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FY2004 Annual Report

Protecting Coral Reefs from Destructive Fishing Practices in the Pacific

Protecting and Managing Reef Fish Spawning Aggregations in the Pacific

PROJECT BACKGROUND

The Goal of this program is to significantly reduce the degradation of coral reef ecosystems in the Pacific region from destructive fishing practices, and especially the over-exploitation and degradation of reef fish spawning aggregation sites.

Destructive fishing practices that target key species and degrade fragile coral habitats are among the major threats to the viability of coral reef ecosystems. Many reef fishes form aggregations at predictable places and times, frequently for the purpose of spawning. The nature of spawning aggregations makes them extremely vulnerable to elimination by over-fishing. It can take as few as two to three years of intensive fishing on spawning aggregations to eliminate breeding populations of fishes. There is presently little awareness of—or capacity to address—this threat to the marine resources and biodiversity in the Pacific. The spawning aggregation phenomenon has rarely been reflected in fishery management plans or the design of marine protected areas (MPAs).

This project will improve local resource management and spawning aggregation site protection, increase awareness of these resources' vulnerability to over-exploitation, and enhance capacity to manage reef fish spawning aggregations and MPAs that incorporate these sites. It has three objectives: (1) to develop and facilitate the application of cost-effective management controls on the exploitation of aggregating reef fish resources; (2) to strengthen the capacity to assess, monitor, and manage aggregating reef fish resources; and (3) to raise the awareness and appreciation among stakeholders of the vulnerability of aggregating reef fish populations and associated ecosystems, the nature and significance of spawning aggregations, and options for improving management.

This project builds on and continues the partnerships and activities carried out under the Protecting Coral Reefs from Destructive Fishing Practices project supported by EAPEI in FY 1999-2003. Site and country level activities are focused on Pacific countries in Melanesia and Micronesia where TNC is presently working. We are developing close partnerships with other international and local NGOs working at key sites. In addition, a small number of activities are being carried out in collaboration with TNC Indonesia to build on work with spawning aggregations in Komodo National Park, and with TNC Belize (who have an extensive spawning aggregation program). These activities will facilitate exchange of knowledge and best practices between Indonesia, the Caribbean, and Pacific island countries. The Secretariat of the Pacific Community (SPC) will play a role in adapting and disseminating lessons learned and successful approaches from specific site and country activities. The SPC currently has one officer dedicated to the live reef fish trade who is also responsible for spawning aggregations. He is within a broader Coastal Fisheries program (see http://www.spc.org.nc/coastfish for more information).

In addition, this project is also an important initial part of the TNC-led component of a global initiative to transform coral reef conservation over the next decade that we are developing in partnership with Conservation International (CI) and other international NGOs. To achieve this ambitious goal, we are catalyzing a multi-partner effort to improve the scientific basis for coral reef MPA selection, design, and management (including incorporating resilience and replication); build the necessary skills and institutional capacity to manage MPAs effectively; and develop innovative solutions for financing

marine conservation action to provide for long-term sustainability. It will permit tangible results to be achieved during the next two years and provide valuable experience from the Pacific to guide future global efforts to effectively protect and sustainably manage key reef fish species that are essential to the integrity of coral reef ecosystems.

There is often confusion surrounding the use of the term "Marine Protected Area" (MPA). The Nature Conservancy applies the term in accord with international usage. MPAs are defined as any area within or adjacent to the marine environment, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by legislation or other effective means, including custom, to protect part or all of the enclosed environment. Within MPAs some areas may exclude all extractive activities that affect living biological resources. The internationally accepted terms for such areas are either "marine reserve" or "nature preserve", and are a sub-set of MPAs. Recognizing the distinction is important.

ACTIVITY SUMMARY

Objective 1: *To develop and facilitate the application of cost-effective management controls on the exploitation of aggregating reef fish resources in the Pacific region.*

Management Issues:

- During the last year a number of the management issues concerning capacity have been partially resolved. While we have still not been able to identify a suitable local candidate for the Melanesia Marine Programs Manager position (although we continue to search!), we have contracted Dr. Richard Hamilton to move the community-based components of the project ahead. Dr. Hamilton's qualifications and experience on the science and conservation of reef fish spawning aggregations, coupled with his fluency in both PNG Tok Pidgin and Solomon Islands Pidjin has significantly boosted progress.

- To assist Dr. Hamilton, and to ensure on-going support to the communities involved with the project, we have contracted two Community Conservation Coordinators—one each in Kavieng (New Ireland Province, PNG) and Manus (PNG). The Manus CCC has been seconded from the Provincial Fisheries for two years. The two Community Conservation Coordinators are from the areas in which we are working to implement spawning aggregation management. They are the primary contacts and liaisons for TNC within the project communities and provide an on-going presence within the communities (rather than the fly-in-fly-out approach). They also facilitate community meetings, help deliver awareness materials and programs on spawning aggregations and destructive fishing, assist with monitoring of the sites, and assist in developing the management options with the communities.

- In the Solomon Islands, TNC has hired a recent University of the South Pacific graduate in marine science. While not funded under this project, some of his time will be allocated to LRFFT and spawning aggregation activities.

Activity 1.1: *Develop and facilitate the application of cost-effective identification, monitoring and assessment programs for aggregating reef fish resources.*

Results/Outputs Anticipated in FY04

- An extensively reviewed and tested spawning aggregation manual documenting monitoring and assessment protocols and training methods for TNC's Asia Pacific Region (prepared in collaboration with the TNC Marine Initiative and Indonesia Marine Program).
- An associated Field Guide for spawning aggregation site monitoring.
- A training video based on the manual and field guide.

