

**Concept Paper for USAID Solicitation
APS Number M/OAA/GRO/EGAS – 11-002011**

Project Title: Conserving and restoring mangrove forests in coastal areas of Sinaloa State, Mexico, to mitigate the effects of climate change and preserve ecosystem services and fisheries-based economies.

Funding Source: United States Agency for International Development, Global Development Alliance Program in Mexico (Forestry Sector)

Mission Receiving Application: USAID/Mexico

USAID/Mexico Program Officer: Kim Delaney

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Applicant: Sustainable Fisheries Foundation (<http://sustainablefisheriesfoundation.org/>); 601A Rainier St., Snohomish, WA, 98290, USA. SFF is a 501(c)3 non-profit organization (EIN: 91-1689421), registered in the State of Washington, United States of America.

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Other Participating Organizations:

Universidad Nacional Autónoma de México, Institute of Marine Sciences and Limnology

Mangrove Action Project (mangroveactionproject.org/)

Ecologists Without Borders (<http://ecowb.org/>)

Plan Vivo Foundation (<http://www.planvivo.org/>)

Local Mexican fisheries *cooperativistas*¹, *ejido*², and *comunidades*² organizations.

INTRODUCTION

Mangrove forests in Mexico provide a wide range of ecosystem services and products. These extensive coastal wetland systems are important nurseries and breeding grounds for many common and rare species of birds, mammals, fish, and invertebrates. They also play a key role in combating the effects of rising sea levels, coastal erosion and flooding from storm surges, tsunamis and hurricanes. As an important source of renewable resources – notably fisheries, wood products, and ecotourism – mangroves are important contributors to the economic viability of coastal communities.

Mangrove forests are disappearing at an alarming rate in the Gulf of California due to destructive practices such as clearing of land for agriculture, aquaculture, tourism development and infrastructure. For example, mangroves are being razed to make way for brackish water shrimp aquaculture in response to rising demand and prices for farm-reared shrimp. Less than half of the original mangrove forests remain, and the current rate of loss (about 1–2% per year) is a major cause of concern.

¹ Fishing cooperatives

² Farming or community organizations whose members may own coastal lands individually or collectively.

Coastal lands in Mexico are typically owned by the national government, which frequently leases parcels to developers and grants them permission to modify it for their purposes. Local resource users such as artisanal fishermen and wood craftsmen are adversely affected when government-permitted tenure and development result in the loss and degradation of mangrove systems.

Changes in sea level, rainfall and storm events associated with climate change are expected to negatively impact mangrove forests in the future. Human responses to climate change, such as the construction of coastal protection structures, are likely to exacerbate these effects. Of the physical changes predicted to occur as a result of climate change, sea-level rise is considered the greatest threat to the ecological integrity of mangroves and associated biological resources (Gilman et al. 2008).

Mangrove destruction has released large quantities of stored carbon into the atmosphere, contributing to global warming and other climate change trends. Restoration of mangrove forests through conservation and proper management techniques would help reverse these trends. People who rely on mangroves for their sustenance and livelihood would directly benefit from efforts to conserve and restore these systems.

This project will promote ecological benefits and economic well-being by engaging local fishers in CO₂ sequestration and emission reduction activities. With financial support from the USAID GDA Program, several private entities, and local community organizations, we propose to conduct the research necessary to inform engagement of small-scale fishers, *ejido* farmers, and others in a program that restores local mangrove forests, fosters policies and practices that result in sustainable use of mangrove-based fisheries, wood, and ecosystem services. The project will also improve the knowledge, capacity, and long-term economic well-being of local resource users through education and training, and the implementation of a Payments-for-Ecosystem-Services (PES) program that incentivizes and compensates them for restoring mangrove forests.

PROJECT OBJECTIVES

The project will tie into an ongoing ecological study by Universidad Nacional Autónoma de México (UNAM) researchers on the influence of mangrove systems on local fish populations and small scale fisheries. With additional funding from USAID and others, the project will be expanded to achieve the following objectives:

1. Measure the health of local mangrove forests in terms of their spatial extent, productivity, biodiversity, and resilience, and describe the effects that climate change and continued development are likely to have on these systems;
2. Investigate the role that mangroves play in the ecology of economically important fishes and invertebrates in the southern Gulf of California;
3. Characterize the products and services that mangroves currently provide, including fisheries, wood and non-wood products, protection against flooding and other potential effects of climate change, and carbon sequestration;
4. Identify management strategies for restoring and conserving mangrove systems, and promoting sustainable use of mangrove resources among fishers and others who are dependent on these systems;
5. Train, educate, and empower local fishers *ejido* farmers, *comunidades*, and other resource users to conserve existing mangrove forests, restore degraded habitats, and plant more mangroves; and
6. Incentivize local fishers, *ejido* farmers, and other resource users by compensating them for reducing CO₂ emissions through restoring mangrove forests.

