Stemming the Tide of Coastal Overfishing

Fish Forever Program Results 2012-2017

Contributors
Over 80 global Rare staff contributed to this report's findings

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Cover photo: Tom Epperson for Rare/FCI

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Fish Forever Program Report – 2012 to 2017

Executive Summary

The Global Challenge of Coastal Overfishing

Coastal overfishing threatens the nutrition, health, and well-being of hundreds of millions of people. It disproportionately affects the poorest communities – 85 percent of small-scale fishers live in developing countries and depend on wild-caught fish[1]. Beset by poor governance, rising populations, and inconsistent management, these fisheries are often in steep decline. With over three billion people globally relying on fish for their primary source of protein[2], this is not just an economic problem – left unchecked, it will become a humanitarian crisis.

Overfishing, or exploitation in excess of regeneration, reduces the abundance, diversity, and size of fish. Such exploitation can result in massive systems change with potentially catastrophic consequences for habitat health, food chain integrity, and ultimately, basic coastal ocean function. Unchecked, overfishing often triggers a "race for the last fish" where an escalating cycle of ever more destructive gear, greater effort, and more boats drives a spiral of diminishing returns. Solving the existential threat posed by coastal fisheries collapse is thus an urgent priority.

The Solution

In 2012, Rare launched a series of partnerships to design and broadly prototype a solution. The systemic design constraints facing the group were daunting, and included:

- **Slow and non-linear recovery.** Marine systems tend to recover, even from severe pressure, if marine habitat was not irreversibly destroyed. However, full recovery can require a decade or more. Marine systems are highly dynamic; recovery tends to be uneven, subject to temporary setbacks, and difficult to attribute to specific causes or triggers. Given this timeframe and the lack of consistent feedback, it is difficult to design and maintain a new system of steadily improving management effectiveness.

[1] Globally, 95 percent of fishers are based in developing countries, and 90 percent of those are small-scale fishers: FAO. 2016. The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all. Rome. 200 pp.4
[2] Ibid.

- **Tangled governance.** Coastal fisheries in developing countries are typically governed by a multi-jurisdictional, multi-agency web of institutions applying rules with widely uneven enforcement and port-side infrastructure. The rules in place tend to be non-adaptive, focused on fishing effort rather than fish mortality, and are often ineffectual through poor implementation. Governance reforms tend to optimize the rents of commercial fishing businesses rather than local communities.
- **Daunting scale.** Coastal fishing effort is, by definition, highly distributed; there are thousands upon thousands of fishing communities. "Piloting" a new approach at single sites in the hope that it will be widely replicated rarely, if ever, works, even if the early results are promising. Outcomes at the scale needed, therefore, require designing and testing a replicable "mass prototype" from the outset.
- **Data holes.** The basic numbers behind fishing effort, fish mortality, and stock status are often unknown. The data which are fundamental to any systematic improvement of management, such as baselines, timelines for fishing effort, and catch profiles must be created from scratch. Many times, the geographic scope of data required goes far beyond the borders of the local communities with which Rare needs to work. On the socio-economic front, systematic monitoring and evaluation efforts similarly need to start from scratch, with very little baseline data available.

Faced with such a highly distributed, complex, long-term, and data-poor systems improvement problem, Rare assembled a network of experts and institutions, including the University of California Santa Barbara (UCSB) Sustainable Fisheries Group, the Environmental Defense Fund, Bloomberg Philanthropies (and Vibrant Oceans Initiative (VOI) partners Oceana and Encourage Capital), Waitt Foundation, and The John D. and Catherine T. MacArthur Foundation, to identify and address the problem's drivers.

It was clear to Rare from the beginning that the solution would need to be based on three fundamental principles:

- **Community behavior change.** The simplest way to envision a solution to overfishing is to focus on the behavior of fishers and the community around them. What are the legal, economic, social, cultural, biological, and structural drivers of this unsustainable behavior? How can sustainable fishing become a new norm? In addition to economic and legal drivers, what are the social incentives for change? How can sustainable fishing be made easier, more attractive, and more profitable? Why might fishers cooperate to manage a common-pool resource?
- **Rights-based management.** Ending the tragedy of the commons requires a transformational shift in behavior, best served by giving fishers from coastal communities the opportunity to exclusively access local waters in exchange for the responsibility to sustain these resources. This transition – from open access to "managed access" – helps engender a sense of responsibility, ownership, and pride.

- **A clear pathway to scale.** The solution had to be developed through "mass prototypes" of sufficient scale to be capable of influencing government and private sector/investor agendas, as well as local communities. Over time, once proof points and ample evidence is in place, Rare could assume a three-pronged strategy for ensuring widespread adoption: 1) government adoption through legislation, governance, capacity building, and sustained financial investment; 2) a low-cost, highly transferrable model; and 3) creative financial mechanisms that blend philanthropy, government appropriation, public finance, and private capital to match the need for building proof points, strengthening the capacities of both government and local communities, and reducing the risk for private investors once better governance is in place.