- Assessments completed and monitoring programs initiated for at least two TNC-related sites in PNG (Manus and Tigak Islands).
- Assessments and monitoring programs facilitated for at least three partner sites in Palau, Gizo and Roviana (Solomon Islands), and [in part] Milne Bay (PNG).

Summary of Major Achievements

Developing consistent reef fish spawning aggregation monitoring and assessment protocols and methods has been a far more challenging undertaking than anticipated. The first version of the monitoring and training manual that was developed in collaboration with TNC's Indonesia Marine Program, was used for the first training workshops (PNG and Palau). Based on feedback from the workshop participants, and the practical realities of working in the Pacific, the manual was modified to suit Pacific circumstances. This resulted in the Indonesia Program having one manual and the Pacific a slightly different one. While focused on different species, the TNC Caribbean Program had a third spawning aggregation manual. Within TNC this caused difficulties, and so it was recently agreed that the Pacific and Indonesian programs would work with the TNC Marine Initiative to develop a single Asia-Pacific spawning aggregation manual. This manual is now in final draft form and should be available in November. In addition, it was agreed that a practical, and basic Field Guide to monitoring spawning aggregations would be prepared by the Pacific program, and would be compatible and linked to the more detailed manual. The target audience for the Field Guide are in-country practioners who need a "how-to" guide to undertake basic monitoring. This draft Field Guide was completed prior to the redrafting of the manual, but will require some minor adjustments to ensure full compatibility with the manual. This will also be available in November.

The training video produced after the Palau workshop, and further modified for the FSM and Solomon Islands, will be modified again in the next two months to better match the revised manual and field guide, and to incorporate some recently obtained footage of installing transects in Manus and Kavieng.

Monitoring has commenced at sites in Kavieng and Manus where communities have indicated their desire to better manage their spawning aggregations. Since May 2004 Tapas Potuku (Community Conservation Coordinator) has been leading underwater visual census (UVC) surveys at six sites around Kavieng that were identified as potential transient grouper spawning aggregation sites through a local knowledge survey in January 2004. The available UVC data collected to date has verified that many of the aggregation sites are indeed transient grouper spawning aggregation sites. These UVC surveys are also providing preliminary data on the status of these aggregations. A critical next step of the UVC monitoring program is to focus on collecting quantitative comparable monthly data from several of the sites over the next 12-24 months. Obtaining this data will allow us to determine the months of the year in which spawning aggregations of each species are forming, and the months in which the abundance of each species peaks. Defining peak spawning seasons is a vital prerequisite for developing future community based and regional management measures such as closed seasons. Identifying peak seasonality is also important for identifying the time frames in which future UVC monitoring on spawning aggregations in this region should be conducted.

In Kavieng, transient spawning aggregation Sites 1 and 10 (site names are not used to avoid identifying these sites to outside groups – see local knowledge reports under Activity 1.3) have been chosen by TNC as locations to focus further conservation efforts, as communities that claim ownership over the reefs on which they occur are interested in initiating conservation measures for these sites, and they also appear to have some capacity to enforce these measures. One permanent belt transect has been placed at the Site 10, and three permanent belt transects have been placed at Site 1. Temperature loggers that are programmed to record the water temperature hourly have also been placed at Sites 1 and 10.

In Manus, all of the Titan communities that own and exploit Sites 29, 33 and 35 asked TNC to assist them in building their capacity to adequately monitor the status of their aggregation sites. In May 2004, Manuai Matawai (Community Conservation Coordinator) and a team of local SCUBA divers

from Pere and Peli began a long term spawning aggregation monitoring program at Sites 29, 33 and 35. In July 2004, after consultations with the relevant communities, permanent transects were established at these sites. The 2004 UVC data verifies much of the local knowledge present on these spawning aggregation sites. Temperature data loggers have been placed at each of these three sites. The objectives of these surveys are to: collect baseline data on species abundance at each site, and pinpoint peak seasonality for each species in this region. Obtaining this data for each species will be essential for designing future site specific and regional spawning aggregation management plans in Manus.

At partner sites in the Solomon Islands, monitoring programs using the methods employed by this project have been established at Roviana Lagoon (Roviana and Vonavona Lagoons Resource Management Program), and are in the process of being established at Gizo (WWF Solomon Islands). Dr. Hamilton is providing technical advice to these initiatives. Representatives from these programs participated in the Solomon Islands Spawning Aggregation Monitoring workshop in March 2004.

The monitoring methods and materials developed through this project have been provided to the Milne Bay project, PNG, run by Conservation International (CI). In addition, Dr. Rhodes, who ran the training workshops, has recently been contracted by CI to assist them with undertaking surveys. While no monitoring programs have been established, the planning is in place for CI to do so and with the methods employed by this project.

Departures from the Work Plan

The development of the standardized spawning aggregation database for recording monitoring and assessment data has been delayed due to the departure of Dr. William Heyman from the TNC Belize Program. Dr. Heyman was coordinating that effort and we are now waiting for the Belize Program to finalize the database structure, so that the data fields and entry forms can be modified for the Indo-Pacific species.

The study to fully document and characterize Palau's grouper spawning aggregation sites has been extended for one more spawning season (until mid-August 2005), due to unfavorable weather conditions during this year's spawning season (at the times of the monthly aggregations). Out of the monthly aggregations that form between April and August, it was only possible to undertake full surveys during one month. While we have data from the 2003 season, and one month from 2004, one additional season's data will be required. A progress report on the study and monitoring to date has been requested and should be available in October, 2004.

The identification of grouper spawning aggregation sites and the establishment of monitoring programs at some of these sites in Kimbe Bay has not yet begun. The key person in the Kimbe Bay project that began the identification of spawning aggregations after the PNG training workshop, was absent on a GIS training course during the spawning season. Identification, verification and the establishment of monitoring is proposed for the latter part of 2004. The Kimbe Bay project is not funded through this grant.

