through a micro-credit facility) linked with sustainable resource management.

Provide a portion of revenue from tourism operations to villages. Revenue is shared with households. The logic is that better protection (and less poaching) means more tourists will visit, and thus there will be more revenue to share.

Provide a portion of dive-tag fees to communities for development and tertiary scholarships. The logic is that better protection (and less poaching) means more tourists will visit, and thus there will be more revenue to share.

Provide training, materials, and assistance to individuals for sponge and coral farming. The income from farming is expected to increase acceptance of the MPAs.

Provide training within the community for alternatives through which fishers can earn income (primarily ecotourism).

Members of the fishing cooperative decided against pursuing alternative incomes and instead focus on maintaining the viability of their traditional livelihood, fishing. The limited access offered to the cooperative in the form of a concession creates the incentive to manage it for long-term profitability.

Provide suitable alternative livelihoods (park rangers and boat captains) for fishers displaced by the creation of the East End Marine Park.

Provide cash income for community members through small-scale marine reserve ecotourism.

This is a publication of the **Science-to-Action** partnership, which includes more than 75 organizations led by Conservation International's Marine Management Area Science Program. **Science-to-Action** is dedicated to sustaining the health of coastal and marine ecosystems and the well-being of people who depend on them.

Our global network puts science into action so that the ocean can provide the multiple benefits needed by people today and tomorrow. Since 2005, we have conducted more than 50 studies in over 70 MMAs in 23 countries, using an integrated approach of natural and social sciences. Based on the scientific results, we develop conservation and management recommendations, and we engage directly with people at local to international scales to implement science-based solutions.

The following **Science-to-Action** publications present global research findings and lessons learned.

Marine Managed Areas: What, Why, and Where defines MMAs and discusses the challenges of implementation.

People and Oceans examines the role of people in MMAs, including the human well-being benefits and challenges of MMAs, and how socioeconomic conditions affect success.

Living with the Sea examines the role of MMAs in restoring and sustaining healthy oceans, particularly the importance of local management efforts.

Science-to-Action provides practical guidance for scientists and decision-makers on using science to inform ocean policy and management.

Economic Incentives for Marine Conservation provides guidance on how to select and implement incentive-based solutions: buyouts, conservation agreements, and alternative livelihoods.

Coral Health Index provides a comprehensive methodology for monitoring the condition of coral reef ecosystems.

Economic Values of Coral Reefs, Seagrasses, and Mangroves: A Global Compilation provides statistics on the economic value of tropical marine resources organized by type of use and by region.

Socioeconomic Conditions Along Tropical Coasts: 2008 demonstrates people's dependence on marine resources for livelihoods, discusses people's perceptions of resource conditions, and highlights governance status worldwide organized by region.

Four-page policy briefs summarize these longer booklets and guidebooks.

These publications and information about the Science-to-Action global learning network are available at www.science2action.org.