Following these principles, the group's work quickly focused on empowering fishing communities – specifically, their ability to control and sustainably manage their own fisheries for significant local gain. The principal mechanism of control, the (re)assertion of communities' rights to manage local fishing grounds, is exerted in terms of relatively simple, locally-applied measures, such as highly managed access to local fisheries, designation of no-take reserves, and basic restrictions on destructive gear and overharvesting.

Enabling the communities to take control is not easy. Current policies often discourage local control, local capital is tight, and agency can be in short supply. Further, local cultures and norms typically reward the hunter: the winner in the "race for fish". Changing the locus of control requires long-term, careful and humble involvement.

In late 2013, the Fish Forever program began testing this theory of change (see Figures 1 & 2) across a mixed portfolio of sites in five countries. As part of Bloomberg Philanthropies' Vibrant Oceans Initiative, Rare's approach to coastal fisheries reform was coupled with Oceana's work on industrial fishing in the Philippines and Brazil to synergistically address both local and industrial fishing pressure for more strategic and impactful results.

This report describes the results of 41 sites across Brazil, Indonesia, and the Philippines, with a focus on three years of program implementation (2014-2017). Not included is Rare's work in Belize and Mozambique, where data are not yet available or complete. The report synthesizes information from **3 country learning reports**, **2,400 in-water surveys** of coral reefs, **15,000 interviews** from individual and household surveys, and the landing records from nearly **56,000 fishing trips**, using a comprehensive monitoring and evaluation protocol. It represents the work of more than **80 Rare staff** and **50 partner organizations** who have committed the time of more than **440 staff** to this project.

Ultimately, this intensive learning process will provide the evidence base to refine, improve and evolve the strategy and implementation for the next phase of Rare's coastal fisheries program.

The Eight Elements

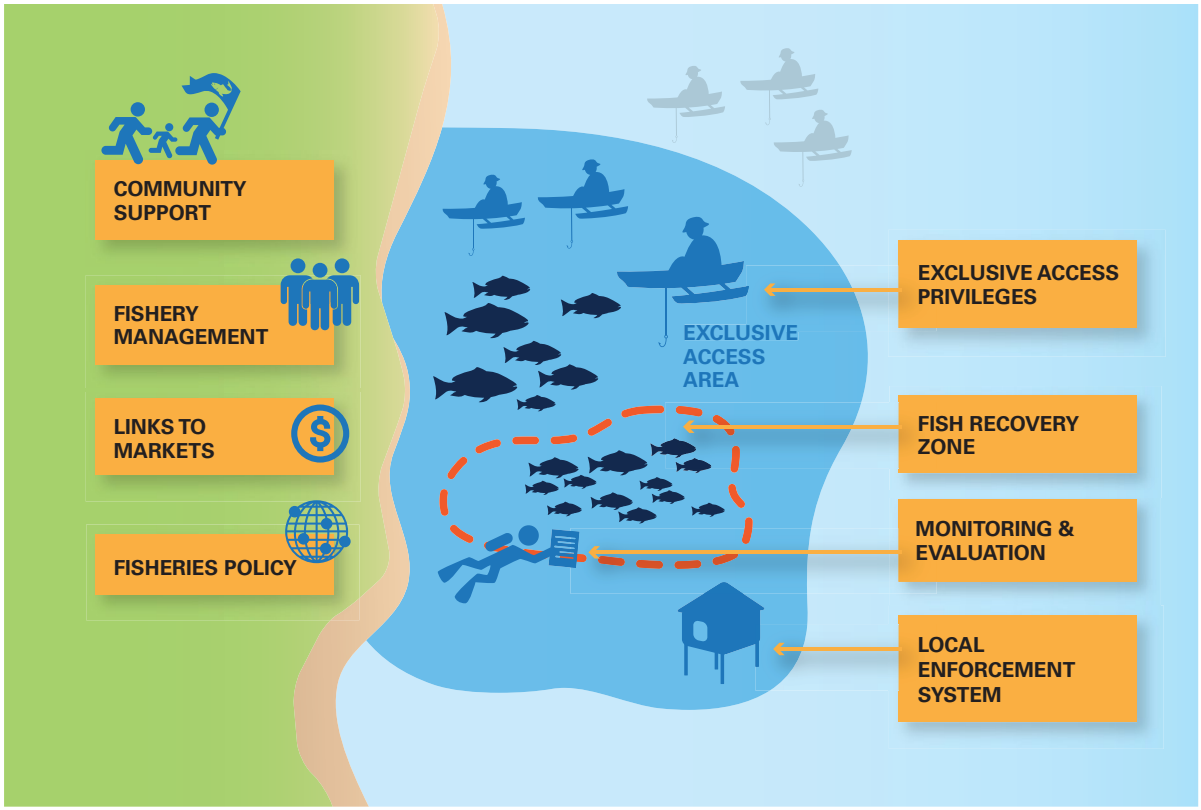

Figure 1: Eight elements of Fish Forever

Fish Forever's original vision for reforming coastal fisheries called for eight programmatic elements (Figure 1). These included:

1. **inspire communities** to support sustainable fishery management (community support);
2. establish explicit and **exclusive rights** for local fishers to manage access (exclusive access privileges);
3. establish fully-protected **marine reserves** to sustain fished populations (fish recovery zones);
4. enable effective **local enforcement** (local enforcement system);
5. develop effective **local fishery management** inside managed access areas (fishery management);
6. improve **fish value chains** (links to markets);
7. support necessary **policy reform** both locally and nationally (fisheries policy); and
8. set up **monitoring and evaluation** to inform local management bodies (monitoring and evaluation).