Activity 1.2: *Develop and have adopted relevant policies and guidelines for application at the regional, national and sub-national levels.*

Results/Outputs Anticipated in FY04

- Development of generic policies and management options and guidelines for reef fish spawning aggregation sites underway.
- Continue to encourage the PNG National Fisheries Authority and the Solomon Islands Department of Fisheries and Marine Resources to review and improved their relevant fisheries policies to include spawning aggregation protection.

- Site-based collaborative programs on protecting spawning aggregations underway with Roviana and Vonavona Lagoons Resource Management Program (Solomon Islands), and WWF (Solomon Islands).
- Spawning aggregation site criteria and policies recognized as an integral component of the nationwide Protected Areas Network in Palau.

Summary of Major Achievements

Positive working relationships have been maintained with both the PNG National Fisheries Authority and the Solomon Islands Department of Fisheries and Marine Resources. While we are continually providing advice to these agencies, we have not yet been able to further the revision of the PNG LRFT management plan, or the adoption of the Solomon Islands LRFT management plan (see Departures from the Work Plan below). These positive relationships have, however, resulted in close cooperation on related activities. For example, TNC is working closely with the NFA contractors (Gillett, Preston and Assoc.) on the ADB funded coastal fisheries management and development project, especially in relation to the inclusion of spawning aggregation protection and management in overall fisheries management, and in the area of awareness raising.

The approaches to dealing with both NFA and the communities in relation to the LRFT and to spawning aggregation protection, has been recognized by others in PNG as being a good model to follow, resulting in CI and NFA requesting TNC's advice on the Milne Bay LRFFT issue. However, due to certain political issues, we have only provided advice to CI and NFA, but have not got directly involved.

The Palau Protected Areas Network Act was passed by the Palau National Congress and signed into law by the President in November 2003. The purpose of the Act is to establish a nationwide network of terrestrial and marine protected areas that will protect areas of biodiversity significance, important habitats, and other valuable resources that are essential to the future social, cultural, economic, and environmental stability and health of Palau. The Act provides a framework for Palau's national and state governments to collaborate on the dual objectives of protecting the country's terrestrial and marine biodiversity, and to assist with local management of natural resources through establishing an interconnected network of protected areas. It also provides the framework for implementing the relevant components of the *Programme of Work on Protected Areas* under the *Convention on Biological Diversity* to which Palau is a Party. The Ministry of Resources and Development is responsible for administering and managing the Protected Areas Network in consultation with state government officials.

The Nature Conservancy provided technical advice to the drafting group that prepared the Protected Areas Network Act, and has made a special commitment to support the establishment of the nationwide network of protected areas in Palau. An MOU was signed that establishes a cooperative arrangement between the Ministry of Resources and Development and The Nature Conservancy to enable full and timely implementation of the Protected Areas Network Act. Through this MOU, TNC is providing both financial and technical support to the government. While not funded by this grant, the cooperative arrangement allows TNC to ensure that spawning aggregation protection is fully incorporated into the design criteria for the network. The characterization and monitoring of Palau's spawning aggregations, partially funded by this grant, is providing some of the key data and information upon which the design criteria will be based.

The Director of the Secretariat of the Pacific Community's Marine Resources Division was involved with the review of the Pacific Live Reef Food Fish Trade Project in April 2004. During this review meeting we discussed possible areas for on-going collaboration between TNC and SPC, with a special emphasis on spawning aggregation protection and MPAs. Discussions were held at the SPC Heads of Fisheries meeting August 30 to September 3, 2004, with the Director and relevant program heads. It was agreed that an MOU between SPC and TNC would be entered into for an initial period of three years. This MOU will set out the areas of cooperation (e.g. MPAs, spawning aggregations, fund

raising, community-based fisheries management, awareness raising). We agreed to establish more specific annual work plans detailing joint or mutually beneficial activities. This MOU should be completed by the end of November, 2004.

Departures from the Work Plan

The PNG NFA was expected to undertake a review of their current National Live Reef Food Fish Trade Management Plan in June 2004. This review has not yet been undertaken. TNC has indicated to NFA that we are willing to assist them with the review and have a number of suggestions for their consideration for modifying the management plan.

The proposal by NFA to have one MOU with all the relevant NGOs in PNG, has not received a positive response from the other NGOs. In a meeting with NFA in July 2004, TNC reiterated its interest to develop and sign a new MOU with NFA focused around coastal fisheries management, with a special focus on protecting spawning aggregation sites and the use of MPAs and MPA networks. This MOU is currently being drafted and should be signed within the next two months.

TNC's offer to the Solomon Islands Department of Fisheries and Marine Resources to assist with the re-establishment of the Fisheries Advisory Council (required under the Fisheries Act to approve any management plans and to advise the Minister) has been accepted, but as yet not acted on by them. In July there was a change in Minister, and we are now working on developing a relationship with him.

The review paper of spawning aggregation management options, their scientific basis, and circumstances under which they can be applied, has been delayed. The contractor, Dr. Rhodes, has not been able to complete the review prior to the end of his contract. Discussions are underway to try to have the review completed as soon as possible.

Activity 1.3: *Develop and implement specific management strategies, locally and nationally.*

Results/Outputs Anticipated in FY04

- Reports completed that document community and traditional knowledge of selected sites in PNG (Manus and Kavieng) and the Solomon Islands (Roviana and Choiseul).
- Provide edited information on the spawning aggregation knowledge to the Society for the Conservation of Reef Fish Aggregations for inclusion in their database.
- At least three communities that are actively managing their spawning aggregations, including the establishment of locally managed marine areas that incorporate reef fish spawning sites.