Addressing the objectives of this project will achieve USAID GDA Objective #1 by mitigating climate change through the restoration of mangrove forests. The project will also help satisfy Objectives #2 and #3 by increasing the viability of local fisheries and wood/non-wood product industries which employ at-risk youth and other disadvantaged individuals, thereby improving the economic viability of coastal communities.

PROJECT APPROACH

UNAM researchers Drs. Felipe Amezcua and Francisco Flores are currently investigating the role and importance of mangrove forest systems in the ecology of fishes and invertebrates in the southern Gulf of California (Objective 2). USAID funding would enable them to extend their studies to measure important ecological attributes of local mangrove forests (e.g., biomass, productivity, and biodiversity), and monitor the effects of climate change, other potential causes of degradation, and future mangrove restoration (Objectives 1, 3, and 4). University researchers and project partners will work directly with local *cooperativistas* (“cooperative fishers”), *pescadores libres* (“free fishers”), and federal and local landowners in the study area to develop and implement the PES program based on proven “Plan Vivo” certification protocols (Objectives 5 and 6). The PES program will strengthen the capacity of local fishers and other resource users to protect and improve the mangrove systems upon which their livelihoods depend, and will also provide regional and global ecosystem services. The partners in this project will ultimately work together to restore mangrove forests through extensive planting programs.

We propose to implement the PES program using Plan Vivo protocols which offers a ready-made, widely accepted framework for planning, managing and monitoring mangrove restoration activities and the resultant CO₂ reduction benefits. The Plan Vivo system will enable us to compensate ‘producers’ (i.e., small-scale fishers, local farmers, landowners) for preventing further destruction of mangroves and for actively restoring deforested areas. The system incorporates government-sanctioned standards and guidelines, administrative processes, and tools and technical models that can be readily adapted to our purposes. Outside of start-up and operational costs, which are nominal, Plan Vivo projects are self-funded in that the amount of carbon sequestered through local restoration efforts can be independently verified and certified as Plan Vivo Certificates (credits). The Certificates will be sold to ‘buyers’, who may buy Plan Vivo Certificates for voluntary carbon offsetting, corporate social responsibility, or simply to support PES in an area. The income is then used to pay local fishers and others who participate in the restoration program. Our plan is to use the proceeds from the sale of Plan Vivo Certificates to not only remunerate Plan Vivo producers directly, but also to replace destructive fishing gear and aged outboard motors, which would provide immediate ecological and economic benefits to local fishermen. Newer, more efficient fisheries gear that is both habitat appropriate and species selective will increase harvest rates and at the same time reduce incidental bycatch and habitat destruction. Ubiquitous among Mexico’s artisanal fishers, the two-stroke engines will be replaced by more efficient four-stroke engines.

The proposed approach is consistent with the United Nations and Mexico’s REDD³ strategy, as articulated in CIFOR’s (2010) report on Forests, Land Use, and Climate Change Assessment for USAID/Mexico. The CIFOR report emphasizes addressing the causes of deforestation and degradation at the local level by providing incentives, conducting outreach, and building forestry- and fisheries-related management capacity among community and user groups.

³ Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

ANTICIPATED RESULTS

The proposed project will produce the following results:

- Research papers and technical reports that document the extent, productivity, biodiversity, and resilience, of coastal mangroves along the central Pacific Coast of Mexico, their role in ameliorating the effects of climate change, and their importance to local fisheries and forest economies.
- Undergraduate and graduate student training and mentoring.
- Science-based, economically feasible strategies for restoring/conserving mangrove systems, and promoting sustainable use of mangrove resources among fishers and others who depend on them.
- Training and capacitation of local fishermen, ejido farmers, and their families to participate in the management, conservation, and restoration of mangrove forests.
- Increased land area, carbon sequestration, and other related beneficial services of coastal mangroves through revegetation and conservation programs.
- Additional income for fishermen and other local producers through the carbon-credit PES system.