Fish Forever Program Goals

The program also established six ambitious goals:

1. Develop sustainable fisheries through ecosystem conservation and fish productivity
2. Establish a local constituency for sustainable fisheries
3. Build fisheries management capacity
4. Boost livelihoods
5. Establish profitable fisheries
6. Catalyze a global movement for fisheries reform

To operationalize this implementation vision, Rare and partners developed a set of design specifications for each of the eight elements and mapped those onto Rare's existing theory of community behavior change (Figure 2).

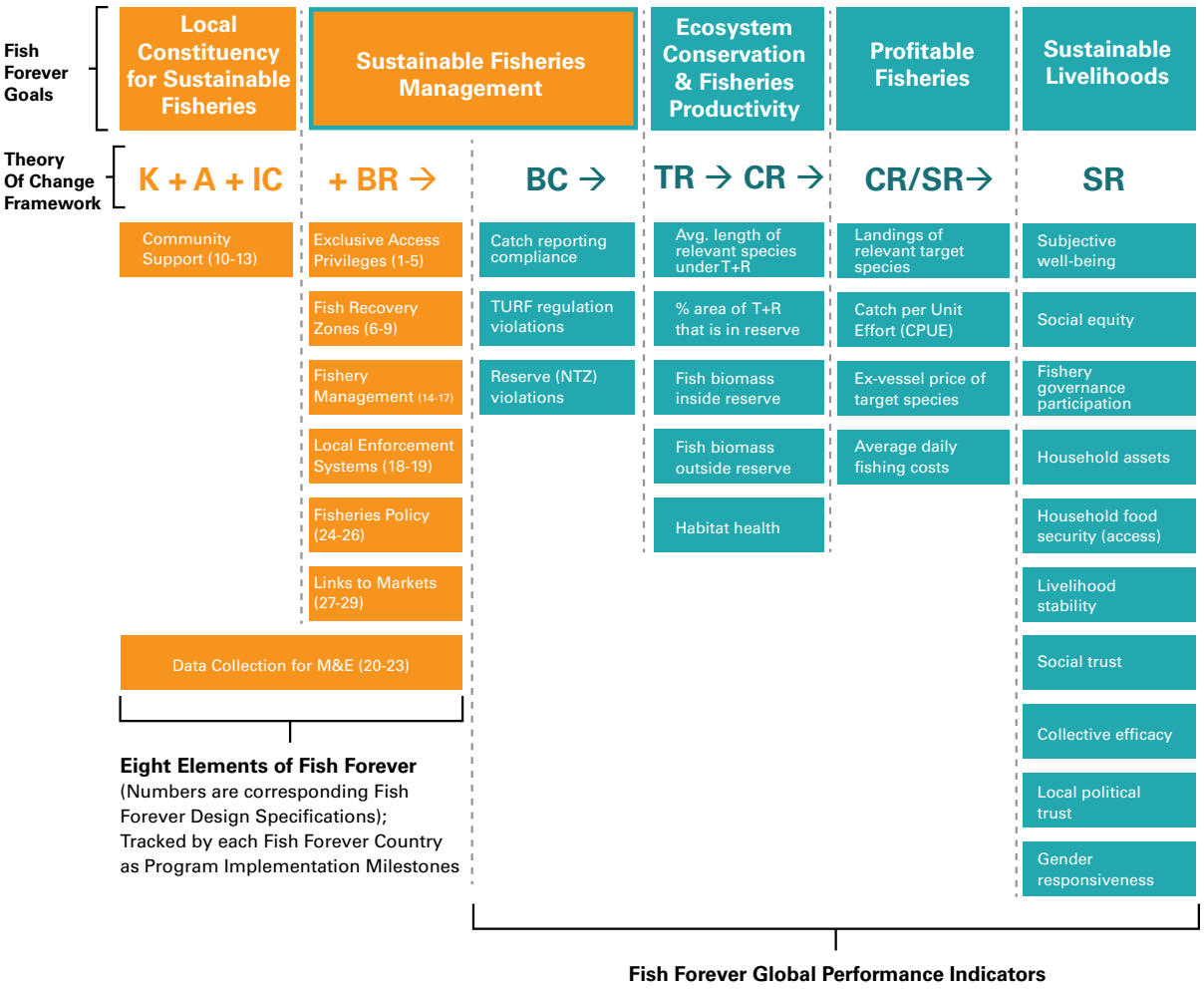

Figure 2: Fish Forever's program framework includes the Fish Forever goals, Rare's Theory of Change, Fish Forever's eight elements, and global performance indicators from the monitoring and evaluation plan.

Results to Date

The program grew significantly over three years of implementation to work in **41 sites** comprising over **250 communities** and **570,000 people**, including nearly **35,000 fishers**. By the end of 2017, **35 legal and functional management bodies** were established across the 41 sites. **63 managed access areas** were built or strengthened, encompassing nearly **600,000 hectares of coastal waters** with **27,000 hectares secured in fully-protected reserves**.