Summary of Major Achievements

After delays last year, the documentation of local knowledge was completed for the south coast of Manus (PNG), the Tigak Islands (Kavieng, PNG), Roviana Lagoon (Solomon Islands) and Choiseul (Solomon Islands). Two versions of each report have been prepared: one is restricted to only the key project staff (Dr. Andrew Smith, Paul Lokani, Dr. Richard Hamilton, Willie Atu, Tapas Potuku, and Manuai Matawai), the other is for unrestricted use. The unrestricted version has the specific locations of the aggregations removed, as well as some of the information that interviewees provided in confidence. The Choiseul report is currently a restricted-only report, as the Choiseul Lauru Land Conference of Tribal Community (LLCTC; the major land-owner group and our primary partner) have asked that it not be distributed publicly at this stage. The unrestricted versions will be submitted to USAID in early October (they are currently undergoing one final review and given a standardized layout).

> Hamilton, Richard J., Manuai Matawai and Tapas Potuku (July 2004). Spawning Aggregations of Coral Reef Fish in New Ireland and Manus Provinces, Papua New Guinea: Local Knowledge Field Survey Report. (RESTRICTED ACCESS VERSION) Report

prepared for the Pacific Island Countries Coastal Marine Program, The Nature Conservancy. iv + 99 pp. TNC Pacific Island Countries Report No. 4/04 (Restricted)

Hamilton, Richard J., Manuai Matawai and Tapas Potuku (July 2004). Spawning Aggregations of Coral Reef Fish in New Ireland and Manus Provinces, Papua New Guinea: Local Knowledge Field Survey Report. (UNRESTRICTED ACCESS VERSION) Report prepared for the Pacific Island Countries Coastal Marine Program, The Nature Conservancy. [iv + 99 pp.] TNC Pacific Island Countries Report No. 4/04 (Unrestricted)

Hamilton, Richard J. and Warren Kama (August 2004) Spawning Aggregations of Coral Reef Fish in Roviana Lagoon, Western Province, Solomon Islands: Local Knowledge Field Survey Report. (RESTRICTED ACCESS VERSION) Report prepared for the Pacific Island Countries Coastal Marine Program, The Nature Conservancy. [54 pp.] TNC Pacific Island Countries Report No. 5/04 (Restricted)

Hamilton, Richard J. and Warren Kama (August 2004) Spawning Aggregations of Coral Reef Fish in Roviana Lagoon, Western Province, Solomon Islands: Local Knowledge Field Survey Report. (UNRESTRICTED ACCESS VERSION) Report prepared for the Pacific Island Countries Coastal Marine Program, The Nature Conservancy. [54 pp.] TNC Pacific Island Countries Report No. 5/04 (Unrestricted)

Hamilton, Richard J. and Francis Taniveke (September 2004) Indigenous Knowledge of Coral Reef Fish Spawning Aggregations in Choiseul Province, Solomon Islands. (RESTRICTED ACCESS VERSION) Report prepared for the Pacific Island Countries Coastal Marine Program, The Nature Conservancy. [31 pp.] TNC Pacific Island Countries Report No. 8/04 (Restricted)

The objectives of these surveys were to:

- Identifying the locations, seasonality, exploitation history and current status of spawning aggregations in these regions.
- Collect preliminary data on existing local management practices and Customary Marine Tenure (CMT) estates in these regions.
- Identifying the level of interest that communities have in managing their spawning aggregations, the capacity of communities to effectively manage spawning aggregations and their information and expertise needs.

The local knowledge surveys in Kavieng documented information on 27 single and multi-species aggregation sites, and information on one migration route for *Plectropomus leopardus* and *Ctenochaetus striatus*. The local knowledge surveys in Manus documented information on nine single and multi-species aggregation sites. Local knowledge on 16 single and multi-species aggregation sites were documented in Roviana Lagoon. In addition, a wealth of enthobiological information of the aggregating species were recorded, as were customary management practices.

Through these studies communities that were interested in monitoring and protecting their aggregations were identified and follow-up support provided through the CCCs. As a result of this work, one community at Dyual and one in the Tigak Islands a have agreed to allow monitoring of their sites with the aim of developing management strategies for these sites.

In Manus, considerable progress has been achieved as a result of the local knowledge documentation and the initial awareness raising work by Dr. Hamilton and Manuai Matawai. The following is an extract from their report (Hamilton, R. J., M. Matawai and T. Potuku, July 2004 – unrestricted version. pp 38-39) :

> "After our initial awareness talks in January 2004, Manuai Matawai held several follow up meetings with the communities of Pere, Locha and Peli and Tawi regarding managing their

multi species transient spawning aggregation sites. As a result of these consultations, these communities have all now decided to impose identical fishing restrictions on three large multi species spawning aggregation sites that occur within their customary fishing grounds (Sites 29, 33 & 35). These three sites are spawning aggregation sites of *P. areolatus* and *E. fuscoguttatus*, and the seasonality and location of these aggregations is common knowledge to Titan communities in this area. Large reductions in the catches of *P. areolatus* and *E. fuscoguttatus* at these three aggregation sites have been raising communities concerns for some time, with day and night time spear fishing identified by all communities as the major cause of these recent declines in catches, and the most likely threat to the future persistence of these aggregations.