PROJECT PARTNERS AND RESPONSIBILITIES

Dr. Felipe Amezcua from the Universidad Nacional Autónoma de México will oversee the study of the effects of mangroves on fishes and invertebrates in coastal waters. His colleague, Dr. Francisco Flores, will lead research on the status, trend, and ecological benefits of local mangrove forests as they are affected by climate change and other sources of degradation. Dr. Eric Knudsen, affiliated with SFF and EcoWB, will serve as project technical coordinator and supervise the efforts of volunteer mangrove and fisheries scientists on the project. In-kind services would be provided by four not-for-profit organizations: (1) Sustainable Fisheries Foundation. SFF will be the fiscal administrator and responsible for the overall management of the project. Silvia Riviera, SFF's International Program Director, will serve as community outreach coordinator and oversee the Plan Vivo certification and disbursement process; (2) Ecologists Without Borders will supply volunteer experts to plan and coordinate on-the-ground mangrove restoration activities; and volunteers to work with local people in the actual restoration planting; (3) Mangrove Action Project will assist with technical review, volunteer coordination, and workshop facilitation; and (4) The Plan Vivo Foundation will provide guidance and assistance in setting up the project's Payments-for-Ecosystem-Services program.

PROJECT TIMETABLE

Project Tasks	Year 1	Year 2	Year 3	Year 4	Year 5
1. Measure mangrove attributes and climate change effects	XXXXXXXX	Research XXXXXXXXXX	XXX Monitor XXX	XXX Monitor XXX	XXX Monitor XXX
2. Investigate mangrove/fish populations/fisheries	XXXXXXXX Research XXXXXXXXXX				
3. Quantify mangrove products and ecosystem services	XXXXXX Research XXXXXX				
4. Develop fisheries and mangrove management plans	XXX Develop Plans XXX				
5. Train local fishers and other users in restoration methods	XXXXX	Train/Educate XXXX	XX Implement XX	XX Implement XX	XX Implement XX
6. Implement PES (Plan Vivo) CO2 reduction program	XXXXXXXX	Develop XXXXXXXX	XX Implement XX	XX Implement XX	XX Implement XX

BRIEF BIOGRAPHIES OF KEY PROJECT PERSONNEL (resumes are available upon request):

Mr. Cleve Steward is the co-founder and long-time Executive Director of the Sustainable Fisheries Foundation, and has guided the organization through 17 years of noteworthy achievements. He has over 30 years of experience and education in fisheries and aquatic ecology and management, with extended periods of employment in government and non-government sectors.

Dr. Felipe Amezcua is a Research Professor for the Institute of Marine Sciences and Limnology (UNAM). He was President of the International Fisheries Section of the American Fisheries Society, and President of the Mexican Fisheries Society in 2010-2011. He has over 50 publications, and has tutored over 20 graduate students. In 2010 he was nominated young scientist of the year by the Mexican Academy of Sciences.

Dr. Francisco Flores is a Research Professor for the Institute of Marine Sciences and Limnology (UNAM), where he has led research into mangrove forest structure, productivity, and restoration in Mexico for over 20 years. He serves as technical adviser to both governmental and not governmental organizations, and has published several studies of anthropogenic impacts on mangrove ecosystems.

Dr. Eric Knudsen recently retired from the U.S. Fish and Wildlife Service. His background in marine, estuarine, and freshwater fisheries science ranges from research on estuarine-dependent Gulf of Mexico fisheries to the management and recovery of threatened Pacific salmonids in Alaska and the Pacific Northwest. Dr. Knudsen currently chairs the Board of Directors at the Prince William Sound Science Center, is the Technical Research Program Director for SFF, and is a co-founder of Ecologists Without Borders.

Ms. Silvia Rivera received her Masters degree in Business Administration from the Universidad de Costa Rica. Prior to becoming SFF's International Program Director, Silvia ran an international consultancy that assisted small enterprises, cooperatives, associations in the Americas, Europe and Africa. She is a director of the Costa Rican Network of Small Business Promoters Institutions, Centre for Applied Studies in International Negotiations (Switzerland) and Costa Rican Civil Aviation Technical Council.