Below is a brief synopsis of the Fish Forever results to date. These data need to be evaluated in the context of their structural limitations, including the following:

- **Limited time.** Most of the data is based on a three-year period. Given the natural variability of marine systems in general and fish stocks in particular, and the typically slow speed of fishery recovery, this is insufficient time to establish causality between management action and biological outcome in analytically irrefutable terms. While the results are statistically relevant by themselves, they do not yet provide proof of the efficacy of Fish Forever's management interventions.

Fish Forever
Brazil, Indonesia, Philippines (2014-2017)

Countries	**3**
Sites	**41**
Communities	**267**
Fishers	**34,834**
Population of communities	**570,144**
Managed Access Areas	**63**
Hectares under Managed Access	**588,593**
Reserves	**104**
Hectares in reserves	**27,026**
Management bodies established	**35**

- **Lack of control groups.** Most of the biological outcome data do not have control groups from non-intervention sites. This is due simply to time and resource constraints. Some control group data do exist, and Rare plans to further analyze them soon. Without them, however, causality becomes more difficult to prove conclusively.

- **Complexity constraints.** Socio-economic data are notoriously difficult to tease apart in terms of causation versus correlation. There is much left to do in terms of measurement and analysis before asserting causation.

- **Capacity.** Most Fish Forever staff are occupied full-time with field-based implementation. Until Rare builds comparative datasets, expands analytical partnerships, and secures the funding necessary to dig deeper, these findings will remain preliminary.

Given these caveats, Rare feels comfortable with the following overall characterization of the data so far: After more than three years of intense effort, the biological and socio-economic outcomes are promising, if not yet fully conclusive. The majority of Fish Forever

sites show stabilization and recovery of fish biomass – a trend that appears to accelerate in years four to seven. Community support, as measured by indicators of trust, participation in management, and public funding, are also trending positively. Other indicators of long-term systems effects, such as improved livelihoods and fishery profitability, are too early to call statistically, although there certainly is strong anecdotal evidence pointing towards positive outcomes.

Below is a sampling of program assessment highlights to date, paired with the original six goals:

Goal 1: Develop Sustainable Fisheries through Ecosystem Conservation and Fish Productivity

Measures: Target species length and biomass, the percent of managed access area that is in a reserve, habitat health, and fish species diversity.

Progress Highlights:

- **Fish Biomass in Water:** In almost all the Indonesia and Philippines sites (97%), the biomass of target fish species[3] was maintained or increased after three years. To achieve the goal however, there are three operational/analytical milestones to be completed: The first is to shape, launch and operate reserves in a way that yields significantly increased fish populations. Fish Forever has met this milestone. In the sites where in-water survey results date back seven years, i.e., those sites where Rare had previous involvement with MPAs, **mean target fish biomass inside the reserves increased by approximately 390 percent**. The second milestone is to increase fish populations in the waters surrounding the reserve. Fish Forever has partially met this milestone. **Fish biomass outside the reserves at these sites increased by 111 percent**, but there is not sufficient time series and control data to irrefutably prove causation, i.e., it is possible that the increase may be from factors unrelated to the reserves. The third milestone is that the restored fisheries outside the reserves are managed to sustainably higher yields for the local fishers. This work is well under way, but given the time lag in fish population recovery, Fish Forever cannot prove consistent increases in fisher yield so far. Given the strong "uptick" in recovery rates in years four to seven from inception, Rare fully expects this to begin happening soon.

[3] Target fish species were identified by program staff as those families that included commercially and ecologically important species. This included 26 families in the Philippines and 10 families in Indonesia.