Consequently, these communities decided to impose lunar bans of all types of day and night spear fishing at sites 29, 33 and 35. Spear fishing is currently banned at these aggregation sites in the 10 days leading up to and including the new moon. This is the lunar period when *P. areolatus* and *E. fuscoguttatus* are known to aggregate to spawn at these sites. This lunar ban is in force for every month of the year, in recognition of the fact that *P. areolatus* aggregates monthly at these sites. Hook and line fishing is currently allowed at these sites, however communities have decided that hook and line fishers may only catch enough fish to meet daily food requirements. Although these management measures have been put in place specifically for *P. areolatus* and *E. fuscoguttatus*, all of these sites appear to represent multi species spawning aggregation sites. Consequently, these lunar bans on spear fishing also provide some protection for species such as *E. polyphekadion*, *E. ongus*, *L. erythropterus* and *S. spilurus* that are known to aggregate here in the week prior to the new moon. These fishing restrictions were enforced at Site 33 in January, at Site 29 in March and at Site 35 in May 2004.

At all sites the bans on spear fishing and artisanal fishing have been implemented primarily to allow spawning aggregation stocks to recover. It is noteworthy that communities have made a point of not stating how long these site based fishing restrictions will be in place. Rather, the communities have stated that the suitability and effectiveness of these initial restrictions will be re assessed in several years time based upon the results of UVC monitoring programs that are being initiated at these sites. Communities have not ruled out lifting gear restrictions if the numbers of aggregating serranids increase dramatically in the future, and likewise, they have not ruled out taking further steps (i.e. complete site closures or seasonal closures) if future monitoring of these sites indicates that this is necessary.

The fact that all of the Titan communities in this region have now imposed identical management measures on the major known transient spawning aggregation sites within this area of Manus is a significant achievement for two reasons: Firstly, it provides all reef fish species that are aggregating to spawn at these sites during this lunar period protection from spear fishing and artisanal fishing. Secondly, since all of the major multi species aggregation sites have had restrictions placed on them, the possibility of spear fishing and artisanal fishing pressure simply shifting to major spawning aggregation sites that may have remained open to all forms of fishing has been eliminated. A shifting fishing pressure scenario could have easily arisen here, as all three aggregations are in close proximity to each other, and many Titan individuals have overlapping customary rights to more than one major aggregation site in this area.

Another development in this region is that The Pere Ward Development Committee is in the process of implementing a five year sustainable development plan for Pere. An Environmental Committee has recently been formed under The Pere Ward Development Committee, and one aspect that the Environmental Committee will be addressing is marine conservation issues. Manuai Matawai has been chosen as a key person to head the Environmental Committee, and he will be responsible for providing ongoing advice on the best management options for spawning aggregations in this area. Such advice will not be

limited to spawning aggregations of serranids. In a Pere Ward Development Committee meeting in late July 2004, local leaders discussed placing bans on monthly spawning migrations of mullet that occur in this area. These spawning migrations of mullet have been heavily over fished in this region in recent decades."

Since 2000, the Roviana and Vonavona Lagoons Resource Management Program has assisted local communities in the Roviana and Vonavona Lagoons in establishing a network of MPAs under customary sea tenure. To date 12 MPAs have been established, most of which have been set up as permanent "no-take" zones While most of the MPAs are inner lagoon areas, several deep water passage areas also protected. Only one MPA includes a possible spawning aggregation site for *P. areolatus*, *E. fuscoguttatus* and *E. polyphekadion*. Through the technical assistance from this project, a greater emphasis is to be placed on adding MPAs based on spawning aggregations. Discussions with various communities are underway to achieve this.

In August, 2004, TNC was invited to a workshop run by the Lauru Land Conference of Tribal Community (LLCTC) on Choiseul to consider the establishment of an environmental program within the LLCTC. As a result the LLCTC has decided to establish the program and TNC will participate in a key LLCTC meeting in mid-October. Dr. Hamilton will present the results of the local knowledge survey and provide a presentation on spawning aggregations to the participants. Following that meeting, Dr. Hamilton, other TNC Solomon Islands staff, and key people from the LLCTC will visit the community that has expressed a willingness to develop management options for their spawning aggregations.

Departures from the Work Plan

There were no departures form the work plan for this activity.

Activity 1.4: *Develop appropriate design and management criteria for marine protected areas (including LMMAs) for protecting both spawning aggregations and aggregating reef fish.*

Results/Outputs Anticipated in FY04

- Development of design criteria initiated for application in at least five marine protected areas in the Pacific.
- Further refinement of the TCRC resilience concepts in relation to spawning aggregation based MPAs.
- Discussions on possible collaborative programs initiated with SPC and SPREP to exchange spawning aggregation management options and experiences.

Summary of Major Achievements

The inclusion of reef fish spawning aggregations in the development of the design criteria for both MPAs and MPA networks, continues to be a focus of TNC's Transforming Coral Reef Conservation program. This project is providing both input to that program and receiving technical support from it. From the MPA network perspective, the protection of spawning aggregations forms one of the key components of "resilience" – the underlying concept for TCRC. The monitoring and research activities being undertaken through this project are providing vital information to build our understanding of spawning aggregations. In addition, the initial community-based work on managing spawning aggregations in remote areas such as in Manus, is beginning to show us that communities are looking at protecting spawning aggregations with the understanding that they will eventually provide either subsistence or some other form of income. We therefore need to factor this reality into the development of the TCRC design principles For example, not all MPAs based on spawning aggregations are likely to be permanently closed for the long term, or for all uses. During the remainder of this project a focus will be placed on determining the management regime options that can best suit the dual objectives of protecting spawning aggregations, but also satisfy fundamental

community subsistence needs. The management of commercial fishing activities is another case altogether.

Both Palau and Kimbe Bay are sites where the TCRC principles are being applied and tested through the establishment of MPA networks. These networks are factoring in the protection of spawning aggregation sites.

During the last year contact was made with the SPREP Coastal Management Advisor on possible collaborative programs and the exchange of information and experiences. However, that person has recently resigned and shifted to SPC. On the positive side, we can now further the partnership with SPC, but will need to re-initiate contact with SPREP once the new Coastal Management Advisor is hired (expected to start in October/November, 2004).