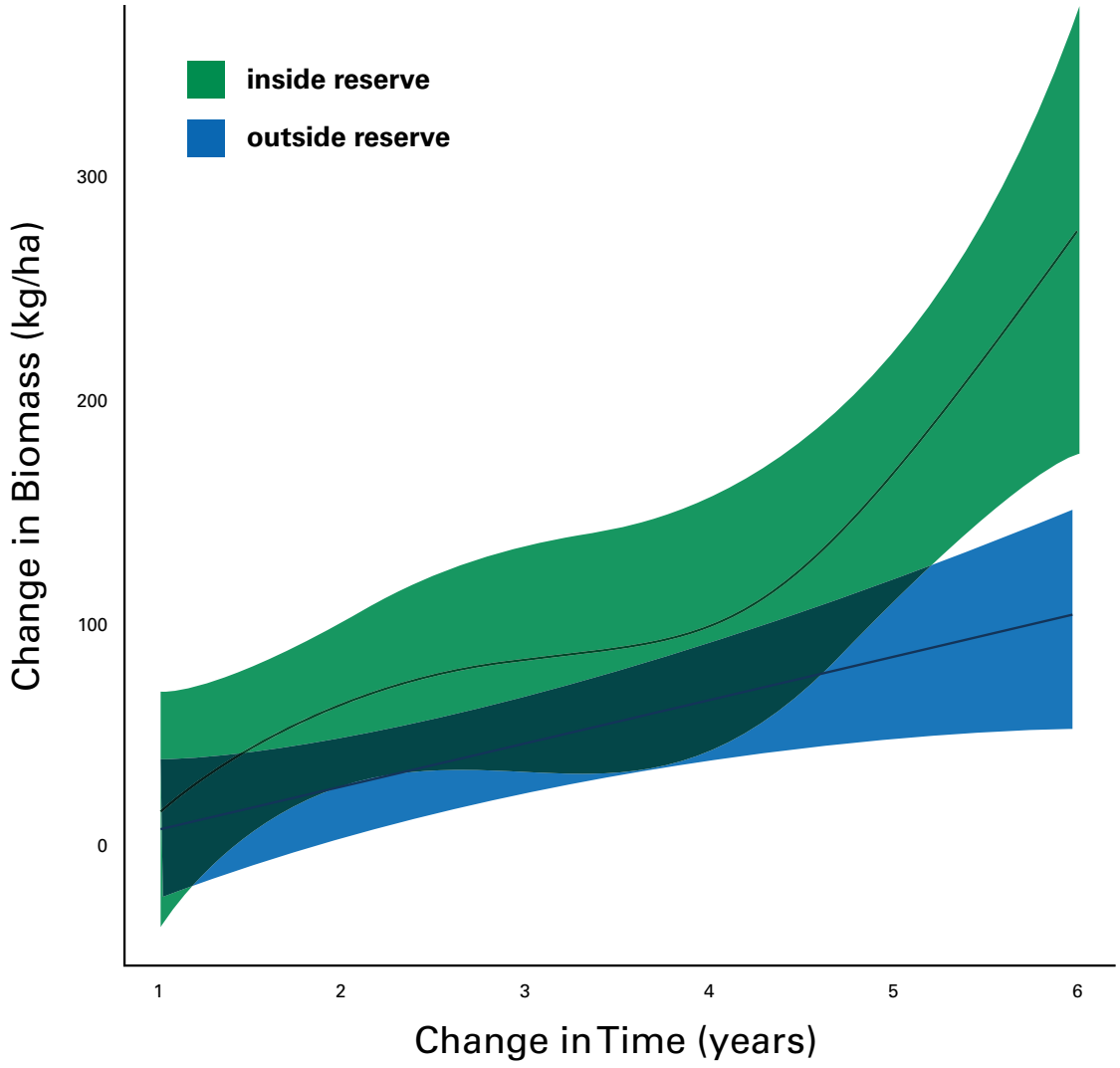

Figure 3: Change in target fish biomass over time (including pre-Fish Forever involvement with MPAs through Rare campaigns) at 30 coral reef sites in the Philippines and Indonesia. Inside fully-protected reserves (green) and outside reserves (blue). Solid lines are the mean across sites with variance as shaded area.

- **Coral Cover:** A record-breaking three-year global coral bleaching event began in 2014, resulting in heat stress that caused bleaching and/or mortality to more than 70 percent of coral reefs around the world[4]. Over the same three-year period where coral cover was measured at Fish Forever sites in Indonesia and the Philippines, in-water surveys found coral cover remained stable or increased inside reserves at 80 percent of sites. Coral cover outside reserves remained stable or increased at 75 percent of sites. While these results suggest a possible connection between reduced fishing pressure and increased climate resilience of reefs, longer time series data and control sites will be needed before this can be verified.

- **Vibrant Oceans Initiative (VOI) Impact Model:** A bio-economic fisheries model produced by University of California Santa Barbara extrapolated the synergistic effects of combined industrial and local fishery reforms. The model showed biomass recoveries

[4] Coral Bleaching During & Since the 2014-2017 Global Coral Bleaching Event: Status and an Appeal for Observations, NOAA, Jan 16 2018, https://coralreefwatch.noaa.gov/satellite/analyses_guidance/global_coral_bleaching_2014-17_status.php

from combined reform efforts significantly exceeding recoveries resulting from separate reforms. Modeled at the national scale, the projections suggest that the combined approach can stabilize declining fish stocks and generate increases in catch and biomass. Gains in catch are particularly likely for the municipal fleet (small-scale fishery) in the Philippines' coastal waters. The fish biomass recovery recorded by Fish Forever's in-water surveys is substantially faster than the conservative recovery curves projected by the VOI model, which is encouraging for future small-scale fishery recovery prospects.

See further analysis in the **Biological Results** section of the full report.

Goal 2. Establish Local Constituencies for Sustainable Fisheries

Measures: Positive outcomes within the target audience and broader community sufficient to support and maintain adoption of new behaviors for sustainable fisheries management.

Progress Highlights:
Despite considerable variance among sites, statistically significant shifts occurred in social metrics, which suggest a positive relationship between the Fish Forever campaigns and prevailing attitudes about trust and social equity. The statistical proof between equity outcomes and Fish Forever interventions is robust, but longer trend lines and more control groups will be helpful to demonstrate causality.

- **Trust in Government and Community:** Survey responses related to trust in government and the community at large show improvement across countries for the majority of sites. Rare's local impressions confirm that active involvement and validation of the individual fisher as a valued member of the management process builds greater trust across the board. Considering the history of negative interactions in many cases, the somewhat inconsistent data to date is not surprising. The process to reinforce positive associations with local fisheries management will take time.

- **Social Equity:** Perceptions of fairness are critical. Fish Forever's process deliberately creates a platform where issues of fairness can be addressed and redressed – openly and transparently. In Brazil and the Philippines, specifically, fishers' sense of equity significantly improved.

See further analysis in the **Social Results: Social Cohesion** section of the full report.

Goal 3. Improve Fisheries Management Capacity

Measures: Levels of compliance with catch reporting, no-take zones, managed access areas, and marine reserve regulations.

Progress Highlights:

- Fish Forever, which worked across **267 local communities,** strengthened and/or established **35 management bodies** to govern managed access and reserve areas with locally-appropriate fishery controls. These bodies are comprised of representatives from fishing communities (including fishers) and local government who have legal jurisdiction to design and execute rules over an area and their fisheries.

- The data regarding breadth and depth of participation in fisheries management are unambiguous and positive. Meeting attendance, engagement in monitoring and surveillance, reporting violations, fisher and boat registration, and participation in catch recording all show significant improvement.

- To the degree that biological data on biomass increase is indicative of Fish Forever's intervention, this will largely be due to increased compliance with measures such as no-take reserves.

See further analysis in the **Social Results: Social Cohesion** and **Policy and Governance: Building Effective Local Management** sections of the full report.

Goal 4. Boost Livelihoods

Measures: Levels of subjective well-being with target fishers, social equity, participation in fishery governance, index of household assets, household food security, livelihood stability, social trust, collective efficacy and gender equality and empowerment.

Progress Highlights:

- **Livelihood Stability:** The data suggest community members in all three countries are feeling more secure in the potential for local fisheries to sustain them and their households, and that the rules around the fishery are "fair".

- **Food Security**: In fishing communities, livelihood stability and food security are closely intertwined, as fishers support the household diet and sell additional catch. The data do show an increase in confidence in food and economic security, especially in the face of outside threats, such as illegal fishing or previously weak governance. In both Indonesia and the Philippines, community members reported a decrease in the frequency that members of their household had to skip meals (improvement) compared with no improvement at the comparison sites used in the study.

- **Assets:** There has not been adequate time to establish a reliable trend line on household asset increases from fishery reform. Fish Forever communities in the Philippines did, however, pilot the implementation of village savings and loan clubs to enable fisher households to retain and build wealth (financial assets) and start on a path to joining the formal economy. In the past two years, 50 savings clubs were established by 1,700 people, who now collectively manage revolving funds of more than USD 110,000. Club members, of which 85 percent are women, can opt to use a portion of the savings to invest in "conservation enterprises". These community-based businesses focus on increasing the value of fish products through improvements in post-harvest processing, such as drying, smoking, and packaging of fish. Most of the enterprises have been established, operated, and financed by women from the clubs.

See further analysis in the **Social Results: Well-Being** section of the full report.

Goal 5. Establish Profitable Fisheries

Measures: Fish landings, catch per unit effort, ex-vessel prices, average daily fishing profits, and average daily fishing costs. This goal also called for the creation and marketing of new investment vehicle(s) that facilitate the transition to, and perpetuation of, sustainable fisheries.

Progress Highlights:

- Fish Forever cannot yet show measurable changes in profits from community-based fisheries. In part, this is simply because fish population recovery (especially resulting from spill-over from reserves) is non-linear, increasing significantly after three to four years of protection. Also, Rare intentionally delayed investing in processing, branding, and other value-added activities given concerns that doing so in the absence of well-accepted fishery reform would likely result in increased effort and more overfishing. Rare is now developing new capacity for value chain improvement and ways to improve fisher access to both private investment capital and public infrastructural investment, for example in enforcement of access restrictions.

- **Impact Investment:** To pave the way for private capital investment in sustainable coastal fisheries, Rare designed an impact investment fund for small-scale fisheries. The Meloy Fund – a $20 million venture capitalized by the Global Environment Facility, the Walton Family Foundation, and the Grantham Foundation for the Protection of the Environment, as well as a network of additional limited partners (and a capital guarantee from the United States Agency for International Development (USAID)) – will provide debt and equity investments in 20-25 fishing-related enterprises that can support coastal fisheries recovery in Indonesia and the Philippines. Creating the Meloy Fund has already led to the establishment of what may be the world's first small-scale fishery investment guidelines.

- **Blended Finance:** In partnership with the Philippines' National Economic and Development Authority (NEDA), Rare is estimating the benefits and cost of recovering and sustaining coastal fisheries at a national scale. This analysis will provide a strong data-based case for public investment in local fisheries reform and suggest the development of investable products, such as "green" bonds. Rare has codified the analytical components of this work to facilitate its replication in other Fish Forever countries.

Goal 6. Catalyze a Global Movement for Fisheries Reform

Despite the critical importance of the coastal marine environment, coastal fishery reform receives little public, policy, or funding support. Rare set out to build support for small-scale fisheries among U.S. and international foundations, bi/multilateral funders, and global policy leaders.

Measures: Level of support from national governments, bi/multilateral funding agencies[5], and the enabling policies[6] for coastal fishery reform.

Progress Highlights:

- Rare has showcased Fish Forever at local, national, and international convenings. The model's emerging proof points are generating demand for replication among other communities and countries, as well as an expanding funding base.