Departures from the Work Plan

This activity has not been moved ahead as far as proposed in the FY04 work plan. In part this has been due to the delays in getting the community-based work (local knowledge documentation, management activities) underway. Now that those activities are well underway, more action can be expected on this activity.

Objective 2: *Strengthen the capacity of regional and government agencies, national and international NGOs, and others to identify, assess, monitor, and manage aggregating reef fish resources at all relevant jurisdictions.*

Activity 2.1: *Increase the skills of our partners in aggregating reef fish monitoring and assessment.*

Results/Outputs Anticipated in FY04

- A cadre of people in both government and NGOs that have the same set of monitoring and assessment skills, enabling them to assist with each other's monitoring programs.
- Trained recipients of the international exchanges with the knowledge of how these methods are being applied throughout the region, and how other areas are undertaking monitoring and addressing management issues at the sites being monitored.
- Trained recipients better able to identify and understand the variation possible with different aggregations (species mix, size, locations, etc.).
- The monitoring and assessment methods spread beyond the limited number of sites that this project is able to work with in detail.
- Training workshops completed in the Federated States of Micronesia and the Solomon Islands. Workshop reports detailing the training.

Summary of Major Achievements

The training workshops in the Federated States of Micronesia and the Solomon Islands were completed in February and March. The FSM training included government and NGO representatives from all four of the FSM states. Three of these states have aggregation monitoring programs underway (CSP in Pohnpei), or about to start (Yap International Waters Project, and Kosrae). The Solomon Islands training was held in collaboration with WWF at their Gizo site, and involved participants from government agencies, NGOs and private dive operations. The training was used immediately at the WWF Gizo sites and in the Roviana and Vonavona Lagoons Marine Resource Management Project. Workshop reports were prepared:

> Rhodes, Kevin L. (April 2004). FSM Spawning Aggregation Monitoring Training Workshop Report, Black Coral Island, Pohnpei, Federated States of Micronesia, 31 January-6 February,

2004. Report prepared for The Nature Conservancy, Pacific Island Countries Coastal Marine Program. 19 pp. TNC Pacific Island Countries Report No. 1/04

Rhodes, Kevin L. (May 2004). Solomon Islands Spawning Aggregation Monitoring training Workshop Report, Gizo, Western Province, Solomon Islands, 13-21 March 2004. Report prepared for The Nature Conservancy, Pacific Island Countries Coastal Marine Program. 16 pp. TNC Pacific Island Countries Report No. 2/04

With the completion of the Solomon Islands workshop we have now completed all the workshops planned and budgeted under this project. We do, however, expect a need for additional workshops, but will either encourage partners to fund these workshops or identify additional funding sources. We are planning on holding at least one advanced training workshop in PNG in early 2005, funding permitting.

Departures from the Work Plan

Both the internal and international monitoring staff exchanges did not eventuate as planned. The international exchange was to has been between the Belize and Kimbe Bay projects, however, with the departure of Dr. Heyman from the Belize program, they were not able to make the trip. In addition, the key Kimbe staff person was sent on a GIS training course at the same time as the planned exchange.

Apart from internal exchanges of people during the monitoring workshops, there have not been any dedicated exchanges this year. One of the challenges we have identified with internal and even international exchanges, is that most programs have very limited staff numbers and most of the spawning aggregations form at the same times of year and moon phase, making it difficult for people to leave their own projects to visit another, which will result in a missed month's data set.

Activity 2.2: *Develop regional and national "teams" composed of fisheries agency staff, locally-based NGOs, and universities to maximize the resources available to identify, assess, and monitor reef fish spawning aggregations*

Results/Outputs Anticipated in FY04

- Reef fish spawning aggregation site assessment and monitoring "teams" established in PNG, Solomon Islands and Palau, and undertaking monitoring.
- SPC and SPREP made aware of the best spawning aggregation monitoring workshop graduates.

Summary of Major Achievements

Trainees from the PNG monitoring workshop have been assisting with the monitoring in Kavieng. Trainees from the Solomon Islands monitoring workshop have been assisting each other with the Roviana and Gizo monitoring programs (geographically they are relatively close and can easily get to each site). One of the Solomon Islands trainees from the Roviana partner project participated in the recent Rapid Ecological Assessment in the Solomon islands.

Dr. Rhodes, who developed and ran the training workshops under contract, has recently been in Milne Bay assisting the CI staff with establishing spawning aggregation assessment and monitoring programs. While this was funded directly by CI, not this project, the methods developed during this project are the ones being transferred to that program.

The former SPREP Coastal Management Advisor (who has now moved to SPC) was informed of the training program and the trainees. With her move to SPC, she will now be involved with the development of a new MOU between TNC and SPC (discussed at the August/September SPC Heads of Fisheries meeting). Continued building of both in-country and regional 'teams' will be one part of that MOU.

Departures from the Work Plan

While this activity is on-track, progress has been slower than expected. More emphasis will be placed on this activity for the up coming spawning aggregation season.

Objective 3: *To raise the awareness and appreciation among stakeholders of the limited productivity and vulnerability of aggregating reef fish populations and associated ecosystems, the nature and significance of spawning aggregations, and options for improving management.*

Activity 3.1: *Compile and develop appropriate awareness materials and hold community-level workshops and meetings on the importance, vulnerability and options for the sustainable management of their reef fish spawning aggregation sites.*

Results/Outputs Anticipated in FY04

- Report on the effectiveness review of the destructive fishing/LRFFT in-country awareness materials commissioned.
- Awareness packages developed and distributed.
- At least three community-level awareness meetings/workshops completed.

Summary of Major Achievements

As proposed in the FY04 work plan, a review of the effectiveness of the awareness materials and their use was needed. Initially, the Social and Environmental Studies Division of PNG's National Research Institute was to be contracted to undertake this study. We develop appropriate terms of Reference with them, but at the last minute they advised us that they were over-committed (they took on a major review for a key donor agency). We then identified a former NRI researcher with the right skills working as a private contractor. He is in the process of being contracted and will undertake the baseline survey in Manus, Kavieng, Kimbe, and Pt. Moresby in September-October, 2004.

Once that survey is complete, we will be able to launch the awareness materials to our partner organizations. This is currently planned for mid-October, 2004.

The awareness materials will be launched in the Solomon Islands at the Lauru Land Conference of Tribal Community (LLCTC) meeting on Choiseul in mid-October, and will first be used in the target community immediately after the meeting. Materials will also be distributed to all key partners in the Solomon Islands.

Progress on identifying the needs and developing specific awareness materials related to spawning aggregations has continued on-track. Both during the local knowledge studies, and during more recent field trips, the information needs of the communities and the Community Conservation Coordinators, have been noted. Of highest priority for the CCC's are briefing sheets on the life histories of the species of concern, management options for both spawning aggregations and for fisheries management (for those species), and examples of experiences from other areas in the Pacific (both positive and negative) concerning fishing of spawning aggregations. We are currently putting together materials to address these needs. The design/format of the community based materials will be guided by the results of the effectiveness study.

We are partnering with the NFA Coastal fisheries management and development project based out of Kavieng. This ADB funded project is being implemented by Gillett, Preston and Associates. We are linking in with this program to ensure that our work on spawning aggregation protection is incorporated into the training and management components. We have agreed to collaborate on some videos (one on destructive fishing and one on over fishing) to maximize our message and audience.

Departures from the Work Plan

The last minute change in contractors to undertake the effectiveness review delayed the review by three months. Also, a printing error (two missing pages) was identified in on of the awareness materials and had to be reprinted. These two issues delayed the original launch of the materials from April/May until mid-October (we also needed to find a suitable time when the TNC Melanesia Program Director would be available to launch the materials).

Activity 3.2: *Develop a set of "fisheries sustainability tools" for aggregating reef fish.*

Results/Outputs Anticipated in FY04

- Collation of all project reports.
- Extraction and summary of lessons learned in FY03 and FY04.
- Live Reef Food Fish Project Review

Summary of Major Achievements

The Nature Conservancy has established a Conservation Measures Group to, in part, undertake conservation audits of programs and projects to gauge their effectiveness and better understand and learn from past activities. With the transition from the LRFFT project to the spawning aggregation project there was an opportunity to review the LRFFT project and apply any lessons learnt to the on-going spawning aggregation project. To that end a review was undertaken in April 2004 and involved TNC and partner members. The report has been completed and is currently undergoing internal approval. A summary of that review is attached, and a copy of the final review will be submitted as soon as it has completed its internal approvals.

> TNC (July 2004) Pacific Live Reef Food Fish Trade (LRFFT) Project. Project Review. TNC Pacific Island Countries Report No. 3/04. 67 pp.

The compilation of all reports, guidelines, methodologies and lessons learnt form the project activities is on-going. During the coming year this will be a major focus of the project.

TABLE OF ACTIVITY STATUS

Activity Number	Activity Title	Status	Page number
Protecting and Managing Reef Fish Spawning Aggregations in the Pacific			
Objective 1	**To develop and facilitate the application of cost-effective management controls on the exploitation of aggregating reef fish resources in the Pacific region**		
1.1	Develop and facilitate the application of cost-effective identification, monitoring and assessment programs for aggregating reef fish resources.	Mixed performance	
1.2	Develop and have adopted relevant policies and guidelines for application at the regional, national and sub-national levels.	Mixed performance	
1.3	Develop and implement specific management strategies, locally and nationally.	On-track	
1.4	Develop appropriate design and management criteria for marine protected areas (including LMMAs) for protecting both spawning aggregations and aggregating reef fish.	On-track	
Objective 2	**Strengthen the capacity of regional and government agencies, national and international NGOs, and others to identify, assess, monitor, and manage aggregating reef fish resources at all relevant jurisdictions.**		
2.1	Increase the skills of our partners in aggregating reef fish monitoring and assessment.	Mixed performance	
2.2	Develop regional and national "teams" composed of fisheries agency staff, locally-based NGOs, and universities to maximize the resources available to identify, assess, and monitor reef fish spawning aggregations	On-track	
Objective 3	**To raise the awareness and appreciation among stakeholders of the limited productivity and vulnerability of aggregating reef fish populations and associated ecosystems, the nature and significance of spawning aggregations, and options for improving management.**		
3.1	Compile and develop appropriate awareness materials and hold community-level workshops and meetings on the importance, vulnerability and options for the sustainable management of their reef fish spawning aggregation sites.	On-track	
3.2	Develop a set of "fisheries sustainability tools" for aggregating reef fish.	On-track	