- Fish Forever has been featured at key global forums, including the United Nations Ocean Conference, Our Ocean 2017 (hosted by the European Union), The Economist's World Ocean Summit, KfW Development Bank's Ocean Finance Summit, and the UN Framework Convention on Climate Change (UNFCCC) Conferences (2015-2017), among others.

[5] Approximately 0.5% of all foundation grant-making goes to marine conservation, and an independent study commissioned by Rare estimates that between 5-12% of that is directed to small-scale fisheries relevant projects; small-scale fisheries related projects makes up less than 0.5% on average of the development finance institutions' portfolios.
[6] Note: In 2014, Fish Forever revised this original goal and hypothesis to additionally target the enabling policies needed for small-scale fisheries recovery and management.

- Rare's coastal development finance partnership with the Philippines' National Economic and Development Authority (NEDA) has been widely showcased and is now under consideration for replication by different government ministries in multiple countries.

- Since 2012, public funders, including Germany's International Climate Initiative (BMUB-IKI) and Blue Action Fund[7], Sweden's International Development Cooperation Agency, the Global Environment Facility, the World Bank/Nordic Development Fund and Nordic Climate Facility, and the United States Agency for International Development, have committed $27.5M to Fish Forever (Figure 4). Rare provided expert input to the creation of the Blue Action Fund, promoting small-scale fisheries as a viable pathway to conserving marine biodiversity through the Fund's investment.

Growing Public Funding Support for Fish Forever

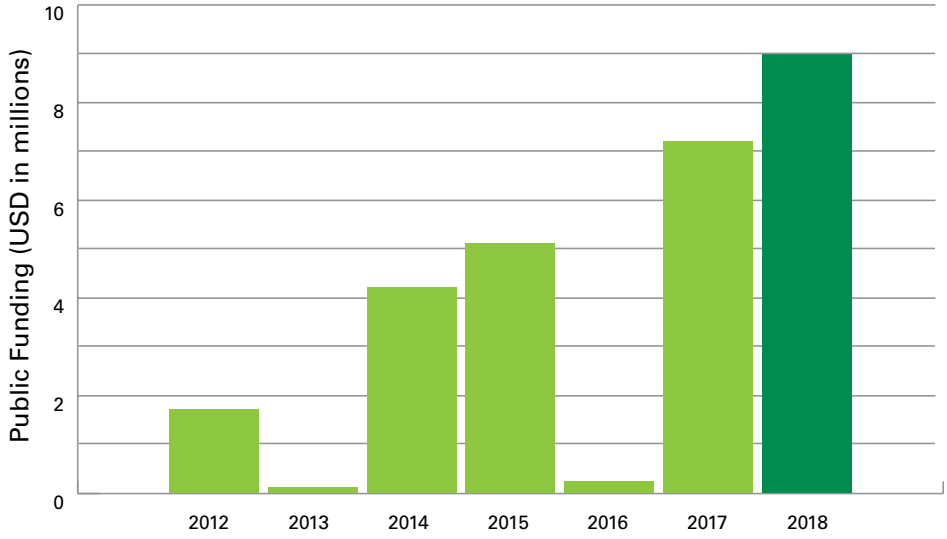

Figure 4: Public funding secured per year by Rare for Fish Forever. Total public funds committed to the program (2012-2018) is $27.5M. Dark green (2018 total) denotes funding in final stages of approval.

- Rare launched the Financing Small-Scale Fisheries dialogue at Our Ocean 2017 in Malta, and will expand on this initial gathering during Our Ocean 2018 in Indonesia and Our Ocean 2020 in Palau.

- Rare commenced a partnership with the United Nations Food and Agriculture Organization to promote implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries and the role of sustainable small-scale fisheries in strengthening resilience to climate change.

See further analysis in the **Policy and Governance: Creating the Enabling Policy and Legal Framework** section of the full report.

[7] Germany's International Climate Initiative (IKI) is supported by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) on the basis of a decision adopted by the German Bundestag. The Blue Action Fund was established in December 2016 by Germany's Ministry for Economic Cooperation and Development (BMZ- with initial funding of EUR 24 million) and KfW Development Bank to enable national and international NGOs successfully working in this field to redouble their marine conservation efforts.

Initial Conclusions

Three years into Fish Forever's implementation, Rare has every reason to be optimistic. A strong pattern of statistically-relevant improvements is encouraging. Anecdotal and "real life" evidence of strong local support from the communities across Fish Forever sites corroborates the belief that the approach is working. The results confirm Fish Forever's central thesis—that an inspired and engaged community can establish and manage sustainable fisheries and in the process, bring benefits to the local economy, environment, and culture.

Rare has remained true to Fish Forever's fundamental design criteria. The initiative is operating in three countries at a prototype scale large enough to move local and national policy and economic agendas – key conditions for replication. The model is resourced and designed for a time scale which allows fundamental, measurable change to manifest and feedback into the model to sustain support— and which, in turn, establishes compelling proof points for other countries, communities, and practitioners. The model has abandoned the traditional top-down, blue-printed approach and replaced it with a highly-adaptive and locally-agile method, which constantly learns and evolves. Rare believes that Fish Forever is on the path to scalable coastal fishery reform in developing countries.