REVIEW SUMMARY – PACIFIC LIVE REEF FOOD FISH TRADE PROJECT

Title	**Review of the Pacific Live Reef Food Fish Trade Project**
TNC Operating Unit/Geographic Area(s)	Pacific Island Countries Operating Unit: Palau, Papua New Guinea, Federated States of Micronesia, Solomon Islands with reference to other Pacific Countries and Indonesia.
Thematic Focus	Abatement of destructive fishing threats from the live reef food fish trade at a regional, national and site scales.
Chronology - **Initial Request**	Initially proposed during Asia Pacific & California Division meeting in February 2003.
- **Review Period**	April 14-20, 2004
- **Draft Submitted**	April 21, 2004
- **Report Complete**	July 2004
Principal Client(s)	**Internal:** ♦ Pacific Island Countries Operating Unit program managers and senior management ♦ Marine Initiative managers ♦ Asia-Pacific Region Director ♦ Other Conservancy OU marine programs and multi-site project managers **External:** ♦ The Secretariat of the Pacific Community ♦ The David and Lucile Packard Foundation ♦ The Oak Foundation ♦ USAID + East Asia and Pacific Environmental Initiative ♦ Other conservation NGOs through a lessons learned publication
Team & Affiliations	***Leader***: ♦ **Randy Hagenstein** – Conservation Director, TNC Alaska Chapter, Anchorage, AK, USA (rhagenstein@tnc.org) ***Members:*** ♦ **Tim Adams** – Director, Marine Resources Division, Secretariat of the Pacific Community, Noumea, New Caledonia (tima@spc.int) ♦ **Ian Dutton** – Director, TNC Conservation Measures Group, Bethesda, MD, USA (idutton@tnc.org) ♦ **Paul Lokani** – Director, TNC Melanesia Program, Pt. Moresby, Papua New Guinea (lok.tnc@global.net.pg) ♦ **Andrew Smith** – Director, TNC Pacific Island Countries Coastal Marine Program (and Pacific LRFFT project manager), Koror, Republic of Palau (andrew_smith@tnc.org)
Principal Method(s)	Review of project documents, in-depth interviews of core team members in Palau, internal and external partner interviews by phone and in person.

Major Findings/Lessons	**5.1 Overall Findings** ♦ The multi-scale strategy has been effective in reducing the threat to marine biodiversity posed by the LRFFT by creating the awareness and the regional and national capacity and alliances to address LRFFT operations.[1] ♦ By clearly and correctly defining the scale of the LRFFT issue, the Conservancy and partners were able to craft a strategic response and implement conservation actions at the scale of the problem. ♦ While we can't document and quantify direct impacts on marine biodiversity as a result of the LRFFT project, the collaborative strategy has reduced the pressure on key fish stocks, assisted in improving inshore fisheries management, and reduced related destructive practices in countries where TNC is active (and indirectly in countries where our partners work). ♦ The LRFFT project and associated strategies have positioned TNC as a credible and effective agent in marine conservation in the Pacific by developing enduring partnerships with national and regional agencies. We are much better placed to address regional-scale threats to marine biodiversity today than we were eight years ago. **5.2 Key Lessons** ♦ The MOU between TNC, SPC, IMA, and WRI played a critical role in formalizing relationships, clearly defining roles, and facilitating joint grants and cross-funding. ♦ TNC had the right key staff in place for the project that had the right experience and relationships in both national and regional management venues. Continuity of key staff (both within TNC and our partners) was also critical to the long-term success of the project. ♦ The LRFFT project would have benefited by additional capacity (at least one full time equivalent) to bring single-minded focus to this complex program. ♦ Clearly defined goals and milestones, with clear evaluation points, should have been included in the original strategic framework for the Conservancy's LRFFT project and the MOU. ♦ Annual "status of the LRFFT" meeting and report as a component of the MOU would have improved the ability of the project to adapt to changes in the LRFFT industry and performance by various parties under the MOU **5.3 Recommendations** Project staff should develop a near-term follow-up plan as a result of the review to: ♦ Create a roadmap that articulates the bigger picture of how the LRFFT project has evolved -and continues to evolve- into

[1] While the threat posed by the LRFFT was reduced, it hasn't been eliminated. Changing economic conditions in China could allow this trade to rapidly reemerge as a regional threat to marine biodiversity. The LRFFT project has established a solid foundation and national/regional capacity to address a future surge in LRFFT activity.

	efforts to conserve spawning aggregations (including linkages to MPA networks) and how leverage at the national and regional levels will occur through selected site level investments. ♦ Establish a new MOU with SPC (and potentially other partners) to guide collaboration around spawning aggregations, finalize and publish the generic management guidelines, where appropriate assist SPC's expanded involvement with other related fisheries management issues (e.g., spear-fishery of aggregations; other fishery impacts on LRFFT species), and create a contingency plan and triggering mechanisms in the event of expansion of LRFFT or related fisheries. ♦ Recommend to the Asia-Pacific Region management a review of the overall Asia-Pacific Integrated LRFFT strategy. ♦ Disseminate the findings of the review both internally (e.g., through an article in TNC@News; through the Conservation Measures Group and the Global Marine Initiative) and externally (e.g., as a case study article for an appropriate environmental journal; SPC LRF Bulletin). **5.4 Observations on the Review Process** ♦ The review, including drafting the report occurred over seven working days. This was sufficient. Not all reviewers needed to be present during the drafting phase. ♦ The review period and location did not allow interviews of key players prior to drafting the bulk of the review report. Interviews in the middle of the review likely would have identified issues to address in the review, rather than after. ♦ The mix of internal and external reviewers was appropriate and effective – it enabled a lot of information to be processed in a very efficient manner and ensured that facts could be checked concurrently with the review process. ♦ Participation by key project staff familiar with all phases of the project was essential to provide perspective, present an overview of the project, and answer questions. This was much more efficient than digging through the universe of project documentation would have been. Having the project manager sort through documentation prior to the review to highlight the most important material was also a huge time-saver. ♦ Preparation time to organize and prepare background documents, etc. was underestimated. This work has to be done by someone intimate with the project. (Contracting a person to compile a chronology and list of documents was attempted, but failed due to their unfamiliarity of the project and TNC.) ♦ The review team was elated that most of the writing was completed prior to getting on airplanes and getting sucked back into the vortex of normal work obligations!