It is imperative that the work be resourced to continue. In two to three years, Rare will have a world-class, robust dataset on coastal fisheries reform, based on internationally accepted monitoring, evaluation, and reporting standards – an essential pre-condition for broad adoption. The recovery of fish populations in existing sites accelerates significantly after approximately three years of protection, very likely providing strong data on rising yields and incomes in the next two to three years. These datasets will be backed by proof points across highly-diverse fisheries, geographies, ecosystems, and cultures, and supported by a team of seasoned practitioners prepared to teach, inspire, and practice. In this time frame, at least one Fish Forever country program, in a 'top ten' fishing country, will be financed at scale, nationwide. If this progress continues, within five years, Rare will have supported ten of the world's highest marine biodiversity and fish-dependent countries on a path to nationwide coastal fishery reform.

Rare's core faith in a community's ability to protect their fishing grounds has, so far, been confirmed. Fishing pressure has consistently decreased within the reserves, overall decline of biomass has halted and fast-growing species have increased. The fundamental tenets of the Fish Forever approach – community control, managed access, and long-term behavior change – have consistently been adopted by communities and refined into locally-appropriate fishery management concepts (involving both spatial and effort-based controls). Lastly, Fish Forever's collective management approach appears to have contributed to a new-found sense of community optimism and faith that change is both possible and achievable.

Reflections, Lessons Learned, and Opportunities for Ongoing Learning

The initial three-year program implementation period has been an enormously valuable learning experience for Rare and our partners. Some of the most valuable lessons include the following:

1. **What Fish Forever does is urgent.** If the current and widespread practice of neglect continues, coastal fisheries' decline in the developing world could become a humanitarian crisis.

2. **Traditional approaches to scaling new programs do not work fast enough.** Multi-local solutions, such as Fish Forever, need to be implemented at a "mass prototype" scale to establish sufficient proof points that move government agendas and private investment alike.

3. Given the prototype scale required to truly move institutional agendas concerning coastal fisheries (critically important for widespread uptake of a rights-based fisheries model), **any new country launch must be contingent on the availability of sufficient financial, operational and political resources**. If in doubt, the cause is best served by focusing on wide-scale uptake of the method in a limited number of countries. In addition, sustained investment in the shared services needed to ensure effective program execution, training, and ongoing learning and design will be necessary.

4. **Partnerships and networks are essential to this kind of endeavor.** Fish Forever benefited immensely from multiple partnerships, especially the close alliance among Rare, UCSB and EDF during the program's early stages. Fish Forever established clear goals, roles, decision rights, and funding models at the outset, but over time, the partners learned that partnerships are best when they remain purpose-built, and match a specific objective and stage of the program life cycle. The initiative identified the need for different kinds of partnership, such as those for product development, for program replication, and for building a movement, and that each needs to be structured accordingly.

5. **In conservation, community engagement is not an afterthought or 'a thing apart'.** Human behavior is arguably the single greatest driver of biodiversity loss and often at the very center of conservation. There are no useful benchmarks for acceptable levels of "outreach", "education" or "community engagement" costs. In Fish Forever's case, most funds are spent not on science or "conservation-by-design", but on a deliberate, long-term effort to change the norms governing institutional, community and individual behavior. Fish Forever's economic model in the Philippines now makes clear that these

kinds of investments over time may offer a 20 percent internal rate of return to the country by ensuring sustainable natural resource use. Clearly, this is an investment worth making. The financial leaders and legislators Rare is now working with agree, and Rare will continue to work with the donor community to prove the efficacy and return on investment of our approach.

6. **The approach needed to build in greater flexibility over time.** Solutions to "wicked" problems such as coastal fisheries tend to be emergent and contingent on what has happened in the past. They cannot be presumed to be understood, predictable in their response to actions, and/or subject to pre-defined solution pathways. And yet, to forge a clear solution and increase the chances of replication, Fish Forever endeavored to establish a very clear approach through the design specifications. Once implementation began, however, we realized the need to adjust the approach for programmatic context and decentralize decision-making while delivering the program's core components; Rare terms this "freedom within a framework".

7. **Patience is required.** Enough time must be built into the solution to allow changes in the ocean and the communities that depend on them to manifest themselves, and then feed back into the system for lasting impact.

Rare still has much to learn. Rare is still working to find the right balance between science-based biological design and community participation and ownership. The impacts of climate change on the program deserve careful thought. And, as ever, the question of scale remains, especially as it pertains to some of the critical and exogenous drivers of change, such as national policy, bi/multilateral investment models, and the never-ending struggle against weak governance, of which corruption is a key sign. Rare needs to determine when work is finished at a particular site and/or country – the proverbial "end state" – and how to effectively select new countries. For these new countries, Rare has identified that a lower-cost launch model, in which national authorities serve as partners from the outset for both early prototypes and national scaling plans, is required. These are some of Rare's aspirations for Fish Forever and the Vibrant Ocean Initiative's next phase, and Rare will address them with one eye on the emergent data from the initial 41 sites, and the other on the growing array of government and private sector relations in the field.